to home

The Recombination Principle: The decision and perception (recognition) process as cause and consequence of multiple recombinations, happening from moment to moment

--- draft, not ready ---

Preface:
The considerations in my homepage are written in the order of the ideas. Step by step I noticed relationships which lead to a systematic change of structure. The texts are partially updated. Concerning focus there was a shift - at first **exact** considerations to the exact term "information" are necessary, not only in physics but even in information science. "Information" is essential for existence. However, search on the web with the keyword "information" shows many vague definitions which hide the exact approach. Thus, let me (again) introduce the old principle

"Information is selection"

This short sentence is so far reaching that at first it is underestimated (I also needed time)
- It implies a "common set of possibilities" resp. "domain"
- The domain must be the same for sender and all receivers of information
  (language vocabulary is only one example of a domain)
- It is valid up to the elementary physical level (no exception, but
  there is need for research for connection of models)
- We could utilize this principle much better than up to now, language independently, systematically in the digital world:
https://www.mdpi.com/1660-4601/17/8/2975/htm

One important conclusion was, that "common sets of possibilities" (domains) can be defined (multilingually) online, efficiently addressable, for any application. Then digital information (number sequences) could select globally uniformly from these online defined sets. It should be clear, how (if wished, multidimensional) sets can be defined and how to define numbers which efficiently select from such sets. Information experts should know, how efficiently such sets can be defined (and how large the cardinality of such sets can be) that this would be far reaching. But up to now (2020) this (basic) approach is not used.

Of course it has real consequences, if an important technical possibility is not used, in this case e.g. for medicine, science and general professional communication. I can only recommend to use it as early as possible.

In physics things are even more complicated, because in physics a complete approach is not available. Some things, however, have become clear: Geometrical approaches provide no basal explanation. A complete (!) information theoretical (subsequently statistical) derivation of spacetime geometry is reasonable, which uses only a minimum of definitions. A first step is done in http://www.orthuber.com/wgeoapp1.pdf e.g. towards description of the multiple mapping of the same (state or constitution) which leads to spatially separated multiple appearance of identical fermions per proper time and so to space time geometry. Of course in physics the domains of information (sets of possible experimental results) can become very large (in case of long measurement), but for comparability all these must result from repeated (meanwhile extremely frequent, but not a priori infinite) access to a common minimal set. The mentioned paper contains some considerations about it.

Let me know if you have any suggestions, questions or comments.

The following text was written mainly before 2015:

That we currently appear spatially distributed as so many individuals (per proper time) is among others consequence of space-time geometry which is (statistical appearance as) consequence of (currently distinguishable parts of space resp.) rest mass, i.e. asymmetrical appearance of matter and antimatter. So spacetime geometry is only (temporary) consequence of initial (and subsequent) symmetry breaking(s) or decision(s). There is a hierarchy of conservation laws which indicates that they descend from a primary conservation law which guarantees that a permanent asymmetry is not possible (and former or later all has to return to the global symmetry center (TimeDependentAxiomOfChoice)).
This formulation is very short, subsequently details follow.

We try to find an approach to existence with minimal preconditions[1]. The approach described here is based on the precondition:

"There is an origin which decides[2] and which then perceives the consequences more and more completely."
or measurably formulated:
"There is an[3] origin which causes temporary asymmetries (symmetry breakings[4]) of an observable conserved[5] quantity, and which, after delay[6], perceives (measures) the consequences in the course of time more and more completely[7]."

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[1] One could try to to explain shortly what we perceive in the following way:
"There is spacetime and matter, created by chance (1) [coincidence], there also exists life by chance (2), which somehow (3) interacts with matter."
(1)(2)(3) are not explained preconditions. A conclusive approach to existence, however, should base on as few as possible preconditions.
Alone (1) is not trivial and not elementary, it is completely improbable.

[2] Former decisions can define basic conditions for later ("smaller") decisions (hierarchical) .
A decision generates **new** information (about a part of the future which depends on the total branching depth of the decision). Information means selection from a set of possibilites or "Domain".

[3] Long term consideration: The identical behavior of the same kind of elementary particles (e.g. protons, electrons) shows that the same kind of elementary particles represents the same (decision sequence or) constellation (ElementaryCoordinates) relatively to (starting from) **one** origin (GlobalSymmetryCenter). So even if we perceive effects of decisions at first (within short term perception) seemingly starting from multiple parts of material surface, at last (within long term (additively unified) perception) the decisions start from one origin. Strictly speaking the completely identical features of the same kind of particles proves that it is a
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This also is an approach to the currently measurable asymmetry of occurrences of matter and antimatter (which is precondition of space (AsymmetryAsPreconditionOfGeo)) and an approach with the conservation laws already in the foundations[8] - in case of large statistics

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multiple appearance of the (except localization coordinates) *same* constellation (like e.g. statistically identical possibilities). See also (PerceptionOfMultiplicity).

[4] Causing a temporary symmetry breaking means in the graph theoretical approach: (1) Starting from a symmetrical situation (with associated symmetrical conserved quantity 0=0, sum is 0) causing a bifurcation (with associated antisymmetrical quantities -1 and +1, sum is 0), then (2) determining which branch of a bifurcation is temporarily taken. After (2) the sum of the conserved quantity appears to be temporarily nonzero. The second act (2) means generation of 1 bit information.

[5] Meanwhile an information- and graph theoretical approach with *very large* statistics seems plausible, in which at last all by past decisions (symmetry breakings) created conditions must be fulfilled consequently in form of conservation laws in predetermined order, so that no permanent contradiction is possible. We should further solve from the pictorial representation and only consider the information content along time.

Probably there is only one primary conserved quantity ("energy?") which leads on different stages of branching depth (or priority) to the *appearance* of different conserved quantities. This is plausible because there is a dependence between conserved quantities. Some have higher priority than other. So (temporary) asymmetry of charge is precondition of rest mass (AsymmetryAsPreconditionOfGeo), which is precondition of large (temporary) asymmetry of momentum, which is precondition of large (temporary) asymmetry of angular momentum. It seems worth to deepen this (***), to map this on a graph theoretical approach. Rem 2012: The hierarchy suggests the assumption, that there is (that a formulation is possible with) only one primary conservation law [PrimaryConservationLaw] which leads on multiple stages of branching depth relative to the global symmetry center (GlobalSymmetryCenter) to the appearance of conserved quantities. The initial stage k=0 has global impact, following stages depend on it.

[6] The time intervals between one decision and the measurable consequences reach from small (but greater 0 (DelayedPerception)) until very large (outside astronomical measurement range).

[7] More and more completely in the sense that this in the long run reduces the asymmetries (recombines the asymmetries) so that they converge to zero, so that no fixed nonzero asymmetry can permanently remain. This means also, that something is only distinguishable, because it (partially) recombines in the moment of perception (and the perceived part leaves the symmetry center newly partitioned), whereby time passes and irreversibly a (further) order before-after is determined. The perception will be added to a temporally growing memory. In the long run this leads to a new partition of perceptible reality.

Therefore we should not overestimate the importance of the current (short term) partition of perceptible reality, and not underestimate the medium term relevance of increasing information exchange and conjoint history (and not underestimate the very long term relevance of conjoint contradiction free memory {ConjointMemory}).

[8] Because all experiments confirm that conservation laws hold strictly (when considering the whole - i.e. in the long run), it seems plausible to use this as a basis for further approaches. Therefore asymmetries of conserved quantities are only temporary (temporary measurable

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forces result from the fact, that at last the symmetry must hold (and become perceptible) (Cons0Sum).

Probably the conservation laws can be deduced from a primary conservation law (PrimaryConservationLaw), which leads on different stages of branching depth to appearance of conserved quantities.

The branching depth and branching maximum[9] between decision and perception are arisen and arise together with time. Large branching depth leads to fine discriminability which can be mapped to large numbers[10].

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appearances - until complete recombination).
2015: An information and graph-theoretical approach with superposition of *partially very large* statistics seems plausible, in which all by former decisions (symmetry breakings) created conditions must be fulfilled as conservation laws in given order so that a permanent contradiction is not possible. Probably we still have to go more away from the representational viewpoint and more look at the information content. Space-time geometry seems outside constant, but the observations suggest that this applies only within short periods in the mid-size range (with great statistics). Experiments with clearly measurable influence on the macroscopic geometry and statistics (e.g. with strong gravity) are not feasible on our planet. Microscopic experiments and the results of quantum mechanics (for small statistics) show other basal laws. Because our experiments start outside in a system after symmetry breaking (matter in space), it is plausible that experimental results (also constants) in this system are influenced by the constellation of preceding symmetry breakings (decisions).

[9] Decisions and perceptions can be mapped to nodes of a (today very large) directed graph which describes the propagation of information or energy quanta. The “branching depth” is the ("branching minimum" resp.) the minimal number of nodes (and the "branching maximum" is the maximal number of nodes) on the way between the node of a decision and the node of a later perception which depends on the former decision (reversely there is also an “inner” branching depth which corresponds to the number of nodes on the (on the “other” side located) way from perception to decision). The propagation of information in the graph corresponds with the propagation of energy in reality (which can be transported also en bloc, bound on matter). Up to now we know some approximative laws (e.g. Maxwell equations) about the propagation of energy but we don’t know the original discrete law which includes further dependencies. So the constants [NotAllPhysicalConstantsAreConstant] which are used in the Maxwell equations depend on branching depth between past relatively early decisions (e.g. in early visible universe) and today’s measurements resp. perceptions. The today’s constants show that there is already a large branching depth between today’s subjective decisions and perceptions (light can pass many atoms within the time from one subjective decision to the following subjective perception). Even if we don’t know the exact law, the quantization of measurement results shows that the branching depth and also the branching maximum are finite.

Now we can ask a basal question (the answer is important for further conclusions): Is the graph spreading in a way that branchings don’t return and get lost, so that summary asymmetry remains?

Conservation laws show that this is not the case. So energy cannot get lost - we should recall that in case of sufficient gravitational potential also light quanta to all directions go
(Fortsetzung nächste Seite)

1. **INFINITY RESP. INFINITE DIVERSITY IS PERMANENTLY EMERGING (BECAUSE OF DIFFERENTIATION AND DECISION) AND NOT A PRIORI EXISTING AS CONSTANT ENTITY (COMPLETED IN PAST)**

{RealInfinityGrowsWithTime} [11] At the beginning of the 21-th century the (obvious[12]) understanding of the infinite resp. infinite diversity as something, which permanently is

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back (new recombined, but in the very long run under maintenance of all conservation laws). Moreover: Also the subjective perception (consciousness) includes a way back: Our subjective decisions move first "very small" energy quanta in our brain which are reinforced by our body to larger energy ("large" means "branched" and so perceptible many times and places; the original prerequisite for this amplification is described in (FreeEnergyNeedsConfidence)). Some branches find (already early) the way back through our body to the brain and are perceived there as "very small" energy quanta. "Very small" means "near to 0" and therefore near to the symmetry center. So the way from a decision to a perception corresponds to a way from a symmetry center back again to the symmetry center.

This is also efficient: only very small energy quanta need to be moved in the start which cause in the course of several branchings (after a time interval) movement of much larger energy whose consequences can be perceived again in the symmetry center in high resolution.

Temporary separation (with relatively small branching depth and branching maximum) can be also experienced within our brain, because even in everyday life we simultaneously (and unconsciously) do more than one thing or "DSQ" (decision sequence). We notice that consciously and simultaneously we can decide only within one thing (the conscious decision sequence), the other simultaneously done things (decision sequences, e.g. walking) are temporarily separated until they are finished or the (energetic) input from there exceeds an individual limit (e.g. pain) and they become conscious. We can also regard the decision sequences "outside" our brain as temporarily separated DSQ (with temporarily higher branching depth in between) whose results become conscious in the long run. It would be most efficient if from the (common) beginning our decisions do not contradict each other (if these have no [contradictory] aims) and from the beginning are orientated towards the *common* long term result (GlobalGain) .

[10] Reversely such numbers do not exist a priori, but have "of course" [OfCourse] been smaller, as long as branching depth has been smaller. From this follows, that important physical constants (and with this e.g. quotients of magnitudes of physical interactions (Cons0Sum)) depend on branching depth. Nevertheless the statistics meanwhile can be so large, that the relative change of branching depth during human observation time is so small, that the time dependency of these constants is not directly measurable for us.

((Let M denote the total energy of the astronomical universe, and dE the minimal energy separated by one decision, and n the branching maximum and cc some constant, then we can try the following approach: n^2 = cc M/dE. From this follows dE = cc M/(n^2). So if n is relatively small (time of early universe), dE can become very large. So this is also an approach to the (relatively) large energy of the early universe and to astronomical superclusters. Rem: Funktion of n is very speculative, therefore this passage is in brackets))

[11] Infinity is never physically measurable, a reality conform approach in this direction is only possibly when coupling it to an unlimitedly growing, open time coordinate. This shows that there is only *one original source* {TheOriginalSource} (in the (GlobalSymmetryCenter)) for real infinity.

emerging together with time (TimeConformApproach) due to differentiations and decisions[13], which cannot be classified as something a priori (i.e. before present in past as completed totality) existing, was still unusual. Basis of mathematical physics were the time independent axioms of traditional set theory[14] which start out of (a priori) existence of infinite sets resp. infinite diversity. But if something exists in the *physical* meaning, it's already past and thus fixated and naturally restricted (cf. a. [liro]).

To avoid misunderstandings: I don't think, that's all. There is always the prerequisite (in the (GlobalSymmetryCenter)) for every distinction, (distinguishable) time and decision. This exceeds the limits of every possible perception and imagination, i.e. it is really unlimited resp. infinite {RealInfinity} [15].

A time dependent approach to decisions (a "time dependent axiom of choice") is possible [TimeDependentAxiomOfChoice] .

Communication is only possible due to a synchronized time coordinate. There is limited freedom of this coordinate in between, until the next synchronization in a symmetry center (plausible is at last synchronization in the (GlobalSymmetryCenter)).

Hint for reading

Latest updates are often in the start or end of this file.

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[12] Justification of skips in argumentation by words like "obvious", "clear", "easy", "simple" {OfCourse} can be sometimes appropriate for abbreviation purposes, but we shouldn't forget: These words aren't generally valid. Instead of this they are relative, dependent on our point of view (e.g. our previous knowledge: A posteriori "easy" things can be a priori difficult. Afterwards one always knows things better...).

[13] Every measurement (resp. perception) contains differentiations and decisions. It is also a central statement of the Copenhagen Interpretation, that every measurement result becomes existent only by doing the measurement (cf. e.g. [lijo] p.543 or [liku] p. 123).

[14] These axioms permit the a priori existence of infinite sets and of choice functions on those sets [lita] [limy1]. They were formulated at 1900 and implied several paradoxes (antinomies) from the beginning, which led to a intensive discussion on the concept of existence and on the foundations of mathematics [lihe] [lihi] [lifr] [liwe] [liwe1] [liwe2] [liri]. There were suggestions for several attempts to moderate the difficulties [litr1] [librid]. But with that always was connected a limitation of mathematical liberty, so that the majority of mathematicians keeps on axioms which demand the a priori existence of infinite sets. This surely also because of the noteworthy successes of analytical approaches in the approximative description of natural processes. So it's explainable that in mathematical physics the analytical working with infinite continuous number sets became an usually not scrutinized self-evident fact (exceptions cf. [likh]), despite of the mentioned open discussion on the foundations, despite of the discovery of quantization of physical measurement results (especially of the half effect quantum hq/2 ([lime] p.47) in the beginning of the 20th century. It has been a good opportunity for drawing conclusions with regard to the *foundations* of mathematical physics, but "the moment was lost" ([likh] p.15).

[15] *He* always exceeds all and enlarges with every progress of time so much so that *He* remains unascertainable. The words

`"He who always was ... "`

give a first hint; "always was" means "existing already before every presence" (i.e. before every decision resp. temporary asymmetry - therefore starting in the (GlobalSymmetryCenter)); i.e. *He* is prerequisite [TheOriginalSource] of every moment, always ... also for all future times, because nothing can get separated permanently, at least in the long run the connection reappears again (ConnectionIsTimeDependent). Connection means *unity*.

Due to the time coupled branching depth (finite branching depth at finite time), and because the *origin* of decisions (due to conservation laws) always plays the *central* role (GlobalSymmetryCenter) in this approach, we can call this a (at last completely) *connected* and *theocentric* approach.

The higher (nearer to the origin) in the hierarchy a decision is, the more reliable (reliability) are the originated consequences. The hierarchy of decisions is impressive: Decisions are generated by life, and temporary locally perceived asymmetry is their consequence. There is a measurable farreaching hierarchy in decisions. The spacetime geometry which we perceive needs rest mass as basis, and this mass is consequence of the perceived asymmetry of the distribution of matter and antimatter (a symmetric distribution would show equal frequencies of matter and antimatter) (AsymmetryAsPreconditionOfGeo) - and local asymmetry in physical laws. I see no other possibility as cause for this asymmetry (and for free energy (FreeEnergy) which is perceptible by us due to this) than a primary decision (PrimaryDecision), which is superior to us - a decision, which has due to its start in (for us) minimal distance from the (for us) common origin (for us) maximal effect - and consequence.
A decision which can move so much energy certainly exceeds human experience - concerning the magnitude of energy we have to recall conservation laws, and we have to think consequently, see [DecisionCanMoveMuchEnergy].
Of course the (for us) visible universe is only a part, the hierarchy is much greater than we can realize.

(GeometryIsStatisticalConsequence) shows a recommended direction for future research. (NewInfo) is an elementary entry. Especially for readers with mathematical entry knowledge there are precise formulations of the introducing arguments and building up on this quantitative considerations to the nature of proper time (TimePerception). However, it isn't necessary to understand all details at once. Additionally, during first reading the lot of footnotes may be skipped. The table of contents offers a concise outline, also look at the by [***] marked locations within the text[16]. A concise formulary is separately accessible.

{InformationDef} The word "information" resp. "information quantity" plays an important role and is sometimes interpreted variously. Therefore it's emphasized, that here the word "information" is used in the standard sense of technical literature (information theory) [lish1] [17].

1.1 Estimation about the primary conservation law

{PrimaryConservationLaw} The primary conservation law says that every from a primary decision (PrimaryDecision) (from a decision without decision relevant advance information) resulting asymmetry (with k inequal 0) goes back again to symmetry (to the symmetry center[18] with k=0) in the course of perception resp. increasing (proper times[19] and) global time [GlobalTime] (therefore a fixed[20] asymmetry is not possible)[21].

1.2 Estimation about dimensionality

Starting from the current state (0) there must be 2 possibilities (1) and (-1), which are distinguishable **after** the decision between these possibilities. The "after" defines time. To define an order (and with this time), at least three independent states are necessary, so that the state-before the current state is distinguishable from the state-after. Chaining 3 states appropriately (***) in the graph theoretical approach can be the key to overcome the flat model.

{3dim}

2015_01_16 very unsharp: Here some ideas towards 3 spacelike dimensions to overcome the flat model, and which also is an approach to our conscious differentiation between inside and outside:

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[16] Some interesting passages are marked by {***}.

[17] This allows a well-defined quantification of information into the known unit "bit". Therefore one can roughly understand the information quantity as the "necessary number of bits for coding the information". It is a relative size (cf. e.g. [lija] p. 86). An exact definition can also be found in http://arXiv.org/abs/quant-ph/0108121 . It uses an entropy concept which is closely connected to the one of thermodynamics [lipo] [libri].

[18] Center of a distribution which is a combination (like (Q1Triangle)) of distributions like (Q0Triangle) with differing sign and scale, but in the global distribution with constant center k(global)=0 (GlobalSymmetryCenter).

[19] Possibly proper time is (seen from the outside) not always defined until symmetry becomes visible again. The mean time until k reaches the center 0 can vary extremely, it depends on the total sum of own return probabilities (PTimePropSumQ0) until the asymmetry recombines (and symmetry becomes visible again).

[20] A fixed asymmetry means inequality which is not influenced by measurement. By quantum physical results we already know that this is not possible.

[21] Information theoretical interpretation: Every viewpoint without balanced (symmetric) perception (due to missing information) will become in the course of time to the viewpoint with balanced (symmetric) perception again (after missing information has returned).

Time differences and the lengths of geometrical coordinates are determined by sums of central return probabilities. The sum can be seen as proportional to a correlation coefficient, it is maximal in case of central returns. The frequency of these returns is very high, so that geometrical appearance results from statistics of many events in high frequency. "Outside" is larger than "Inside" because the less we know about last past, the greater is the distance (delay) and the larger is the space (equal way possibilities back) [SpacePropThereAndBackPossibilities] .
In the mean over many decisions the 3 dimensions are equally righted, but at one elementary event resp. time (n>=2, central return after a (PrimaryDecision)) there is an order of the 3 Dimensions:

- Z "Up-Down": This is the oldest dimension k_old after a (PrimaryDecision) which due the conservation law goes back to 0 (locally or globally, depending on start) (DelayedPerception). At last the coordinates |k_old| |-k_old| (of the old conserved quantity) become smaller than 1, towards *subquantum level* (therefore my assumption to represent k by multiples of h/2, where h is the Planck constant). The associated information (order of decisions {Loop} since (PrimaryDecision)) becomes *conscious* and (only temporarily, if outside the (GlobalSymmetryCenter)) fixed past (memory).
- Y: "Radial": orthogonal resp. uncorrelated to Z, remainder of the previous decision
- X: "Left-Right": orthogonal resp. uncorrelated to Z and Y, sign of X will be determined by the current decision

What is the information theoretic origin of the geometric concept "direction"?
Because orthogonality is defined by a zero scalar product, the term "uncorrelated" seems adequate. If we have nearly stable rest mass, the high frequency statistics is mainly generated by closed loops (Loop) . If we measure optically the macroscopic direction from us (macroscopic) towards a macroscopic mass, then during measurement time only very little quanta (photons=electromagnetic quanta) are exchanged, compared to loops within matter. The momentum of the quanta shows a large correlation in the measured direction. What is the mathematical background? The quantum mechanic wave function of a photon can express the (relatively low) frequency (compared to loops within matter), differentiation along a certain direction d/dx yields momentum in this direction x. We have not derived x, because x is again used in the term. We need a more fundamental approach.
(SpacePropThereAndBackPossibilities)

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A more fundamental approach is necessary to close the complete loop, to derive also inertia (e.g. by comparing probabilities of local loops with the probability of the complete (global) loop). The complete loop has been smaller in astronomical early times, and quotients of probabilties of loops have been nearer to 1 (NotAllPhysicalConstantsAreConstant) .

1.3 Orders of magnitude

1. nuclear: 10^-15 m
2. atomic
3. (macro)molecular = visible life
4. planet
5. sun system
6. galaxy
7. universe: 10^25 m

A study of elementary particle physics would be interesting, vectorial representation of elementary particles is more expressive than symbols.
How is the hierarchy of conversation laws connected with the orders of magnitude?

1.4 Question for research

How does a large number of decisions (resp. temporary asymmetries of perception due to the own standpoint temporary outside the center) - or relatively long past time (many returns to the symmetry center) approximately lead to the analytical borderline case, to the appearance of spacetime geometry as statistical consequence?
The answer would help to find ways to avoid the wrong infinities connected with analytically (geometrically) starting approaches.
An information theoretical approach seems appropriate, which preserves conservation laws and summary symmetry (union of consciousness, conservation of the global symmetry center (GlobalSymmetryCenter), no final contradictions).

1.5 Perception of spacetime geometry (geometrical appearance) as statistical consequence (missing information, incomplete, to be continued *******)

Spacetime geometry is consequence of rest mass which is only possible *after* symmetry breaking (AsymmetryAsPreconditionOfGeo), therefore geometrical argumentation cannot start at the beginning.

The approach "perception of spacetime geometry as statistical consequence" {GeometryIsStatisticalConsequence} (to guarantee without contradictions in the long run the primary conservation law (PrimaryConservationLaw)) seems to me (2012) most promising for appropriate description of reality, but my intellect is too limited to collect the entire idea.

The measured identical behavior of equivalent "elementary" particles (e.g. electrons, protons) proves that these are defined by the same relation (ElementaryCoordinates) to a unique origin. The geometrical appearance approximately describes within medium scales, how such particles currently appear repeatedly (within our own proper time unit) (PerceptionOfMultiplicity)).

The (except quantum physical deviations) nearly predictable geometrical behavior of rest mass is consequence of the conservation law and the hugeness of statistics (astronomical magnitude / quantum physical magnitude) which leads to spacetime geometry.

Estimation of some framework conditions (since 2014):

- Statistics which lead to spacetime geometry is very large so that during human life we cannot measure its relative increase per proper time (which leads to change of physical constants, e.g. to increase of the quotient of electromagnetic and gravitational interaction)
- Some rough estimates can be interesting. If we assume t=4,354 * 10^17 seconds as the age of the universe, d=1,7×10−15 m as scale of a nucleon and c=299792458 m / s as speed of light, we get t*c/d=7,4588*10^40 as naive estimation of maximal branching depth. However, not only t, also c/d can change during time. Furthermore this estimation concerns only one dimension.
- Different physical interactions (interaction probability per proper time) result from early symmetry breakings, which now recombine with individual probability per proper time.
- Macroscopic interaction results from statistical superposition of different physical interactions. The strength of these interactions seem to be determined by Spacetime geometry, but actually the probability of these interactions is determined by the statistics of fulfillment of conservation laws in contradiction free order, and geometrical appearance is a consequence of this.
- Comparing the strength of interactions means comparing their probability per proper time.
- The inevitable delay by the speed of light leads to well defined branching depth towards past resp. radial, which leads to increase of the count of possibilities (PerceptionOfMultiplicity)
- Information theoretical reason, that geometry allows "far away" more possibilities (place) than "near": We can regard the simultaneous appearance of many equivalent rest mass particles as possibilities (possible choices). **There are the more possibilities, the less we know** (relatively to the maximum). Due to the limited speed c of information we know the less, the greater the distance is. In case of a distance r we have no information about the past time r/c ago. An information theoretical approach could start from a quickly increasing graph which allows after a time r/c in

the statistical mean in case of macroscopic distances r: $a\pi r^b$, for example 2 Pi r [PlaneCountOfLocations] equivalent (there and back) way possibilities, see also (NPropT2) , in case of very large r the count of way possibilities will become again smaller (Cons0Sum) .

- The central role of Pi (π) in spacetime geometry follows from combination of at least two statistics (of the statistics of way there and the statistics of way back), the next chapter shows a possibility for an approach:

1.5.1 Outside is larger because there are more possibilities for locations, because our delayed knowledge

2015: 2+1 step extrapolation-estimation:
(unsharp: The formulas should only show the way of thinking, also derivatives (Q1, Q2) can be interesting.)
maxcount(n) = 2 Pi n circumference of a circle with radius n = possible maximal count of locations {PlaneCountOfLocations} or multiples of the same matter particle with diameter 1 on a plane at given distance n. The probability particle(n) for meeting a particle is 1 / maxcount(n) and therefore $\frac{1}{2\pi n}$

It is $\lim_{n\to\infty}\left[Q0Z(n)\right]=\sqrt{\frac{2}{\pi n}}$

where Q0Z(n) is the probability for a central return after n steps, n is even numbered. So

particle(n) = (Q0Z(n)^2) / 4 = 1/4 * probability of 2 subsequent central returns

goes to $\frac{1}{2\pi n}$

Because Q0Z(n) is the probability to return after n steps (n is even-numbered, see (DefQ0Z)), this can be seen as probability for division into 2 parts and recombining simultaneously making a loop, e.g:
- make a step outwards (p=1/2)
- start a bernoulli random walk and return after n steps (p=Q0Z(n))
- make a step inwards (p=1/2)
- start a bernoulli random walk and return after n steps (p=Q0Z(n))

For large n the product of all probabilities approaches $\frac{1}{2\pi n}$ which is the probability to meet a particle with size 1 at distance n (in a circle with radius n).

2015-07: It should be mentioned that Q0Z(n) represents an **OR-operation** of all possible returns: Q0(n-1,1)/2 + Q0(n-1,-1)/2 = Q0Z(n)
In case of perfect symmetry (global symmetry central as starting point) this is also a meeting probability like TAR (important for the probability is dependence resp. independence of meeting parts)

But (in case of decentral starting point and independent parts) returning to the starting point does not necessarily imply a central meeting. A central meeting occurs only, if **simultaneously** the 2 initially separated independent parts return. Its probability is called here QM0(n,k)= (Q0(n-1,k+1)/2) * (Q0(n-1,k-1)/2) and represents a **AND-operation**
QM0(n,0)=(Q0(n-1,1)/2) * (Q0(n-1,-1)/2)
= Probability of division into 2 parts at k=0,n=0 and return of both parts (complete reunion) at k=0, n=n
= probability for meeting of both initially separated parts after n steps in the center k=0

this goes to $\frac{1}{2\pi n}$ = probability to meet a particle with size 1 at distance n (in a circle with radius n)

{SpacePropThereAndBackPossibilities} see also http://www.orthuber.com/wgeoapp1.pdf . Abbreviation for: "Space proportional There And Back Possibilities" = 1/(Q0(n-1,1)/2) * (Q0(n-1,-1)/2) . So
probability for meeting of both initially separated parts after n steps
goes in case of temporary independency to
probability to meet a particle with size 1 at distance n

This connecton shows an **expandable approach**, how statistics can lead to features of geometry. (***)

There cannot be more than 2 pi n particles at distance n, in this case the probability to meet a particle after n steps would exceed 1

ääüü
(PTimePropSumQ0)
... unsharp:

We need at least 3 steps for determination of an order (3dim) , and we see, that Q0(n-1,1)^2 is proportional to probability of location of matter. Due to Pauli Exclusion Principle (PEP) double occupation of a location is impossible.

This indicates, that Q0(n-1,1)^2 are not allowed. Definition of an order by 3 states is only possible, if Q0(n-1,1)^2 (two steps back instead of one step forth) are not allowed.

..... unsharper:
This leads to the assumption, that double occupation of the same location by matter is not possible, because reversal of time is not possible, and time is defined by ordering 3 subsequent states by decisions. This also indicates, that in case of double occupation (e.g. due to extreme gravitation) order is not constant.

If due to decisions a certain direction is (was) preferred, statistics lead to visible speed.
to be continued (some time)
äääü

(a not plane approach with sphere volume: The probability particle(n) for meeting a particle is 1 / maxcount(n) and therefore $\frac{3}{4\pi n^3}$

it is $Q1(n,k) = -\frac{k}{n} Q0(n,k)$ and $\lim_{n\to\infty} [\, Q0(n,0)] = \sqrt{\frac{2}{\pi n}}$

and so It is $\lim_{n\to\infty} [\, Q1(2n,k)] = k\sqrt{\frac{1}{4\pi n^3}}$ and so $\lim_{n\to\infty} [\, Q1(2n,1)Q1(2n,3)] = \frac{3}{4\pi n^3}$
where Q1(2n,1)Q1(2n,3) exist only every 2 lines (between central returns) (Q1Triangle))

1.6 Further thoughts

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- (rough: From the information theoretical point the radial coordinate has an implicit order (which contains information), but not the other 2 coordinates not (less information implies more freedom of decision). Bridge from statistics to geometriy: Is there a statistics going outwards from the nucleus with very high frequency? too geometrical: At this initially going in radial direction as 2D alternating (north-south east/west) random walk?)
- Until perception: parts have to follow the original decision sequence (of the root) in reverse order.
- äääü

As mentioned, (analytical) spacetime geometry cannot have an exact equivalent in perceptible reality. Better is an information theoretical approach starting from symmetry breakings which leads to spacetime geometry as secondary statistical consequence to avoid contradictions[22].

(((xxx provosional, unsharp Possible information theoretical start:
(time dependent) definition of "inside" and "outside" necessary, then
Event AO: A with free energy[23] inside sends a photon to the outside.

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[22] Remark 2012 here repeated: The until now usual (Big Bang) Models extrapolate until "Diameter of Universe is 0" with a priori n-dimensional geometry. Better would be an information and graph theoretical approach which starts discretely with a hierarchical sequence of temporary symmetry breakings of conserved quantities, in which spacetime geometry secondarily statistically results as approximation after a large number of branchings. Important physical constants (e.g. the quotient of the strengths of electromagnetic and gravitation interaction) are time dependent functions which ensure at any time the exact validity of conservation laws. Probably the conservation laws can be deduced from a primary conservation law (PrimaryConservationLaw), which leads on different stages of branching depth to appearance of conserved quantities.

[23] (Only rough memo:) Free energy is defined as a state (e.g. charge "A-") after a symmetry breaking with the following information (promise) for the future: "there will be return and perception of time when parts of the counter pattern (e.g. parts of charge "A+") return. Localized perception of time is connected with the appearance of matter, i.e. only X parts of A- find (in the symmetry center, where time passes) their complete antisymmetrical counterpart A+. The proper time of X contains information. In case of high n (large global graph) it is approximately proportional to the difference of the line numbers dn of the
(Fortsetzung nächste Seite)

Event AI: A without free energy inside receives a photon from the outside (which had free energy).
We notice that AO becomes identical to AI if we exchange (inside of) A and "outside", i.e. if we revert the radial coordinate.
We notice, that AO becomes identical to AI if we revert time. But this is not possible for global time (GlobalTime).
In a general approach the asymmetry between (inside of) A and outside must become smaller and smaller along global time due to conservation laws[24] (which result from the primary conservation law (PrimaryConservationLaw) at multiple stages of branching depth).
Definition of A resp. location ("inside" of A) is only possible with rest mass there, i.e. there must be previously an asymmetry of matter and antimatter, i.e. there must be an asymmetry in charge (more information needed); look at (ElementaryCoordinates) with small k for high energy density
to be continued
Rem: Where we not are (inside or outside) (temporalily), there is temporarily no possibility for distinguishment.
Rem: If we combine AO and AI and go to medium (not too large) macroscopic size (with defined 3D-location), the count of possibilities of measured returns is approximately proportional to the surface, i.e. to 4 Pi r^2 .
Try to calculate the count of possibilities in very small (quantum physical) sizes, in small (quantum physical) sizes, in larger sizes

Subjective facts: Inside is temporary freedom back until first memory, outside is more locally freedom.

Some thoughts (provisional, english only ##)
- All elementary particles, the complete perceptible existence is defined by relation to the (GlobalSymmetryCenter). The uniqueness of the origin shows e.g. the identical behavior of equivalent elementary particles.
- simultaneity (e.g. of multiple equivalent particles) is not measurable exactly, the simultaneous (geometrical) appearance of many equivalent (particles) results from the long own time unit during perception of these.
- the equivalent behavior of equivalent elementary particles shows a common partial way in the graph of their perception. It seems that this common way is assigned to initial separation of matter and antimatter (AsymmetryAsPreconditionOfGeo) , and it is still relevant in current time. Only after definition of this common initial way of separation (matter and antimatter) the definition of local separation is possible. Because our current standpoint is outside the symmetry center (perhaps for all spin 1/2 particles), this initial (originally symmetric) way seems to be hidden on the other side
- different location of equivalent particles is defined by steps outside the common way in the graph of their perception
- due to the conservation law there must be (an equivalent of) antimatter. The energy from annihilation of matter and antimatter can be hidden behind (e.g. gravitation) potential difference.
- the appearance of matter shows that we are on one side and therefore not in the (GlobalSymmetryCenter)

Estimation due symmetry: In case of very large sizes the count of possibilities probably reduces again to 1 (gravitation due to symmetry). So plausible would be multi(3? (3dim)) dimensional random walk(s in between recombining, look also at (PerceptionOfMultiplicity)) **under the condition** of return.

##
xx)))

1.7 Hypothesis about time and energy

Starting from the superior symmetry center temporary symmetry breakings are generated which lead to appearance of separated rest mass units (with temporary defined “location”). Starting from these separated units (outside the superior center) individual time starts with a symmetry breaking (without perception), which recombines (returns) stepwise again in the symmetry center which is connected with stepwise progress of proper time there and

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meetings. dn is approximately proportional to the maximal size of the graph of included information quanta.

[24] The conservation laws lead to forces due to the following connection (to past): They determine at multiple stages of branching depth certain former states, which have per step of proper time (PTimePropSumQ0) higher probability than other states - so there is a (delayed) "force" towards former states of conserved quantities. This is not trivial because the term "former" depends on proper time. Proper time started with a decision at the corresponding level of (hierarchy or) branching depth.

Remark: Conservation laws mean also, that subordinated "proper times" must come together again in course of superordinated "proper time". So thinking of (currently separated) individuals can become more and more overlapping in the long term average. In the long term, because the superordinated proper time must be fully reliable for this.

partially[25] with perception of measurement results which can be understood as symmetry breakings in the subordinate system.
The more “distance” from the superior symmetry center (the higher the borrowed energy), the smaller is the probability per time step to remain there (the lifespan of systems with much “borrowed” energy is shorter).

It is not possible to borrow a fixed nonzero amount of energy permanently, i.e. it is not possible to keep this outside the symmetry center, i.e. with and after progress of proper time or partial return to the own subordinate symmetry center also the probability of return to the superior symmetry center (of the former superior symmetry breaking which starts this proper time) goes towards 1 (RealInfinityGrowsWithTime).

Only the {GlobalSymmetryCenter} (with k(global)=0, i.e. k maximal near to 0 and not distinguishable from 0) can persist (connected with conservation laws with perfect precision). It can allow infinitely[26] many returns (also with smaller energy than measurable), because there it is not necessary to keep an asymmetry permanently, because no system nearer to a (superior) symmetry center exists.

Symmetry breakings (decisions) starting from the global symmetry center (the origin of every primary decision (PrimaryDecision)) have maximal branching depth and with this maximal longterm effect. Reversely (due to the (PrimaryConservationLaw)) all (i.e. maximally many) branchings return to the global symmetry center, i.e. there is maximal perception in the long run. The primary conservation law ensures this on a sustained basis.

It seems plausible to regard the appearance of (due to temporary (AsymmetryAsPreconditionOfGeo) geometrical separation "multiple" (PerceptionOfMultiplicity)) creatures (live) as geometrical (temporary) expression of decision sequences starting from the (GlobalSymmetryCenter) .

1.8 A large number, which is much smaller than ...

It seems that the term "infinity" often is underestimated, therefore this chapter:
Let g: $\mathbb{N}_0 \rightarrow \mathbb{N}$ denote a function on the natural numbers. We define for $n \in \mathbb{N}_0$:

$$g(0) := 10$$

$$g(n+1) := g(n)^\wedge(g(n)^\wedge(g(n)^\wedge(g(n)^\wedge(g(n)^\wedge(g(n)^\wedge(g(n)^\wedge(g(n)^\wedge(g(n)^\wedge g(n)))))))))$$

$$oops := g(g(g(g(g(g(g(g(g(g(10^\wedge 100))))))))))$$

The function g is extremely increasingly increasing. Already g(1) by far exceeds human imagination and all physically measurable proportions. The number *oops* is much … much greater. Nevertheless also *oops* (and oops_oops[27] etc.) is vanishing small when compared to "infinity" (like all other fixed resp. time independent numbers).

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[25] Outside the global symmetry center, i.e. in a local symmetry center only a part returns to the local center, before this returns to the superior center.

[26] Despite this infinity analysis cannot describe this exactly, because every return is connected with progress of time (there, which in the long run implies progress of time everywhere - because in the long run there is no isolated part in the graph).
[27] We can continue:
```
o(0):= g(g(...oops times ...g(oops)... oops times ...));
```
(Fortsetzung nächste Seite)

In calculus one works with (positive) intervall lengths smaller than 1/*oops*. But it is clear that such small intervals (e.g. in multiples of Planck's constant) do not exist[28]. The consideraton of this fact and of the resulting combinatorics in mathematical physics could be the start of substantial progress (RGraphTheoreticalResearch) .

2. TO THE USAGE OF INFINITE SETS IN MATHEMATICAL PHYSICS

Unlike the infinite the (within finite time) measurable (as information perceptible[29]) reality, which is the physical reality, is just characterized by being finite. Particularly it's information content is finite.

Concerning the physically existing reality (resp. physical reality) a scientific consensus should be possible. Even Hilbert comes to the following result ([lihi] p.165, translated from german):

> "Now we have established the finiteness of the reality in two directions: to the infinite small and to the infinite large."

Every physical measuring needs a finite, different from zero measurement time and provides information (cf. a. InfoConcrete) in form of the choice of a measurement result from all possible measurement results. If infinitely many (different) measurement results would be possible, the choice[30] of a measurement result could deliver infinite information (an infinite information quantity [InformationDef]). But the results of physical measurings (of finite[31]

```
o(k):= g(g(...o(k-1) times ...g(oops)... o(k-1) times ...));
oops_newstart:=o(oops);
```

now we replace oops_newstart by oops_0 and the function o by the function h_0 and the function g by the function o
then the function h_0 by the function h_1 and the function o by the function h_0 and the number oops_0 by the number oops_1
then the function h_1 the by function h_2 and the function h_0 by the function h_1 and the number oops_1 by the number oops_2
...
then the function h_[n-1] by the function h_[n] and the function h_[n-2] by the function h_[n-1] and the number oops_[n-1] by the number oops_[n] and we repeat this until n=oops
and we get oops_oops. It is also vanishing compared to infinity (and so on)...

[28] Quantitative estimations about minimal intervals of SI units are possible, starting from known minimal (quantumphysical) und maximal (astrophysical) measurements.

[29] After measurement we perceive it as present (for the moment fixated) information. So it becomes conscious and with that sure truth, i.e. its probability reaches 1.

[30] Also the *mental* choice of an element out of a set S is something physical. Due to the finite time, which we have for doing this, S always is finite. If we for example choose mentally an integer number within one minute, the information content of its mentally chosen representation will always be smaller than a predefined upper limit m, for example below m = 10000 bits. Therefore S contains only those integer numbers, whose representation (seen from our point of view -- information quantity is relative) requires at the most m bits, i.e. S contains not more than 2^m elements and therefore is a finite subset of all integer numbers.

[31] Our physical measurements are implicitly always done within a finite proper time interval, which starts with the definite decision to the measurement *going out from us* and ends with the perception of the measurement result *returning to us* [DecisionToPerception]. Every terminated measurement contains an only finite sequence of recombinations [FiniteRecombinationSequence].

duration) *never* deliver an infinite quantity of information. Therefore the set of all possible measurement results *a priori* is finite[32].

This (natural) fact has been mentioned in literature already long time ago (cf. e.g. [lipe] p. 195). Nevertheless even in quantum physics analytical models and derived concepts (exponential functions, operators with continuous spectra...) are still usual. - May be that many people (also scientists) cling on the model of continuous reality (as something which already exists) not only because of the macroscopic impression but also because they think that "continuum" is necessary for freedom of decision - because it's subdivisible infinitely often. I think there can be a bridge: *Future* as the subdivisible together with freedom of decision along proper time as primary axiom, and finer and finer approximation of continuum as consequence - so fine subdivision not a priori, but in the course of time as result of decisions. The order (Order) is important.
In physical reality steps towards infinity cannot be done independently of time; they are coupled with a growing time coordinate.

In the physical reality only a finite information quantity can be processed within a finite (proper) time[33] interval. For mathematical models whose representation requires a processing of an infinite quantity of information, for example irrational numbers, no (exact) equivalent exists in the physical reality. So mathematical calculations, which have an equivalent in physical reality, can only be rational combinations of rational numbers. Conclusions arise from this for the foundations of mathematical physics.

2.1 The perceptible (physical) reality as that, what is (exactly) conceivable within finite time

Deduced[34] analytic functions like

$\sqrt{1-x^2}, \quad \cos(x), \quad e^x, \quad e^{ix}$

etc. are frequently used for description of physical (natural) processes. The question arises for a fundamental explanation of the fact, that those functions can be used to make approximative

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[32] According to the subsequently explained approach [NewInfo] information and diversity first must be created by decisions, whose number at given time always is finite. From this easily follows discreteness resp. quantization of measurement results.

[33] The condition "within a *finite* (proper) time interval" is important here. I have not at all the (pessimistic) opinion that "everything is finite". On the contrary, concerning the (very) long-term I am optimistic. Due to its arbitrary great diversity the real infinite needs place in future (and exceeds past, if one doesn't want to pervert the natural meaning of the words) (RealInfinityGrowsWithTime). With my texts I want to show among other things that a complete uncoupling (of ego resp. proper time coordinate) isn't possible, that infinity (infinite coding depth resp. information) of something potentially existing is necessarily connected with infinity of potential (proper) time. Here the word "proper" is in brackets because the information barriers (which define the "proper" reference system) are changing in the course of time.

[34] Deduced using analytic concepts, e.g. differentiation of functions, which are proceeding on the assumption of a priory existence of continuous (not countable) sets of numbers. The exact calculation of many analytic functions needs an infinite number of elementary combinations (ElementaryCombination), what is problematic for an exact approach to perceptible reality.

prediction of physical measurement results (that is a limited forecast of perception resp. future). Such explanations should[35] base on as simple as possible axioms.

It is now started out from the assumption, that those axioms permit only a finite number of *elementary combinations* per time unit, in which an elementary combination {ElementaryCombination} is defined as basic calculating operation, i.e. as addition resp. subtraction or multiplication resp. division of integer quantities resp. numbers. This assumption seems to be justified, because such elementary combinations are within finite time exactly conceivable (comprehensible), at least in the potential sense, for example by counting. That's important, because something, which is perceptible, is also conceivable at least in the potential sense.

There are common mathematic models, e.g. numbers, which aren't conceivable within finite time and therefore aren't perceptible (sometime, in some representation, in complete exactness[36]). Therefore these models deviate from perceptible reality[37] after some time and in principle are unsuitable for an *exact* elementary approach to it[38], even if these models deliver and further will deliver good approximative results.

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[35] We could say at once there is the (quite complex) world because it is here. We then have given reasons for something complicated by using something complicated but we haven't got further.

[36] Perhaps you wonder why I attach importance to exactness. It simply because "exact" is the primary concept which is suitable for elementary (primary) considerations. Something is (exactly) equivalent or not. The notion "approximate" arises only secondarily (e.g. from analyses of probability distributions) and a definition of this notion is difficult and arbitrary, therefore it is unsuitable for elementary considerations; see also (ConservationLawsImplyExactness) {ExactnessNecessary}.

[37] The perceptible reality contains all, which sometime, somehow can be represented (fixed) as information (potential past). Here notion *reality* means "perceptible reality" {PhysicalReality}. The whole also permits decision liberty resp. life resp. the *potential* of an (unknown) future [Future]. By definition this potential cannot be fixed as information. This applies to the completely symmetrical situation (GlobalSymmetryCenter) . Outside the symmetry center the long term future is more determined (towards the center), because the "own" standpoint cannot remain at the same side. In the long run perception of one side must be compensated by perception of the other side.

Strictly speaking we cannot say that physics works completely value-free, because (average) time itself is directed towards future. It seems that this is connected with growing complexity around the center.

[38] For a description of the perceptible reality at most an exact start is possible. Already the currently by us perceived reality {ToPast} can not be described exactly, because there is no further equivalent for it, it is complex and as unique as we personally are. Therefore it is fair to assume that everything, which we perceive (as reality), in the end comes from ourselves. Whether this conclusion is correct also in the objective sense, you perhaps will be able to judge better after you have read the further text.

Of course also mathematical partial models can be very helpful {helpful} (especially for approximative[39] calculations) and are thus justified[40], for example in case of to macroscopic particle numbers greater 10^26 and still much larger number of combinations n per proper time unit (ProperTimeUnit)… We only should guard against over interpretation[41] of our models of thought because they are not equivalent to reality (AnalysisAtBestApproximative). Particularly, if we forget the simplifications contained in our model, we would block[42] a "thinking beyond the model". This problem of course also affects my mathematic suggestions. Also here occasionally approximative considerations are used (as bridging) e.g. the use of the Stirling formula. I hope that it remains clear, where simplification begins. Perhaps sometime there is a possibility that we can speak about this.

At first the following preceding chapter should clarify the mentioned difficulties of current models: They orient themselves too little to our fundamental decision and perception process. Particularly the natural sequence (Order) of the combinations which are (in the large and in the small measure) cause and result of our decisions and perceptions (resp. measurings) isn't taken into account in these models.

For example the time independent axiom of choice (on which basic analytical concepts build up) postulates a priori the existence of infinitely many decisions - from the physical point of view a contradiction in terms, because "a priori" means "before presence" resp. "in past", but physical (measured) past is finite.

3. MODEL CONCEPTS LIKE INFINITE CONTINUOUS SETS, HILBERT SPACES AND THE TIME INDEPENDENT AXIOM OF CHOICE PERMIT THE DISREGARD OF THE NATURAL (TEMPORAL) ORDER

In mathematical physics analytical approaches and concepts (i.e. approaches and concepts of

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[39] Within "outer" systems self-combinations (recombinations) run much faster than we as observer can perceive (per proper time by combination with us personally). Only a part of those recombinations we perceive (which is for proportional to the sum of the probabilities, that transmissions from us return to us again [PTimePropSumQ0]). Usually this part is very small at first, which may be one of the reasons for it, that analytic models are suitable for approximative calculations quite well.

[40] The noteworthy successes of several model concepts of quantum physics, for example the Hilbert space concept, shall not be put in question in any way. Of course useful models have their sense, e.g. as bridging. Also from those models we can derive valuable hints to get ideas for exact approaches (see below).

[41] E.g. the (complex) exponential function is often presupposed for representation of a wave function. The exponential function is extremely frequently used because it's proportional to it's own derivative. Mathematically the differentiation, which leads to this derivative, uses the borderline case of infinitesimal differences of the exponent. But in the physical literature the exponent usually is proportional to time and/or location coordinate. With this the preconditions for infinitesimal differentiation aren't fulfilled, because there are no infinitesimal differences of time and place due to the uncertainty relation. The problem already lies in the differential equations, which presuppose infinitesimal differences of location and time and whose solution leads to the exponential function. Correction is e.g. possible by use of analogous equations with discrete resp. finite differences (Schroedinger) or discrete representations of the function (Q0SCTriangle).
At this it's reasonable to adapt the quantity of finite differences to natural quantization. Look for example at f(n,E):=(1+iE)^n. The finite difference f(n+1,E)-f(n,E)=((1+iE)-1)(1+iE)^n= iE f(n,E) is proportional to the original function. At this we can choose n=Et/(hq) (E=energy, t=time, hq=effect quantum).

[42] If we follow up this train of thought, the idea appears, that even the past known to us only presents an imperfect model of the whole - there is only then (new) future, if we don't get stuck in such models.

analysis) are quite common, and with that also the usage of continuous, a priori infinite sets. Most important examples for those sets are the complex and real numbers. They form a metric space equipped with the absolute value norm. Hilbert[43] spaces play a central role in quantum physics. Important quality of these metric Hausdorff-spaces is the completeness i.e. any Cauchy sequence converges towards a limiting value which is contained in the space. This is problematic if used for description of nature, because for the exact description of the limiting value of a Cauchy sequence it's mostly[44] necessary to carry out (isolatedly, *before* any interaction with the surroundings[45]) an infinite set of approximation steps, if one allows respectively only elementary combinations [ElementaryCombination]. This implicitly means (uncoupled from the natural order[46] (Order)) an infinite number of decisions[47] (application of

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[43] In no way Hilbert's merits should be questioned. So he has written in his essay "Über das Unendliche" after a chapter concerning quantum physics ([lihi] p. 164):
"Und das Fazit ist jedenfalls, daß ein homogenes Kontinuum, welches die fortgesetzte Teilbarkeit zuließe, und somit das Unendliche im Kleinen realisieren würde, in der Wirklichkeit nirgends angetroffen wird."

My translation: "And the result is in any case, that a homogeneous continuum which would allow the continual divisibility and would create the infinity on a small scale is found in the reality nowhere."
Was this taken into consideration, when Hilbert‘s concepts of continuous spaces (e.g. the Hilbert space concept [lico] p. 14-20) found broad application just in quantum physics? The answer is clear, and it is also clear, that neglection of a contradiction in the fundament cannot lead to truth.

[44] e.g. for R/Q or for a Cauchy sequence converging towards the irrational number π - the "imagination" of a circle of course doesn't mean an exact description of this number. As further below described, we can work on the principle, that the entire geometric appearance (of us personally and of our surroundings including the visible surfaces resp. information barriers) is only a secondary consequence of a combinatorial law which is directed by (our more or less old) decisions (within recombination points), that it represents only the borderline case of the composition of a large number of recombinations.

[45] In the model the surroundings are described by further variables.

[46] If an ordered set has infinitely many elements, their order contains infinitely much information. Analysis requires preexistence of such infinite sets and implicitly uses the information of their order for definition of central concepts like e.g. convergence. In nature, however, first the order has to be defined step by step together with (direction of) time and its information content is at given moment of time always finite (NewInfo).

[47] It is sometimes distinguished, whether a (non periodical) sequence of decisions is lawless or lawlike. To this has to be noticed from physical point of view, that even if there is a law or an algorithm (which can be coded with finite information) for calculating the sequence step by step, the actual calculation of the sequence (for example with the help of a computer) with every calculation step leads to an increase of entropy and therefore in other place to excessive information loss. Infinitely many steps would need infinitely much time and energy (ETMGreatEnough). So if a model should be reality conform, the law or algorithm which describes it must produce after a *finite* number of steps an exact result. We can see from this that a reality conform consideration always requires attention of the increasing time coordinate - concepts like "maximum fast recombination sequence in the local (informed) system" are relevant [MaxLocalFrequency].

the time independent axiom of choice[48] [limy]), therefore the processing or production of an infinite large quantity of information[49], which isn't possible under natural conditions within in finite time[50] (at finite availability of free energy (FreeEnergy)).

So from the retrospective point of view the appearance of quantum phenomena in the physical reality [PhysicalReality] would have been predicable (cf. a. [NoAnticipation]): Confirmed is not only the fundamental limitation of the quantity of information, which is perceptible within finite proper time, it also becomes clear, that basic analytic concepts (i.e. continuous sets of numbers) are models, (which can approximate reality in case of large branching depth and statistics, but) which at last deviate from reality {AnalysisAtBestApproximative}.[51]

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[48] E.g. every non periodical real decimal number between 0 and 1 means a choice mapping from the infinite cross product of the set {0,1,...,9}, at which each of the infinitely many fractional digits means a new (new to decide) choice of an element of this set.

[49] The infinite large quantity of information is the fundamental problem (infinite information never belongs to past). *Almost* all real numbers are irrational numbers whose exact representation would contain an infinite large quantity of information. If the limit of an (infinite) Cauchy sequence however doesn't contain infinite quantity of information, for example in case of a rational limit value, an (exact) equivalent of the limit can exist also in nature (within finite time), e.g. in form of digital information in a computer memory (this word clarifies, that "existence" always reaches back to past). But the infinite Cauchy sequence is an artificial product (an endless sequence never belongs to past; we know, that time isn't arbitrarily sub-divisible). For example the limit of the series

$$\sum_{j=1}^{\infty}\left(\frac{1}{2}\right)^{j}=1$$

can exist in nature (in form of an exact equivalent) but not the series itself. Concerning this topic there have been already many misunderstandings (e.g. Zeno's paradox). In special cases the limits of infinite series even can be exact. But unfortunately, since there is no equivalent to these series in nature (within finite time), the model concepts connected to these series also can obstruct our cognition.

[50] Physical quantities can not be defined independently from others. This has to be taken into account, if in mathematical models physical quantities, which don't fully compensate each other tend to zero or infinity. At this also other quantities change, which are connected in reality (often indirectly, outside the simplified model). Particularly also the proper time coordinate is concerned after finite time. So if it's necessary "to let tend variables against infinity", this must happen in the right combination (also with the proper time coordinate, cf. a. [DtOnBothSides])) and order (Order), otherwise calculation becomes wrong.

[51] For instance higher powers of as infinitesimal assumed quantities are usually neglected. Since the commutator of location and impulse is used frequently in quantum mechanics, a short consideration of the commutator of the operators "multiplication by x" and "differentiation along x" is worth mentioning here. It is in the analytical borderline case

$$\left(\frac{\partial}{\partial x}x\,f(x)\right)-\left(x\frac{\partial}{\partial x}f(x)\right)=\left(f(x)+x\frac{\partial}{\partial x}f(x)\right)-\left(x\frac{\partial}{\partial x}f(x)\right)=f(x)$$

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3.1 In principle restricted validity of the used models

It isn't a miracle therefore that mathematical models which are based on the completeness of the underlying metric spaces only can be restrictedly valid for the description of actual natural events[52]. The problem quite similarly also lie in other models which also require the time

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from which the well known commutator relation $\left[\frac{\partial}{\partial x}, x\right] = 1$ follows. We write this now in finite difference calculus.

Let $df := f(x+dx) - f(x)$, then

$$\frac{(x+dx)f(x+dx) - xf(x)}{dx} - x\frac{f(x+dx) - f(x)}{dx} = \frac{(x+dx)(f(x)+df) - xf(x)}{dx} - x\frac{df}{dx}$$
$$= \frac{x\,df + dx\,f(x) + dx\,df}{dx} - x\frac{df}{dx} = f(x) + df\,.$$

Although the quantity *df* cannot be arbitrarily small in reality (if *df/dx* is nonzero), it is neglected in the analytical model. Therefore the frequently used conclusion $\left[\frac{\partial}{\partial x}, x\right] = 1$ is not exactly transferable to reality (if *df/dx* is nonzero). We shouldn't forget that nature operates exactly [ConservationLawsImplyExactness].

[52] Mathematical reasoning resp. mathematical proofs are exemplary with regard to consequence and exactness (within the dealt topic). It would be a pity [lish], if suddenly a strong break in consequence occurs, in that the results and/or models (e.g. from geometry or analysis) are being transferred to the reality in too far-reaching and therefore inadmissible way, particularly, if an extrapolation into ranges is done, which are far away from any possibility of experimental verification (e.g. in context of cosmology). The great probability of errors gets clear, if one thinks of the obligatory, hardly scrutinized application of analysis in mathematical physics and simultaneously of the cunning constructions in many analytical proofs (e.g. the counting of the union of countable many countable sets, sequences, diagonal sequences, the usage of infinite small not countable surroundings...). In these constructions often (n->infinite) choice decisions are (implicitly) necessary and the liberties granted by the definitions are exhausted very largely - the definitions however don't describe the reality (in which decisions require free energy and time, see (ETmGreatEnough)) but a model, which (sometime, t ->infinite) deviates from reality.
I again would like to emphasize, that of course there is no doubt, that analysis (also in mathematical physics) can be very helpful. It is just important to remain in the experimentally checkable range resp. in case of extrapolations not to forget the difficulties of the used models.
For many approximative calculations analytical considerations will remain necessary. Moreover the working with not countable, continuous sets (e.g. real numbers) can give valuable hints - such models permit extended liberties to test different combination orders and to check results by experimental findings. Perhaps so we can find the correct combination order, too. But there is the danger of time-consuming wanderings and systematics can be lost [TooManyPossibilities].
For a definite exact calculation not countable (continuous) number sets aren't suitable in principle, so that we must confine ourselves to numbers which (resp. their conceivable and so realistic equivalents) exactly exist within finite time and early enough as quotients of integer numbers (as result of our mental decisions resp. choices). At this the words "early enough" also mean, that even countable sets, e.g. the natural or rational numbers, can not be simply assumed as existing from the start, also here the order of counting is important.
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independent axiom of choice (often indirectly and hidden)[53] or which start out in some other way of the infinite (of infinite diversity) as something which *already* exists as completed entity [RealInfinityGrowsWithTime].

Specially at calculation models, whose validation is not guaranteed because of missing or only indirect experimental possibilities, there is a strong[54] likelihood that the sequence of calculation steps (implicitly connected to decisions and perceptions[55] within the restricted model) differs from the natural order (Order) of the combinations connected to decisions[56] and perceptions. So nonsensical calculation results are the consequence. The difficulties lying in these results are (more or less) known by many insiders and also should be evident in publications[57].

3.2 Task: Finite approach to the existing, physical reality

If our considerations should not be superficial, the mentioned problem is fundamental and severe. Therefore we have to accept, that a mathematical approach, which is faithful to physical reality, also is finite (finite according to http://arXiv.org/abs/quant-ph/0108121).

Since in the physically measurable reality obviously counting is done very fast (short elementary time, parallelizing), analytic concepts probably will keep their justification on approximative calculations. However great progress might have to be expected, if we can explain the order of the combinations more exactly by orientation at our natural decision and perception process. Of course this process at first has to be described more exactly, cf. (Order).

[53] In many mathematical proofs implicitly or explicitly extensive use is made of the possibility of choosing a subset from a larger set. Under natural conditions this is joined to decisions, which require time (and free energy)...

[54] the greater, the more one calculates "at random"

[55] At first glance one perhaps could relate decision to division or subdivision, perception on the other hand to union (of Something). The so combined Something resp. the so combined formations are probably not only simple scalar quantities but sets with two or more dimensions, for (differentiated) perception always implies a decision within the perceived thing, more exactly said a distinction, i.e. a subdivision of the perceived set and an assignment of the parts to separated sets within the own past. For construction of an axiomatic system therefore it's reasonable to introduce the concept of the (primary) decision before the concept of the perception. Possibly it is necessary to distinguish between primary (1/2:1/2) decisions, which are independent of prior perceptions, and secondary decisions, which are dependent of prior perceptions.
Remarkable is the narrow connection of decision and perception particularly in later times; a sure (completed, perfect) decision would be possibly equivalent to a sure (completed, perfect) perception.

[56] their number becomes larger and larger also in the reality, but just not necessarily in the same order as in the (arbitrary, extrapolated) mathematical model

[57] However, often it is superseded, which also is consequence of an environment, which demands for quick and as clear as possible statements (without those often no money comes. But it's long-term seen unproductive, if wrong information is sold and bought). Particularly in popular scientific magazines such statements are frequently represented as "truth" (besides other actually correct statements). Such magazines belong to the mass media and there exists the trend to believe the statements of the mass media because they try to penetrate in frequent repetition on us. But an untruth doesn't get right by the fact that it is frequently repeated (mixed within true statements).

There are two possibilities for the method on the way to this approach:

1. We continue to work with the usual mathematical models, which presuppose a priori existence of infinite sets and the time independent axiom of choice, and hope, that sometime the infinities can be in a way reduced, so that the resulting approach finally is finite.

2. We start with plausible approaches, which don't presuppose a priori infinite sets (which are finite from the beginning and so also discrete). This implies that we have to consider initially minimal sets of possibilities for experimental results which are created and enlarged in the course of time (inclusive order). In the borderline case "t_total to infinite" this process should lead to current physics (and more) - a start from the other side to meet in the middle (again).

As far as I know up to the beginning of the 21st century only the first of both possibilities is considered in literature[58]. Due to the diversity of publications it's difficult for me to estimate, how far the in 1. mentioned hope for complete reduction of all infinities is legitimate, but I got the strong impression that lopsided much intellectual capacity is invested in this possibility. It is questionable, whether this is efficient - the method "explore and hope for reduce" allows many wanderings.

Without guideline there are (too) many possibilities {TooManyPossibilities}. Already today there are many special subjects (and special-purpose languages) so that an increasing hindrance of communication is the consequence. Due to the nature of the matter substantial progress on a way to an exact[59] (and therefore also finite) approach probably only is possible, if at this research is done without the time independent axiom of choice, continuous number sets and all from it derived model concepts, even if it is difficult[60] at first.

This is one of the reasons for this which caused me to try the 2nd possibility. At this it's comprehensible to work on the principle that the finiteness is reflected in the fact, that the number of combinations (mapped on elementary arithmetic steps) leading from a decision (to measure) to a perception (of a measurement result) is finite, exactly if measuring time is finite. This is the case in the approach discussed below [RecombinationCountFinite], in which the progress of proper time is related to a return of (own) pattern back to the center (TimePerception).

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[58] Up to now I didn't find in literature any approaches which try to describe, how the number of possibilities of experimental results increases discretely in the course of time. If I'm wrong or there is a change to this, I would be very much (***) interested in references, which are relevant to this.

[59] In case of approximative calculations often it may be impracticable (and also not necessary) to work completely without the axiom of choice and continuous sets of numbers. Nevertheless an exact approach also is necessary for basic knowledge, which e.g. is needed to be able to estimate the applicability of approximative calculations.

In this context one of many examples, which shows the necessity of exactness [ExactnessNecessary]: We look at the function sin(x 2π), which frequently is used for description real waves. It has zero points for all (arbitrary large) integer x. If the number π (and the function sin) however has no (exact) equivalent in reality (because never exact conceivable), the function values and zero points in reality in case of sufficient large x clearly deviate.

[60] I noticed afterwards, that my previous argumentation in parts is similar to the one of the *intuitionism* [libr1] [libr2] [litr] [litr1] (cf. a. [IntuitN3]). Independently of this the considerations here should be substantially new.

3.3 Finite approach by combinatorial inspection of information paths

No doubt, the way of the information from our decisions to our perceptions depends on a physical law. Because of the shown problems this law can *not* be of analytical and therefore continuous (for example geometric[61]) nature. Primarily it must be a discrete, combinatorial law[62]. Of course in case of a macroscopic measuring many combinations happen, so that the borderline case of the continuous, geometric appearance results.

Abbreviated prehistory: About 1992 I noticed, that we could only recognize codes, for which we have the counter code (the decoding code). So before every measurement we have to send away something *from us* like an "anti pattern" or "test pattern" (later I recognized that this action lays in our decision for the measurement) and the change of the returning pattern (relative to the original) contains the information of the measurement result. I studied the probabilities for return of the test pattern and noticed, that they correspond to the coefficients of the taylor series expansion of the function 1/√(1-x^2). It is well known that for x=v/c this function is proportional to relativistic time dilation. So, shortly spoken, proper time is proportional to the sum of probabilities for return and it is plausible to assume, that progress of time is necessarily connected[63] with return events, i.e. "central returns" (in the middle, in the symmetry center of a symmetric binomial distribution, cf. (Q0Triangle).

One important progress connected with this approach is, that it gives first insight in the (of course *finite*) ways of information from decision (to measurement) to perception (of measurement result) and that it contains only finitely many arithmetic steps - from start in the present center until return to the center. There is no a priori necessity[64] of analytic models [which implicitly uncouple[65] physical reality from consciousness, which hide the

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[61] The geometric appearance influences our thinking so much that there is great danger of wrong conclusions. Even the mathematical approaches of quantum physics are concerned. For example one speaks about a total angular momentum *lges* of a particle and calculates it from (in reality not simultaneously measurable) momentum components *lx*, *l*y und *l*z according to the formula $l_{ges} = \sqrt{(l_x^2 + l_y^2 + l_z^2)}$, although it is well known that in reality every angular momentum is an integer multiple of the half effect quantum hq/2=h/(4π).

[62] This law is actually an old hat.

[63] The fact, that nothing can happen without progress of time, shows the strength of the connection. Therefore a computer with infinite clock speed is not possible.

[64] I also see no possibility to *justify* the a priori usage of analytical models. Already the basic analytical concept "continuity" proves to be inappropriate for (exact) description of physical reality.

[65] Any decision, which we take, is strictly speaking the decision to a most often very complex (physical) experiment, whose initial parameter is the complete information at the beginning of the experiment, including the information about our decision. Depending on time then our perception contains a more or less large portion of the information about the experimental result. In the case of a simple quantum physical experiment with simple result (e.g. "Spin +1/2" or "Spin-1/2") our perception can be complete quite soon, i.e. it can contain the complete information about the experimental result. If the mathematical model, which describes an experiment, requires an *infinite* number of arithmetical operations for calculation of the probability distribution of the result from the initial parameters, this means strictly speaking (ExactnessNecessary) an uncoupling of the experimental result from the initial parameters, which also include the information about our decision. But actually (in case of finite experiment duration) the way of the information from every decision to every
(Fortsetzung nächste Seite)

connection[66] between our frames of reference and so can lead to a wrong and restricted philosophy [EgoismIsStupid].

The next chapter should give insight into the nature, way and sequence of the combinations, which are connected to our decision and perception process and make first mathematical suggestions, of course only as far as I could get ideas of it. I hope you then will understand why I have named these combinations "recombinations". I have approached the topic in a similar way in thoughts like the next chapter is written.

4. APPEARANCE OF SPACETIME GEOMETRY AS (STATISTICAL) RESULT OF A DISCRETE COMBINATORIAL LAW

First a recall: We should not forget that all geometrical appearances like "location" and "direction" are only possible, if rest mass exists, i.e. if there is an asymmetrical appearance of (charge resp.) matter and antimatter relative to our present frame of reference {AsymmetryAsPreconditionOfGeo} (***).
Due to the initial symmetry and the conservation law (PrimaryConservationLaw) matter (and the with it statistically emerging space time geometry) is not the final state. The largest perceptible branching width has the first state after a primary decision (truth) .

4.1 No isolatedly definable metric units, no "smallest particles" resp. "building blocks" of matter

It is already known that the concept "(smallest) particle" is only a model idea which doesn't correspond (exactly) to reality. Of course it's understandable that use of this model concept is frequently made: It is easy to imagine matter as composition of smallest particles or "building blocks"[67] (with firm, absolute sizes) and helpful for calculations. But (all in all) it isn't

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perception (from us to the surroundings and back) isn't infinite (we aren't uncoupled), but finite. It contains only a finite chain of recombinations, whose mathematical equivalent includes an only finite (RecombinationCountFinite) chain of elementary arithmetical operations (ElementaryCombination). Of course we are not uncoupled from our surroundings but connected (by finite ways of information).

[66] The (strength of the) connection between two points of reference can be defined as square of the correlation coefficient of available information on both points. It is the larger, the smaller the branching depth between the points is, and the longer the time tc is, in which information is collected. In case of small tc (like human lifetime) it is not obvious. In case of tc becoming very large, the connection goes to 1 {ConnectionIsTimeDependent} . When the branching depth changes and becomes 0 (former or later inevitably due to conservation laws), the connection also becomes 1.

Within these general conditions the (strength of the) connection depends on the measurement method and measuring accuracy (on the energy of the electromagnetic quanta used for measurement). If accuracy is becoming smaller, the measured connection is becoming larger.

[67] The phrasing "building block" clarifies the common idea of elementary particles and also shows the error in train of thought connected to the particle model. Namely a "building block" means something "stiff" or "frozen", therefore from the point of view of time unchanging, which exists completely isolated (implicit: "always independent") of the observer. It then wouldn't be observable at all.
Observation is always connected to the exchange of information. However, the exchange of something means that both in the subject and in the object something happens. This is only possible, if in both sides time passes {DtOnBothSides}, if there is an [overlapping].
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consequent to be left with this model (or the mathematically equivalent wave model[68]).

4.2 Special functions as dimensionless conversion factors

When we try to free ourselves from this model idea, first of all the question after the basis of metric[69] sizes arises: What is small, what is big? It is known that measurement results regarding this are dependent on the observer's "point" of view. In this context the functions

$$QW(x) := \sqrt{1-x^2}, \quad QV(x) := \frac{1}{\sqrt{1-x^2}}$$

So the experimental results also show that e.g. the length is connected with the impulse (unsharpness resp. indefiniteness of location). The isolated definition e.g. of a smallest length greater 0 isn't meaningfully possible probably because that isn't compatible with our decision and perception process: The "length ends" would be distinguishable (a step further into the future), which however would only be possible, if there are still smaller lengths. Primarily the discreteness (discontinuity) of the perceptible reality probably is caused by {information} theoretical quantities (bit, proper time unit [ProperTimeUnit]), which relate to our decisions resp. distinctions, not e.g. by (isolatedly defined, absolute) metric quantities.

[68] The wave model also works with absolute scales. In addition, one uses approximative (analytic) functions for the description of the waves at present. The reference to probability distributions, which is joined with the concept "wave", provides however interesting hints. The concept "wave" corresponds more to a probability distribution, i.e. the pre-state of a decision, the concept "particle" more to the result of a decision (to information causing in turn a new probability distribution).

[69] These surely cannot be viewed isolatedly from other physical quantities. We have already learned that even "small" dependences have important consequences e.g. dependences of lengths to impulse or potential. Of course further dependences are existing, already because of the frequent usage of (analytic) formulae, which are approximative due to the mentioned reasons (AnalysisAtBestApproximative).
If a dependence isn't known up to the present, unfortunately often is concluded (unconsciously) that there isn't any dependence. Particularly clearly this then is, if analytical models are isolatedly extrapolated to the extreme (e.g. big bang theory, spherical black holes [ExtrAstroPhys]). This leads to nonsensical, partly contradictory results because the basic conditions for which these models have approximative validity don't exist in such extreme ranges any more.
(e.g. it was asked, whether the universe is open or closed: At firm, absolute Schwarzschild radius the universe "expanding since the big bang" would have been closed in early times, why should it be open now? So the suspicion arises that the used concepts are in principle unsuitable.
A reality conform model should have 0 as "total" sum for energy and all further quantities for which conservation laws apply (Cons0Sum) . Experience shows that there is never a violation of conservation laws, and it shows that any positive energy (e.g. rest mass) implies a negative gravitation potential, which is large within the (probably flat) universe. So the gravitation "constant" could be calculated from conservation laws, and would be not necessarily constant. The gravitational interaction could statistically (meanwhile very slowly) decrease in the course of time, compared to the electromagnetic interaction. Probably the perceptible mass increases faster. If the mass is constant and in the early universe concentrated within a much smaller radius, then the early universe would be (extremely) closed. Very arbitrary framework is necessary to explain how this expands up to now, see also http://www.cosmologystatement.org/ .)
Other basic conditions make other combination orders more probably than the one for which the formula was written. At the solution of non-linear equations it would be necessary to take the natural probability of different solution directions (combination orders) into account correctly.

play both in geometry and in the physics an important role, e.g. QV(v/c) [70] as factor for relativistic time dilation or QW(v/c) as factor for length contraction (cf. a. [GyroscopeModel]). These functions contain only an approximative approach but they after all are used for calculations which don't start out of absolute scales but of a non-linear[71] connection of the sizes of the observer system and watched system.

4.2.1 Discrete considerations to nonlinear relativistic relations can lead to a bridging from relativity theory to quantum physics

{BridgesToRel} Relativity theory (problematically) presupposes continuous spacetime geometry and the frequently used functions QV and QW lead to irrational results. The following discrete considerations (e.g. to finite series expansions of QV and QW, cf. (TaylorQV), (TimeDilation) and (TaylorQW)) avoid this from the beginning and at the same time offer approaches for a bridging from relativity theory to quantum physics.

4.3 Correlation (of sizes) and flow of information

Correlation implies flow of information and this is necessary for every observation (to and for finished perception also back[72] (FinishedPerception)) The conservation laws (Cons0Sum) show that calculation is exact in the end {ConservationLawsImplyExactness}.
(To be new the transmitted new information component should lie in (physical) quantities, which are temporarily solved from this connection (correlation coefficient resp. scalar product is 0, geometrically: orthogonal). Probably therefore the individual flow of the information must change the direction[73] {DirectionChanges} at every new observation.)

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[70] v = relative speed, c = speed of light

[71] As mentioned we cannot proceed on the assumption, that any endless (one- and of course also multidimensional) number sets (more exact: their equivalents in the reality) are existing from the beginning. Linear dependences either don't exist (for elements of a kernel unequally {0} or in case of missing surjektivity for elements outside the image of the dependence describing linear function) or (in the case of a bijective function) don't allow any freedom for new information, which could be represented e.g. as a set of new number vectors (in independent direction). However the elementary combinations, which correspond to non-linear dependences give hints for an objective explanation of the growing simultaneously perceptible information set (of recombinations) resp. the equivalent in form of a growing set of different number vectors.

[72] Outflow and inflow (flow and backflow) from different (orthogonal) pairs of directions?
In this context I thought of the Maxwell equations and the orthogonal directions of electric and corresponding magnetic fields, whose vector product (the {Poynting} vector) represents the flow of free energy, and that this free energy is directly perceptible by us (and also can be emitted by us (FreeEnergy))
These might correspond to the transitions future-presence resp. presence-past.

[73] Here further (combinatory) considerations may continue, e.g. under consideration of the [Maxwell] equations. But change of direction means by implication that the observer's point of view {ObserverViewPoint} cannot be a simple point. Otherwise there wouldn't be any distinguishable directions. Indirectly the former observer point of view already is taken into account with the impulse, which evidently not yet suffice. In the following we nevertheless talk of points, otherwise the considerations get quite complicated too early.

As generally known, information (initially) is transmitted by photons[74]. These information packets move to the following target point [FollowingReturn] (where the are absorbed) with light speed and no information exchange is possible in between (otherwise we would regard the "in between” as following target, [WayTimeConstantTillNextReturn]. Especially in elementary consideration at the moment of the start we don't know, which of two elementary directions[75], which spin the photon will choose resp. which possibility is predestined (by an earlier decision). In abbreviated formulation[76]: We don't have information about the destination of the photon or its next decision.

4.4 Combinatorial considerations to the ways of information (Q0-triangle) (***)

We come to the {combinatorics} now {InformationPath}:
The elementary information unit is a bit which means the information about the choice for one of two possible alternatives. Let us assume that we have no information about the next decision resp. the next direction. No direction is preferred in the beginning {DecisionFreedom}. Thus both alternatives have equal probability p=(1-p)=1/2. Now, each of these possibilities again is starting point for a new decision etc... The so emerging probabilities for the different ramification possibilities resp. recombination points have a symmetrical binomial distribution (cf. [lifa] p. 245-281, [ligr] p. 153-256, also[77] [lied] p. 3).
We will call the totality of recombination points subsequently "Q0-triangle"[78] :
{Q0Triangle}

n	k->	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	
↓																					
0											1'										*1/1
1										1		1									*1/2
2									1		2'		1								*1/4
3								1		3		3		1							*1/8
4							1		4		6'		4		1						*1/16
5						1		5		10		10		5		1					*1/32
6					1		6		15		20'		15		6		1				*1/64

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[74] More general: By "determined" units which contain enough free ("non-contradictory") energy to overcome a separating potential (information) barrier [PotentialBarrier].

[75] As model one could imagine, that the photon comes from a single dipole radiator. But already the rotation symmetric form of the dipole radiator with surroundings isn't elementary but a geometrical borderline case. Therefore subsequently we assume that at first only 2 directions are eligible.

[76] This formulation may be even a quite good, if no decision about the direction has been made yet.

[77] The Gaussian distribution plays a central role in Eddington's "Fundamental Theory" and led him to interesting conclusions. In case of an priori finite (and therefore also discrete) approach the Gaussian distribution has to be replaced by a symmetric binomial distribution. The binomial distribution offers additional starting-points for elementary combinatorial considerations.

[78] The original Pascal triangle [lius] shows the numbers of way possibilities. Here (in the Q0-triangle) these numbers are multiplied by 1/2^n respectively (pl=pr=1/2; n is the number of the row resp. the count of steps) to get the corresponding probabilities. The numbers of the Q0-triangle are quotients of the regular Pascal triangle numbers and 2^n.

```
7           1    7    21    35    35    21    7    1        *1/128
8         1    8    28    56    70'    56    28    8    1      *1/256
9       1    9    36    84   126   126    84    36    9    1   *1/512
...
```

The probabilities in the vertical symmetry axis of the triangle are indicated by " ' ". These are the probabilities of central return events {ReturnToK0} in the center, the "central return probabilities" and dependent on the row number n. We shall call them Q0Z (n) and obtain {DefQ0Z}

$$Q0Z(n) = \frac{n!}{2^n \left(\frac{n}{2}\right)!^2} .$$

The resulting table for Q0Z(n) is

n:	0	2	4	6	8	
$Q0Z(n)$:	1	$\frac{1}{2}$	$\frac{3}{8}$	$\frac{5}{16}$	$\frac{35}{128}$	...

On the other hand the Taylor[79] series expansion of QV(x) is

$$QV(x) = \frac{1}{\sqrt{1-x^2}} = 1 + \frac{1}{2}x^2 + \frac{3}{8}x^4 + \frac{5}{16}x^6 + \frac{35}{128}x^8 + ... \qquad \text{\{TaylorQV\}}$$

Remember that QV(x) is the factor of relativistic time dilation in case x=v/c {TimeDilation} (cf. e.g. [lifl] p. 26 and 27).

4.5 The middle column as the vertical symmetry axis, the column of the central return probabilities of pattern and counter-pattern

{CounterPattern} The (vertical) sum[80] of the "central return probabilities" (probabilities for return) corresponds (because[81] of 4p(1-p) = x^2) to the Taylor series expansion of QV(x) in the case x-> 1 or v-> c. In the case v=c (photon speed resp. speed of light) the probability of a step to the right is exactly equivalent to the one of a step to the left, so the next step direction is completely undetermined and in the middle resp. in the center (the vertical symmetry axis

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[79] For exact calculation of finite partial sums of the taylor series expansion we need only a finite number of elementary combinations (ElementaryCombination). This is nearer to reality than the function itself, which cannot be exactly calculated (in some way) within finite time.

[80] One has to start out from the assumption that (at first, elementary) only simple combinations (arithmetic operations) are carried out in nature (which need time). If in a series summation is done only over a finite number of sum members, infinities can be avoided, just in the usually quite difficult case x = 1 resp. v=c. Relatively complicated functions like QV(x) or QW(x) are the borderline case, the result of a large number of simple elementary combinations.

[81] {xAndp} For p unequal 1/2 changed probabilities result in accordance with [Q0Pvar], especially a correction factor (4p(1-p))^n, which corresponds to x^(2n) in the taylor series expansion [TaylorQV] of QV(x), must be used for every row 2n.

k=0) the probability is maximal {VisCinMiddle}. Because it's just the speed of light resp. the flight speed of information, which is assigned to the central return probabilities, it is natural to use the word "information" for that, which arrives here and is (after recombination) sent out again. [InfoConcrete]

4.5.1 Correlation of decision resp. perception (orthogonality as information theoretical concept)

If 0 < x < 1, then we have a correspondence to the case that the probability p of a step to the right differs from the probability of a step to the left, i.e. p is unequal 1/2. This means that we here already have more or less information about the next decision there i.e. already more or less information exchange[82] has been possible between here and there. The proper times[83] of here and there are not orthogonal, i.e. the "correlation coefficient[84] of decision resp. perception" isn't zero, but has a parallel, common component [CommonComponent]. Because of inertia this is valid along a series[85] of steps, in which proper time here seems to run QV(x) times faster then there [TimeDilation], where the factor QV(x) is equivalent to the sum of the own central return probabilities [PerceptionInCenter].

4.5.2 Proper time proportional to the sum of the central return probabilities; input is descended from former output

In analogous way also from our own (lokal, individual) point of view the central return probabilities correspond to the probabilities (per double step n->n+2) that the information resp. pattern, which had been temporarily separated[86] (in form of free energy [FreeEnergy])

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[82] For v<c it is matter with rest mass. Seen so, information interchange (with the observer) therefore means (partial) transfer of the photon impulse to rest mass.

[83] One could argue analogously with metric (and of it derived physical) sizes.

[84] Orthogonality of vectors means a scalar product of 0 . The correlation coefficient also can be understood as scalar product, and thus {orthogonal} vectors as {uncorrelated}. The absolute value of the correlation coefficient is the smaller, the greater the separating potential barrier (x^2) is {PotentialBarrier}. It has to be considered that all potential barriers which must be overcomed necessarily have to be taken into account. If e.g. two rest mass reference systems can exchange information only by photons, then also in case of low relative speed of both the separation of perception may be great because information has to overcome at least 2 subsequent transitions with great potential difference, with flight speed v -> c, i.e. x=v/c->1 and the correlation coefficient goes against 0.
It is still worth mentioning that the proceeding of the outer time coordinate at first isn't influenced by our decisions, i.e. it is plausible to assume outside a decision direction orthogonal to time direction. This is different inside {IOtime}. In our thoughts we have relatively far-reaching decision liberty regarding the time coordinate. We can remember different times and also control this, bat there isn't a liberty in location relative to our body. Till now I haven't deepened these considerations.

[85] The reasoning with information flow over single points is simplified. Interactions of several points must be taken into account at the same time (deductively) to consider e.g. inertia. A quite demanding, but interesting (***) task - suggestions would be very welcome. A more precisely definition of "at the same time" and "after each other" is necessary.

[86] This means temporary lack of information for us, because at first we are missing the information (the perception of the reality) in the not chosen alternative. So decisions imply temporary lack of information defect for the one, who decides and therefore needs confidence [ConfidenceNecessary] [FreeEnergyNeedsConfidence] (like falling asleep, like temporarily
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by our decisions from us resp. the information starting from us (the amount of security which we give or take away) returns to us and is perceived[87] by us again in recombined[88] form. This can be understood indicating, that with our temporal perception {TimePerception}, with each proper time progress necessarily the partial re-union[89] of our own (lokal, individual) pattern and counter-pattern[90] [CounterPattern] (which has been separated from us by our former decisions) is connected – that in the end exactly that pattern is perceptible for us, which is descended from us[91] (separated by our own former decisions[92]) [OwnPerception], whereby

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leaving control, like "giving oneself for decisions"). Since the system separated by decision is temporarily free, it also can decide itself. The so possible recombinations in between quickly permit a gigantic set of way possibilities (for return) and multiplication of Information [Diversification].

[87] Perhaps the formulation "added to our local reality resp. presence" also would be adequate here.

[88] Consecutively, in the long run; after renormalization (Renormalization) in amplified, diversified form (Diversification).

[89] Since at this pattern and counter-pattern are extinguishing (becoming 0) in one direction component, this component probably isn't immediately perceptible by us, but only the projection onto our (Hyper)plane t=0. For example conceivable would be, that the reunification (and the with it joined deletion of pattern and counter-pattern in individual resp. local time direction) is connected with putting the present time to 0 permanently, from which the impression of the permanent new begin of present could emerge. The probability of the new presence is permanently (after every decision) set to 1, renormalizated. [AxiomP1] {Renormalization}
This (probably an axiom - we are here) would have to be taken into account in calculations. From this the subjective impression of the surrounding multiplicity of (also identical) particles could follow, so to speak as necessary "compensation" of renormalization to avoid contradictions (number π as approximative divisor of the proportionality constant) [PerceptionOfMultiplicity]).

[90] I chose the word "counter-pattern" to clarify that the key of perception lies in an (nearly) exact fit of counter-pattern to the corresponding part the own pattern - so that the sum is (nearly) 0 which is the symmetry center. Speculation to "nearly": in case of exact fit only time passes (so time as large flow, but not visible due to exact antisymmetry which results in exact extinction), else there is additionally energy transfer (information transfer - information is only measurable, if the symmetry is temporarily incomplete there). It is plausible to assume that directly before reunion the speed of pattern and counter pattern is the speed of light, this would directly explain that a greater speed is not possible.

[91] Strictly speaking every elementary decision is also the decision to a definite measurement, by the fact that an exactly the (coordinates of the) decision describing counter-pattern is separated. Due to the conservation laws the perception of the (in recombined shape, also after and after) coming back counter-pattern done always sometime and is the measurement result {DecisionToPerception}. Therefore one also could grasp each of our macroscopically visible decisions as transmission of a large connected sequence of counter-patterns, which we receive again after more or less many recombinations (in changed shape, together with other counter-patterns which have been sent out by us) as truth resp. reality in the extensive sense. In this (Fortsetzung nächste Seite)

(outside of present consciousness) in between more or less many recombinations happened[93] (***) {PTimePropSumQ0}.
May be, that on the second look much of this conclusion is obvious without much arithmetic, already due to the constancy of the light or *information* speed relative to us personally.
So the formulae indicate, that all information[94], which we now receive (input) is descended from information, which we formerly have sent (output), and, of course, that also future input will be consequence of former output (***).
Definition: "global time" {GlobalTime} is proportional to the sum of probabilities of return to

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respect our life also is a science, a science not quite in itself, but in the beginning a very individual (special).

[92] Separated {TemporarySeparationNecessary} by decisions between the left and the remaining - after every decision the remaining is our immediately following (present) frame of reference. Most often the change of the reference system is minimal (proper time increases), however, it also can get quite clear [FullReferenceFrameChange].
Additional remark: The function QV(x) appears as factor and x is the root of a potential difference. Work is necessary to overcome a potential difference. One can on the one hand interpret this information-theoretically, then this means output of information (release of free energy (FreeEnergy) which results from own decisions), on the other hand simply physically as work=force*way.
If the factor QV(x) is large, so also the separation of the reference systems, i.e. the directions of the most probable ways within the reference systems are unmistakable different. The separation arose from earlier (locally primary) decisions, these also determined the individually locally most probable way. New decisions (which also may be objectively better than some old local decisions, which also may be able to come nearer to the objective truth), which lead away from this local way, initially require work and effort. We already notice this in small dimensions in form of inertia.
Such considerations are locally still easily comprehensible. A more global consideration is fundamentally more complex. One consider, that a globally most probable way (as result of a primary decision, which determines the truth) can "look" e.g. circular or even completely crumpled in small dimensions (if it would be visible previously).

[93] Clearly the number of recombinations (and with this the number of equivalent arithmetical steps) from the starting point to the current destination point always is finite {RecombinationCountFinite}.

[94] QV(x) is proportional to the increase of proper time. The greater n resp. the longer the partial sum of the taylor series expansion of QV(x), the more recombinations are done, the greater is the probability that something, which is separated before, returns. In case of x=1 resp. v=c this probability goes against 1 (cf. a. taylor series expansion of –1/QV(x)=–QW(x) [TaylorQW], summation beginning with the second power of x). This is the common case for photons, which transfer information. So we can assume, that all information (the sum of generated security or insecurity about future), which we send, is coming back surely, in recombined form.
This also clarifies the stupidity of egoistical thinking resp. behavior {EgoismIsStupid}. Such thinking restricts itself unnecessarily (e.g. within the current reference system and its short-term future), doesn't recognize the consequences of current behavior (current output) for long term future (input) and therefore makes mistakes. The unnecessary, often very painful consequences are problematic outside and at last *also* inside (in a long-term consideration every egoistical concept proves to be senseless, because the "I" is only temporarily distinguishable of "we".). The fatal consequences of egoism also apply to greater units (couples, small and great groups, lobbies, companies, nations, mankind), if these units behave ruthless towards the environment {EnvProt}.

the global symmetry center (GlobalSymmetryCenter) .

This is too large to be measurable (RealInfinityGrowsWithTime). A measurable (statistical) time direction is defined (from outside the center) *towards* the center. At this the resolution is growing.

4.5.2.1 In the two-dimensional model the total number of steps resp. central return points is proportional to t^2

{NPropT2} If we define

$$t(n) := \sum_{m=0}^{n/2} Q0Z(2m),$$

then holds

$$\lim_{n\to\infty}\left(\frac{(t(n))^2}{\frac{2n}{\pi}}\right) = 1\ .$$

{T2GoesTo2nDivPi} [T2GoesTo2nDivPi]

So if we start out from the assumption that (in case of no reference system change, two-dimensional model) the sum the central return probabilities Q0Z (return probabilities) is proportional to proper time t, then (for large n) the step resp. row number n increases proportionally to the square of proper time.

4.5.2.2 (Proper time without reference system changes; row number n and distance covered during constant acceleration)

Preliminary note: At last this approach seemed to me less relevant than the one of (small) correlation (GravitationBecauseOfCorrelation).

We know that the length of the distance covered during constant acceleration is proportional to t^2. This may remind to the proportionality of the row number n to t^2 in (NPropT2). Also gravitation conveys the impression of constant acceleration, at "constant" distance (and missing centrifugal force). But the classification of a distance as "constant" is dependent on the own length scale, and with the row number n also squarely the row length and with that the own length scale can increase {DynamicLengthScale}. Of course more exact considerations should take into account also the distance dependence. The probability for way there and way back between recombination points is the greater, the smaller the relative distance between them.)

4.5.3 In case x=E0/E the symmetry center k=0 corresponds to v=0

{xAsE0divEandkAsMomentum} Above (TimeDilation) we set x=v/c and recognized QV(x) as proportionality factor of the relativistic time dilation. But the interpretation possibilities are by no means exhausted. If for example we understand x as quotient E0/E of rest energy and total energy and P as absolute momentum, then because of [QWasExpectationValue] we get

$$\frac{Pc}{E} = \sqrt{1-\left(\frac{E0}{E}\right)^2} = QW\left(\frac{E0}{E}\right) = |< k/n >|$$

{Ppropkdivn} We see that the momentum is proportional to the expectation value of k/n. So the symmetry center k=0 of the distributions (vgl. (Q0Triangle) und (Q1Triangle)) can be related not only to the case P=mc resp. P=mc but also the case P=0 resp. v=0 (Low Temperature Physics).

4.5.3.1 At this the mean value of k/n is proportional to the quotient wave number/frequency of matter waves

The wave number K of matter waves is

$K = 2\pi / \lambda = P / \hbar$
and their angular frequency
$\varpi = 2\pi\nu = E / \hbar$.
So in the case x = E0/E because of [Ppropkdivn] follows

$$\frac{K}{\varpi} = \frac{P}{E} = \frac{1}{c}\left|\left\langle \frac{k}{n} \right\rangle\right|.$$

4.6 The introduced model (Q0-triangle) needs additions

The presented model, which works with the Q0-triangle, surely is incomplete (and also too flat, cf. a. [NotFlat])), questions like "From where comes the source in the start?" cannot be answered so. A modified Q0-triangle shall be introduced now, in which the central return probabilities are "flowing out" and therefore in the actual system for the present cannot be sources any more (by the fact that they are put on 0).
They then could flow out to another (orthogonal) direction and come back after[95] and after. Symmetry considerations (attention of conservation laws) can give first hints, where and how this happens. If for example something flows out in the center (concerning both sides exactly symmetrically) then the total effect of the returning must also concern both sides in symmetric way (e.g. output in k=0 <-> input in k=0 or symmetrically round k=0; generally the number of drains isn't necessarily equal to the number of sources. Multiple points (PerceptionOfMultiplicity) of in flow and of out flow (also "back flow"[96]) are possible per proper time unit (ProperTimeUnit).).

4.7 Directed flow of information, centrally "flowing out" probabilities: Q1-triangle

The following "Q1-triangle" bases on the assumption, that during measure resp. perception process all of the central return probabilities[97] is taken away, so that they can't be sources (for superposition, interference) in the same triangle any longer (directed flow of information). So they get incompatible with each other: The definition of incompatibly can be formulated miscellaneously, e.g.:

1. Incompatibly of two events means that they cannot happen[98] simultaneously.

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[95] Our current point of view (our localization) determines the order and the separability of the perceptions. That, which by one point of view is simultaneous, generally by another point of view isn't simultaneous (and conversely) in the general. However, the (symmetric and antisymmetric) exceptions are also interesting.

[96] There is no causality violation within (***) a single proper time unit, because an order is only defined by chaining multiple proper time units.

[97] With it are meant more strictly speaking the events (the returns in the middle of the Q0-triangle with all ways and accompanying amplitudes which flow into there), which correspond to the respective central probabilities; the corresponding places are the "outflow holes". From the observer point of view after removal of the corresponding probabilities the events don't exist any more in the present. One surely can describe this also in another manner, for example as differentiation (DiscreteDiff), i.e. presence as difference between future and past, flowing out into memory.

[98] the are not simultaneously be perceptible by any observer. Also our own reference system is unique. By the fact that we are aware of something, e.g. a localization, we exclude another localization for this moment.
Possibly one can associate to every sort of particle a specific position, more exactly said a specific combinatorial constellation (relative to a common frame of reference) cf. (ElementaryCoordinates).

2. Events not appearing at the same time are incompatible with each other if the first excludes the following.

The second definition applies to our case: If a single quantum is "flown out" centrally in the previous row, it cannot flow out in the next but one row again {DistinguishableOrder}.

4.7.1 Orthogonal change of direction in recombination points (multidimensional approach); Separation (of inside/outside, past/future) due to perception (of something separable), due to differentiation

The more central probabilities "flow out" (are set to 0) with increasing row number n, the more disconnected become left and right side of the triangle. Therefore a so described perception resp. measurement {QuantumPhysicalObservation} causes (quantifiable) separation (***) resp. separability (according to the perception[99]), which a decision makes possible in turn, in this model between the left and the right[100], in multidimensional[101] approach perhaps also between "inside" and "outside"[102] or past and future [IOtime].

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[99] Bridge to the double slit experiment: The destruction of interference by perception of a passage through the right or left slit could just be caused by this separation: The interfering (the center crossing) parts were set on 0 (due to absorption of photons [PhotonAbsorption]), only those way possibilities, which lie *completely* on the right side (resp. passed through the right slit) or those, which lie *completely* on the left side (resp. passed through the left slit), remain.

Due to renormalization (Renormalization) the sum of their probabilities becomes 1, because no other ways are possible and after registration of the particle behind the slits on the screen surely one of the *possible* ways has been used.

[100] We can decide in favor of a side and one moment later (along proper time) we can explore it more exactly (during this perception we can make further subdivisions) {SubDivisionWithinChoice}. Decision and perception are closely together.

[101] At first it is remarked that the *perception* of an orthogonal change of direction as "geometric bend of 90 degrees" is dependent on the observer point of view (synchrotron radiation). If one starts out from the assumption that with every recombination the direction is changed, the set of all (within the triangle vertical subsequent) recombinations whose probabilities |Q2Z(n)| flow out becomes a {multidimensional} (not dot-like) structure, e.g. a surface (from view of almost all points of view), which in analogous way also applies to the points of (horizontal) rows. The sum of all |Q2Z(2n)| (without row 2n=0) goes for v->c (flight speed) against 1, according to the probability, that a transmitted photon meets the next surface which is surrounding the transmitter (therefore reverse approach: Surrounding as "outflow hole"; in the case v<c we look at rest mass particles, whose "outflow probability" is smaller than 1, but greater than 0 (tunnel effect).

[102] More exact information about the area which was separated in the start (row 0) is missing. The subjectively nearer area of the own recent origin however is better known. Due to the conservation laws both ranges must be represented somehow (in our world), their asymmetric perception (surplus of matter [SurplusOfMatter], more below in hierarchy also the distinction inside-outside) is result of the own asymmetric information (of the individual last start point outside the center) due to our decisions [FullPrimarySymmetry]. Our asymmetric perception of reality shows us human beings, how much we are subordinated in hierarchy. Information exchange can help us to recognize the objectively existing symmetry more clearly. Then we can recognize the symmetry center from our current point of view and decide in direction to the objective (central) point of view (again).

Geometrical concepts like orthogonality are portable to [information] theoretical concepts, cf. (orthogonal)
If one provides the probabilities in the normal Q0-triangle on the left side with negative[103] sign (cf. [ProbabilityAmplitude]), the following "Q1-triangle" results. It is a modified Q0-triangle with central probabilities[104] set to 0:
{Q1Triangle} [105]

n k->	-9	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9
↓																			
0										±1									
*1/1																			
1									1		-1								
*1/2																			
2								1		0		-1							
*1/4																			
3							1		1		-1		-1						
*1/8																			
4						1		2		0		-2		-1					
*1/16																			
5					1		3		2		-2		-3		-1				
*1/32																			
6				1		4		5		0		-5		-4		-1			
*1/64																			
7			1		5		9		5		-5		-9		-5		-1		
*1/128																			
8		1		6		14		14		0		-14		-14		-6		-1	
*1/256																			
9	1		7		20		28		14		-14		-28		-20		-7		-1
*1/512																			
...																			

4.7.2 Quantitative considerations, symmetries

It is obvious that the amounts of the probabilities decrease (centrally they are flowing out[106]).

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[103] With this one can take into account the opposite direction from view of the (unique, singular) row center.

[104] So they are no possible sources during the next moment (step), just like a photon with impulse not to the observer but with direction to the outside.

[105] Probably in our system with rest mass (asymmetric mass of nucleus and atomic shell) the outflow (the passage of 0) is decentral with assymmetry of the distributions at both sides of this 0-passage.

[106] An interpretation possibility as bridging to physiology: the more we take decisions consciously (as connected sequence within ourselves), the less is left, the greater the probability becomes, that the kernel of consciousness finally "flows away" resp. "flows out" {FullReferenceFrameChange}. So a connected chain of consciously controlled decisions is the more improbable, the longer it is - except in the (GlobalSymmetryCenter). We know that e.g. the depth of our concentration is limited, also the duration of connected conscious control (sleep need…). It is only a question of time, then we change the reference system.
(Fortsetzung nächste Seite)

For even n the sum of all probabilities in row n equals the central return probability Q0Z(n) of the normal Q0-triangle, the sum of all squares of them equals Q0Z(2n). The simple sum yields 0, what matches the conservation laws well {Q1RowSumIs0}.

4.7.3 Differentiation of the Q0-triangle, solutions of the quantum mechanical oscillator, Hermite polynomials

One can arithmetically regard this Q1-triangle as discrete differentiation [DiscreteDiff] of the Q0-triangle along k, the horizontal direction. So the removing (perceiving) of the Q0Z results in a differentiation along the horizontal direction (difference left-right, d/dk). Perception surely also means differentiation along time axis (difference future-past, vertical, d/dn) and the correspondence [TimeSpaceCorrInMiddle] of vertical and horizontal differentiation in the middle is remarkable.
The graph of a multiple (discretely) differentiated Q0 function yields an continuous seeming wave-like picture after a larger number of recombinations [wavelike]. There is a far-reaching analogy between those multiple discretely differentiated functions and the solutions of the quantum mechanical harmonic oscillator: By multiple discrete differentiation construction of orthogonal systems is possible, analogous to the Hermite polynomials [HermPolDiscrete]. At this the Hermite polynomials [HermPol] are (except sign) special cases of pre-factors resulting from multiple differentiation in the analytic borderline case. There are further considerations possible concerning integration and differentiation. Some can be found in the download files.

4.7.4 Possible further (open) combination possibilities

Particularly demanding: How can several triangles[107] be combined in different (how much?) directions (NotFlat)? At this the system must remain {open} [108] (***). Do multiple application of the Maxwell-equations give partial hints? How can the recombination points (in symmetric way) be connected, to get broad analogies to the physical measure-, distinction and decision process (cf. [PauliMatrices] [109])? Which recombination points are (dependent on

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Also before the complete reference system change (in the consciously controlled time interval) we give (with every decision) parts of us, these show in other systems, where things should go according to our will. How much follows, depends our influence (giving in prehistory) and current investment.

In ordinary everyday life we consistently recognize the influence of decisions. We recognize the influence of far-reaching decisions in far-reaching trends, at last also in the effects of physical forces along global time direction.

[107] Also other modifications are conceivable, for instance other outflow areas, "inflow" areas - it is for me alone impossible to explore all this.

[108] One has to take into account that the system must remain open and doesn't get completely deterministic, i.e. that connections back arise more slowly than recombination points with new open channels are created (for this there must be sufficient time, and space).

[109] Perhaps also the attempt "rational quaternions as probability amplitudes (Pl, Pr)" might be helpful. At this the probability amplitudes Pl resp. Pr for steps to the left resp. to the right correspond to two quaternions and consecutive axes of rotation (which results from the multiplication of the quaternions) should be orthogonal to each other.

observer location) differentiable in time[110], which one differentiable in localization, which seem to be an unit (cf. [ElementaryCoordinates])?

4.7.4.1 Strength of interactions

If there is a physical interaction between two systems, there is a way between them over more or less many recombination points. The shorter the passage, the more probable it is in the average (per proper time unit (ProperTimeUnit)), the stronger it appears. For example the strong interaction probably goes over only relatively few recombination points. This also permits more symmetries. The weak interaction however probably needs more recombinations, so that this complex connection hasn't left-right symmetry any longer [DecisionFunnelBorder]. It needs more time, from which the possibility for a comparison with past left-right definition arises.

4.7.5 Neg. sum of central "outflowing probabilities" multiplied by the sum of the central return probabilities yields 1

For every even row number n>0 let be the number |Q2Z(n)|=-Q2Z (n) the "outflowing probability", i.e. the probability for flowing out[111] centrally. Q2Z(n) is equivalent to the 1nd (discrete) derivative of Q1(n,k) in k=0 along k, i.e. Q2Z(n) = (Q1(n-1,1)-Q1(n-1,-1))/2; so Q2Z(n) is in k=0 the 2nd derivative of Q0(n,k) along k. It holds:
{DefQ2Z}

$$Q2Z(n) = \frac{Q1(n-1,1) - Q1(n-1,-1)}{2} = -\frac{n!}{2^n (n-1)\left(\frac{n}{2}\right)!^2} = -\frac{Q0Z(n)}{n-1}$$

The resulting table for Q2Z(n) is

$n:$	0	2	4	6	8	
$Q2Z(n):$	1	$-\frac{1}{2}$	$-\frac{1}{8}$	$-\frac{1}{16}$	$-\frac{5}{128}$	...

On the other hand the Taylor series expansion {TaylorQW} of QW(x) is

$$QW(x) = \sqrt{1-x^2} = 1 - \frac{1}{2}x^2 - \frac{1}{8}x^4 - \frac{1}{16}x^6 - \frac{5}{128}x^8 - \ldots$$

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[110] In combinatorial approaches it must be taken into account that temporal distinction doesn't allow any commutation of the order (***) [Order].

[111] If one calls for n greater 0 the values |Q2Z(2n)| = -Q2Z(2n) "outflow probabilities", so Q2Z(0)=1 is an "inflow probability" because of sign inversion. The probability to flow out in some row corresponds to the sum of the values -Q2Z(2n) from including n=2, the probability to flow in (and not to flow out opposing again) corresponds to the sum of the values Q2Z(2n) from including n=0. Here I am a little more generous also because the meaning of "out" and "in" is dependent on the observer's point of view which wasn't fixed till now. If however this point is defined more exactly, such finenesses become important and have to be taken into account.

The coefficients of the Taylor series expansion of QW(x) correspond to the negative probabilities centrally flowing out. If a system is separated by a potential x^2 (if it moves for example with v/c=x relative to us), so this expression is proportional to the component {CommonComponent} resp. part of time (reality) which is common between us and observed system, which is also belonging to own proper time[112] and present and therefore will also become own past [ToPast]. It is the greater, the smaller the separation potential x^2 is. One also can think about a matching, more exact description of the initial situation in the Q1-triangle [StartQ1]. The formula of all probabilities in the Q1-triangle can be found in the addendum [FormulaQ1].
A discrete differentiation (DiscreteDiff), here along (proper) time is clearly dependent on the relation subject/object.

4.7.6 QW (x) corresponds to the expectation value of |k/n|

In case of equal probabilities of steps to the right and to the left no direction of coordinate k (cf. (Q0Triangle) (Q1Triangle)) is preferred and the expectation value <k/n> of k/n is zero. <k/n> is equal to the difference of the probability p of a step to the right and (1-p) of a step to the right, i.e. <k/n> = p-(1-p)=2p-1. Because of x^2=4p(1-p) [xAndp] from this results {QWasExpectationValue}

$$QW(x) = \sqrt{1-x^2} = \sqrt{1-4p(1-p)} = \sqrt{1-4p+4p^2} = |2p-1| = |<k/n>|$$

4.7.7 An information theoretical interpretation of the Planck effect quantum h

{hAsConstantProduct} We know, that the Planck effect quantum can be understood as product t*E of proper time t (of a measurement) and the energy uncertainty E (of the measurement result). Proper time resp. measuring time is proportional to the function QV(x) resp. to the sum of the return probabilities in the Q0-triangle (PTimePropSumQ0). The partial sum of the Taylor series expansion of QV(x) (TaylorQV) up to the 2n-th power of x corresponds to the sum of the return probabilities up to the row 2n in the Q0-triangle. Analogously the partial sum of the Taylor series expansion of 1/QV(x)=QW(x) up to the 2n-th power of x (TaylorQW) corresponds to the probability to reach row 2n without return to the center (in k=0). Because the not returning part isn't measured it remains uncertain, so we could understand QW (x) as proportional to the uncertainty of the energy. With QW (x) * QV (x) also t*E=h is constant. Even in the borderline case v->C resp. x->1 the product of the partial sums (TaylorQV) and (TaylorQW) is constant:

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[112] Now the proper time is clearly seen in relation to the observed object. In the case of information exchange there always is a common part of the proper times of subject and object. So an attempt for quantification of {overlapping} of consciousness contents seems to be given, but without further precise definition this statement is little helpful for the time being. Different details must be taken into account, even the definition of subject and object resp. definition of direction of information flow is dependent on an primary (initial) decision [PrimaryDecision]. Perhaps we can come back to this later again.
A short remark: In the case v/c=x=1 the separating potential barrier is maximal, the liberty there to here is maximal [DecisionFreedom], decisions uncorrelated, orthogonal), i.e. there is a free choice possibility left and right to the local center resp. probability maximum with p=1/2 and the (immediate) overlapping of proper time there and proper time here (regarding this local choice) is minimal. So proper time there resp. perception (meeting) there resp. event located there (e.g. the way of a photon from point A to B) contributes only a minimal share to own perception resp. proper time (*if* only the immediate perception is taken into account). Therefore the event there needs minimal time, from our point of view. This could be the reason for the fact that photons move from one (differentiable) point to the other in as short as possibly way, i.e. maximal fast on the shortest way (v=c and p=1/2 for way possibilities respectively on the left and on the right of the local way minimum - Fermat's principle of the local shortest time).

$$\left(\sum_{m=0}^{n/2} Q0Z(2m)\right)\left(\sum_{m=0}^{n/2} Q2Z(2m)\right)\xrightarrow{n\to\infty}\sqrt{\frac{2n}{\pi}}\sqrt{\frac{2}{\pi n}}=\frac{2}{\pi}$$

4.8 Many (arithmetical) coherences

Due to the shown coherences of course it is reasonable to examine *finite* partial sums of the taylor series expansions of QV(x) resp. QW(x) more exactly, also in the case of imaginary[113] x, |x|=1 and even for |x|>1 . The corresponding "probabilities" for steps to the right or to the left wouldn't be limited within the real interval [0,1] any more[114] because of 4p(1-p)=x^2. The mean vertical reach (1st order momentum) of |Q2Z(n)| from row n=1 on up to the outflow is equivalent to the sum of the Q0Z(n) from row n=2 on (cf. [DefQ2Z]), i.e. the mean reach from row n=0 on is equivalent to the sum of the Q0Z(n) from row n=0 on and therefore approximates QV(x). At more detailed occupation with the topic many coherences stand out (cf. [DeviationQ1Equal1], the formulary in wqm or the concise formulary). A more exact definition of concepts like "simultaneity" resp. "concomitance", a more exact analysis of the process of new creation[115] of information and the process of copying[116] (also parallelizing)

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[113] Apart from other conceptions (e.g. as 2 x 2 matrix) one can conceive an imaginary number simplified as number which changes the sign with every multiplication (then it's naturally orthogonal to a real number). For instance the sequence of partial sums of the taylor series expansion of QW(x) converges to a real number |y|>1 for imaginary x in the case |x|<1. On the other hand for real y in the case |y|>1 the taylor series expansion of QW(x) has a partial sum sequence which alternates for sufficiently great n, i.e. the finite partial sums multiply so to speak like imaginary numbers, if one increases n by 1 with every multiplication ("like time").

[114] On the other hand they surely wouldn't cover a continuous interval due to the necessary discrete consideration.

[115] This always means a decision which isn't completely deducible from the perceived past (lack of information) and therefore always means a more or less great risk (the not chosen alternative might be the better). This is the clearest, if we have no pre-information (1/2 to 1/2 decision), but also the everyday digitalization (1-p to p decision for small p: 1>p>0, p->0) also belongs to it:
If we go for example across the street in the city, the probability, that we do it, is exactly 1 (because this process belongs to the conscious present). This is greater than the probability (1-p) that the street is actually free, for we then cannot exclude that we have failed to see something or somebody suddenly races with 100 mph along and then crumbling takes faster than it would be because of the decisions in the context of the natural ageing process.
The decision for life, particularly for the very conscious human life means a considerable risk and self effort to create new and more abundance, in the end for the whole. Life and particularly every human being earns respect also therefore.

[116] For this it's necessary that after copying something is left, that with the perception not all way possibilities from decision (which should make new information) up to perception flowed out and therefore are consumed. Of course this renunciation of complete safety is not quite without risk and so again a partial new creation - it is digitizing information again: If from our view e.g. a probability is 0.9, we (have to) proceed on the assumption that it's 1 if error risk and profit value are the same (of course this is a special case, in traffic the error risk for example is extremely greater than the profit value, as mentioned...).
(Fortsetzung nächste Seite)

information would be necessary. The formation of scalar products (Scalarproduct) in horizontal and vertical (and even sloping) direction in the triangle could serve as bridging to the common mathematical framework of quantum physics[117]. Because of the underlying recombination principle and for study of different branching resp. connection possibilities in the triangle the consultation of specialists in [combinatorics] and graph theory [RGraphTheoreticalResearch] can be helpful (perhaps even of geneticists or in the field of the genetics active mathematicians).

4.8.1 The mean deviation in the Q1-triangle is constant

{DeviationQ1Equal1} An example of arithmetical coherences:
In connection with the constance of the Planck effect quantum

$$hq = \hbar = \frac{h}{2\pi}$$

also the constance of the mean deviation (1st order momentum) of the Q1 in horizontal direction is interesting (but the in [hAsConstantProduct] described information theoretical consideration seems more reasonable for me). For example the following (surely abbreviated) interpretation may be a first suggestion for further thinking:

$$\begin{array}{lllll} ET & * & force & * \; length & = 1 \\ -\sum_{k=-n}^{n} & & Q1(2n\;,\; 2k\;) & 2k & = 1 \\ -\sum_{k=-n}^{n+1} & & Q1(2n+1,\; 2k-1) & (2k-1) & = 1 \end{array}$$

Here the summation goes over both horizontal halves, the impulse was decomposed in time * force. The time ET was interpreted as a not sub-divisible unit, as elementary time between the beginning and end of the summation (the integral) and the force as current probability for flowing out, as probability for leaving within the time ET the relative[118] location with maximum impulse (with maximal speed v=c).

(A possible bridging to quantum physics: One could consider the Compton effect (***), (the interaction of a photon with matter; I also think of the generalized Compton effect as interaction of long wave photons with matter) as outflow event (or a result of connected outflow events) within the Q1-triangle. At this the

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By the way also our ideas are just based also on digitized information copies (from different time directions, from experiences of inside and outside). Perhaps they have won more details and clarity again because of (risky) digitalization, one can regard this as the new (not always fault-free) part, but in the essential they contain more old things, than it appears at first sight. Of course this also applies to my texts.

[117] By making discrete differentiation (DiscreteDiff) along k and/or n (and renormalization) we can form orthonormal systems. In addition, there are many possibilities to superimpose the functions Q0 or Q1 (with sign) so that for great n wave pictures (***) of the graphs result. To this a couple of considerations are found in the download files wq2 and wq3 (in case of special interest enter corresponding string search, as usual).

[118] Perceptible (existing) are only the *differences* of the forces, more exactly said the resulting acceleration differences. If the same constant force per mass works everywhere, e.g. within an inertial frame falling freely, then this "force" doesn't change physics.

energy of the photon is reduced, a part is flowing out analogous to the reduction of the horizontal sum (over k) of the probabilities Q1 (n, k) [119]. Nevertheless the angular momentum remains the same due to mentioned formula, the photon "is stretched".)

The Plancksche effect quantum hq still was interpreted here quite graphically (as product of physical quantities). [A priori] An information theoretical interpretation is more consistent, though (hAsConstantProduct) [lish1]. One also can understand hq as energy * time and so as information * proper time. *On the average* much Information can be given [give] resp. transferred only along short time intervals, little information along longer intervals. Of course at this has to be considered, that the conversion factor for energy * time to information * proper time isn't a constant but a function, dependent on the extent of branching depth and on renormalization .

4.8.2 Q1 as finite difference of Q0

The exact formula of the Q1 function is:
{FormulaQ1}
Let be n a natural number, k an integer with absolute value smaller or equal n, and p a number contained in the interval [0,1]. If we define

$$Q0P(n,k,p) := \frac{(1-p)^{(n-k)/2}\, p^{(n+k)/2}\; n!}{\left(\frac{n-k}{2}\right)!\left(\frac{n+k}{2}\right)!}$$ {Q0Pvar} [120]

and
$Q0(n,k) := Q0P(n,k,0.5)$, {DefQ0}
then holds

$$Q1(n,k) = -\frac{k}{n}\,Q0(n,k)$$

The Q1-triangle results from a superposition of two Q0-triangles with opposite sign, starting in position n=1, k=±1 after multiplication by 1/2. Addition of both means a discrete differentiation {DiscreteDiff}[121] along k. The formula then arises from the difference quotient with minimal dk, i.e. dk=2:
(Q0 (n, k + 2) - Q0 (n, k)) / 2 = Q1 (n + 1, k + 1) .
Analogously one can make m-th order (discrete) differentiation by using row n=m of the Q0-triangle, equipped with along k respectively alternating sign, as starting row[122]

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[119] resp. the reduction of the sum of the squares, i.e. the [Scalarproduct] within row n in case of measuring or perception in row 2n; then the word amplitude would fit better for the number Q1(n,k) (ProbabilityAmplitude).

[120] With [DefQ0SC] Q0P is the special case   Q0P(n,k,p)=Q0SC(n,k,(1-p),p)

[121] Of course differentiation normally means that dk goes against 0. Since we make discrete (not continuous) considerations here, however, this isn't possible. We vote dk = 2, the smallest possible (horizontal) distance for k. In case of great n the common differentiation approximates the (exact) discrete differentiation.

[122] For great n the resulting function is near k=0 approximatively proportional to k^m. Q1(n,k) for example is for great n and small |k| approximatively proportional to k (linear), which offers hints for bridges to classic physical models.

(BinCoeffDiffMatrix). The initial zigzag of the accompanying function graph flattens in the following rows to m+1 continuous seeming waves {wavelike}. Discrete alternating state functions can also cause wave-like phenomenons (probability distributions), if the initial situation (e.g. the binomial distributed discrete analogue of "phase angle" [PhaseAngle]) is not sharp. The superposition of many rows with even (or odd) row number n and alternating sign respectively yields a wave-like picture.

Still to mention is, that a second order discrete differentiation (finite difference) along k means[123] a first order discrete differentiation (finite difference) along n:

$$Q0(n,k-2)-2Q0(n,k)+Q0(n,k+2)=4(Q0(n+2,k)-Q0(n,k))$$
$$Q1(n,k-2)-2Q1(n,k)+Q1(n,k+2)=4(Q1(n+2,k)-Q1(n,k))$$

A connection to the (***) Schrödinger equation {Schroedinger} seems reasonable.

Remarkable is the correspondence of vertical and horizontal differentiation in the middle {TimeSpaceCorrInMiddle}:

Q1(n+1,1) = Q0(n+2,0) - Q0(n,0) = (Q0(n,2) - Q0(n,0)) / 2

The middle (the vertical symmetry axis k=0) represents the relativistic borderline case [VisCinMiddle] - also in the common theory arise equal rights of time and location coordinates in the relativistic borderline case.

5. BRIDGES TO CURRENT CONCEPTS OF QUANTUM PHYSICS

5.1 Probabilities and probability amplitudes

{ProbabilityAmplitude} [liba] [libo] [lifi] [liko] [lipa] In quantum physics usually one talks about complex valued probability amplitudes, the corresponding probabilities are calculated secondarily from the square of the absolute amount, i.e. from the scalar product with the corresponding complex conjugated probability amplitudes. Just also the central return probabilities Q0Z(n) (resp. |Q2Z(n)|) correspond to such a scalar product. In the presented example (cf. Scalarproduct) real probability amplitudes are used - even if the currently used probability amplitudes are complex, their scalar product has to be real, if measurable. As bridge to current concepts one also could e.g. identify the absolute value of Q0(n, k) resp. Q1(n, k) as amount of a probability amplitude, whose phase angle is varying with n and k (cf. RowSumAsWave). It has to be remarked here that in context of discrete considerations the phase angle {PhaseAngle} cannot be calculated (exactly) and so doesn't have an equivalent in the reality. The (continuous) trigonometric functions and of course also the (complex valued) exponential function are approximative. However, exact discrete representations[124] [DiscreteRepresetations] are possible, which don't imply infinite series expansions.

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[123] Therefore and because the Q2Z(2n) also represent the discrete resp. finite differences of the Q0Z(2n) (we have Q0Z(2n)-Q0Z(2n-2)= Q2Z(2n)), also the central numbers of the (with 2n=2 and row [1/4, 0, -1/2, 0, 1/4] starting) triangle with the *second* discrete derivatives of the Q0-triangle along k are equivalent to Q2Z(2n).

[124] Discrete considerations permit realistic functions with similar behavior, also nearly continuous functions with arbitrarily great (finite) number of waves (wavelike).

5.2 Example of a (discrete) scalar product

{Scalarproduct}: In discrete considerations [like] of course integrals have to be replaced by finite sums[125]. Particularly important sums are scalar products. In the compendium of formulas wqm several dependencies are described for different possibilities of scalar product formation in the Q0-triangle. Also in the Q1-triangle there are such. An particularly obvious example, which allows remarkable simplifications[126] (***), is listed here. For m smaller or less n holds:

$$|Q2Z(m+n)| = Q1(m+n-1,-1) = \sum_{k=-m/2}^{m/2} Q1(m,2k)\,Q1(n,2k)$$

For example one gets for m=n=3 {ScalarproductExample}

$$\frac{1}{16} = |Q2Z(6)| = Q1(5,-1) = \left(\frac{1}{8}\right)\left(\frac{1}{8}\right) + \left(\frac{1}{8}\right)\left(\frac{1}{8}\right) + \left(-\frac{1}{8}\right)\left(-\frac{1}{8}\right) + \left(-\frac{1}{8}\right)\left(-\frac{1}{8}\right)$$

The list of the accompanying recombination points in the graph for the ways from A to B is:

n ↓ \ k->	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	
0							**A**							*1/1
1						**1**		-**1**						*1/2
2					**1**		**0**		-**1**					*1/4
3				**1**		**1**		-**1**		-**1**				*1/8
4			1		**2**		**0**		-**2**		-1			*1/16
5		1		3		**2**		-**2**		-3		-1		*1/32
6	1		4		5		**B**		-5		-4		-1	*1/64

Every way from A to B contains an only finite sequence of recombination points {FiniteRecombinationSequence}. Abbreviated said it can be subdivided into a (Dirac) "ket" part (e.g. from A to row n=3) and a remaining "bra" part. The recombination points on the ways from A to B are marked by underlining. A simultaneous perception of row 3 (with *all* way possibilities coming from the decision in A, cf. {DecisionCenter}) is at the earliest {earliest} in the center (k = 0) of row 6 = 3+3 possible, i.e. after new not perceived branchings[127] already have arisen again (in not underlined recombination points). The system

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[125] So constructed functions like the Dirac delta-function [DiracDeltaFu] (or alternatively the introduction of distributions which one can understand as mappings of *infinite*-dimensional vectors into a continuous, not countable set) become superfluous.

[126] Consider that m and n can be very large and that in the analytic borderline case the sums are represented by integrals. Due to the nature of the function Q0 and its derivatives (e.g. Q1) automatically all way possibilities are taken into account. The development goes from the comprehensible to the complicated and back again to the comprehensible.

[127] These contain from view of point B partial information about the future although they already exist (within the whole). One can call this localization dependent part of the future "existing future". Further rows don't exist yet. So from local point of view there is a (finite) part of the future which already exists. Because further rows are possible (after new decisions), always there is an (infinite) part of the future, which still not exists. One can call the latter part "nonexistent future". {Future}
The concept of row n as boundary between existing and nonexistent future is simplified. At first this row probably is a finite [multidimensional] discrete set of points, in addition one can assume a hierarchical constellation of systems ("triangles") with respectively own definition of the horizontal direction (and so own

(Fortsetzung nächste Seite)

remains [open], though for every (also arbitrarily great) n the simultaneous perception of row n always is possible from row 2n on (an analogous argumentation is possible for the Q0-triangle). From row 2n on for every way to a point in row n also a corresponding way back exists, which is necessary for finished perception {FinishedPerception}.
Perhaps the spread of row n resp. 2n is cause of the in principle unsharpness of perception (the very last past) - the mean deviation in the Q1-triangle is constant like the Planck effect quantum hq (DeviationQ1Equal1), and the scalar product can correspond to the integration over one period. Sharpness however can exist concerning the origin (point n=0, k=0) of this distribution (completed past).
If for a system in A because of the initial decision resp. differentiation there a special way is predestined, for example a way over point 1', a probability gradient [ProbabilityGradient] arises relative to the distribution listed here, which could result in a relative force (working on this system, to and back again).

Point A determines the origin and also the coordinates of point B in the center {DeterminedReturnInCenter}. This leads to manifestation of conservation laws and to a partial determination of the experimental result. So in the above example the second half of the graph can be regarded as a converging "funnel" for the ways caused by the decision for this experiment in A {FunnelOfDecision}.

5.3 Deduce of Heisenberg's uncertainty (indeterminateness) relation using Q0(n,k) as discrete state function (***)

It will be shown shortly, how Heisenberg's uncertainty relation results, if Q0(n,k) is used as state function and k is identified with the location coordinate x. At first we introduce the variances of the location x and the impulse p

$$\overline{(\Delta x)^2} = \overline{(x-\overline{x})^2}, \quad \overline{(\Delta p)^2} = \overline{(p-\overline{p})^2},$$

in which the dash marks the quantum mechanical expectation value. We can always transform the coordinates so that we get

$$\overline{x} = \overline{p} = 0 \ .$$

Then we may assume

$$\overline{(\Delta x)^2} = \overline{x^2}, \quad \overline{(\Delta p)^2} = \overline{p^2} \ .$$

If ψ is the not normalized state function of a quantum mechanical system, one defines (cf. [liha] p. 434)

$$\overline{(\Delta x)^2} = \frac{\int \psi^* x^2 \psi \; dx}{\int \psi^* \psi \; dx}$$

$$\overline{(\Delta p)^2} = -\hbar^2 \frac{\int \psi^* \frac{d^2}{dx^2} \psi \;\; dx}{\int \psi^* \psi \; dx} .$$

If we replace ψ by the discrete function Q0 (n, k) (cf. [DefQ0]) and k by x, we get, if we use the same notation for analytical and discrete differentiation
{LocationXasK}

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definition of the discrete set of points corresponding to row n). With complete perception in the center k=0 of row 2n however row n of the corresponding system surely exists.
The conical shape of the area of information ways converging to point B suggests a connection to the light cone model. But the light cone is a four-dimensional, geometrical model with limited validity (vacuum, flat space time, borderline case of large numbers). Here, however, we talk generally of information ways within a discrete space, which is finite-dimensional (RealInfinityGrowsWithTime), but not necessarily only four-dimensional (further dimensions can make possible long-distant seeming interactions). We know that the ways of information can seem very curved at presence of rest mass. The definition of "straight" is dependent on the observer's point of view and with this also the appearance of the border of the area of the information ways to B.

$$\overline{(\Delta x)^2} = \frac{\sum_{x=-n}^{n} Q0(2n,2x)\,(2x)^2\,Q0(2n,2x)}{\sum_{x=-n}^{n} Q0(2n,2x)^{\,2}}$$

$$\overline{(\Delta p)^2} = -\hbar^2 \frac{\sum_{x=-n}^{n} Q0(2n,2x)\,\frac{d^2}{dx^2}\,Q0(2n,2x)}{\sum_{x=-n}^{n} Q0(2n,2x)^{\,2}} .$$

Because of

$$\sum_{x=-n}^{n} Q0(2n,2x)^{\,2} = Q0(4n,0)$$

$$\sum_{x=-n}^{n} Q0(2n,2x)\,(2x)^2\,Q0(2n,2x) = n\,Q0(4n-2,0)$$

$$\sum_{x=-n}^{n} Q0(2n,2x)\,\frac{d^2}{dx^2}\,Q0(2n,2x) = \sum_{x=-n}^{n} Q0(2n,2x)\left(\frac{(2x)^2-2n}{2n(2n-1)}\right)Q0(2n,2x) = -\frac{Q0(4n,0)}{4n-1}$$

we get

$$\overline{(\Delta x)^2}\;\overline{(\Delta p)^2} = \frac{n\,Q0(4n-2,0)}{Q0(4n,0)}\,\frac{\hbar^2 Q0(4n,0)}{(4n-1)Q0(4n,0)} = \hbar^2\,\frac{Q0(4n-2,0)}{Q0(4n,0)}\,\frac{n}{4n-1}$$

$$= \hbar^2\,\frac{4n^2}{(4n-1)^2} = \left(\frac{\hbar}{2}\,\frac{1}{\left(1-\frac{1}{4n}\right)}\right)^2 \geq \lim_{n\to\infty}\left(\frac{\hbar}{2}\,\frac{1}{\left(1-\frac{1}{4n}\right)}\right)^2 = \left(\frac{\hbar}{2}\right)^2 \quad ,$$

which had to be shown.

Here it's worth mentioning, that the discrete scalar product

$$\sum_{x=-n}^{n} Q0(2n,2x)\,\frac{d^l}{dx^l}\,Q0(2n,2x)$$

disappears in case of odd l. Particularly consecutive derivatives are orthogonal resp. [uncorrelated].

5.3.1 Interpretation: Operator works on all way possibilities

Under con-attention of the discussion to the discrete scalar product the following qualitative interpretation is possible: The operator (multiplication by x, discrete differentiation) works in all points of row n on all ways from point k=0 of row 0 of the last perception to point k=0 in row 2n of the current perception. *All* way possibilities[128] have to be taken into account {AllPossibleWays}: The more exact the measuring resp. the finer the differentiation, the greater is n (,the smaller is the renormalization factor in the denominator), the more way possibilities exist, the greater is the variance of the complementary quantity in line 2n.

---

[128] Connected with this is a remarkably simple interpretation possibility of unsharpness of perception as necessity for ensuring liberty: One could regard the one ways (e.g. those over the left half of row n, over points with k<0) as ways there and the others as ways back. By the fact that the exact way there isn't fixed, also the exact way back isn't fixed (by symmetry conditions), i.e. there is liberty in the choice of the way.

5.3.2 Perceptible equivalent of information

{InfoConcrete} The following interpretation is possible: As mentioned the location coordinate x was identified with the horizontal coordinate k in the Q0-triangle (cf. [LocationXasK]). Remembering the discrete [Schroedinger] equation the vertical coordinate n can be identified with the time coordinate. The distribution of the probability amplitude valid in row n is a function of the variable k and can be understood as state function over which a discrete scalar product is formed. At perception in row 2n (cf. [FinishedPerception]) the won information resp. the measurement result (for example the location) lies in the result of the scalar product over row n.

5.4 Information theoretical interpretation with simple example

We can represent reality conform information units as choices of an element from a *finite* set M, as choice functions on this set - after distinction of the elements of M is possible and so freedom for new information (which needs separated resp. free energy (FreeEnergy)).
Suppose M has 2m+1 elements which represent the possible values of a discrete variable. We choose in our example m=3 and M={-6, -4, -2, 0, 2, 4 6}
(The elements may represent e.g. multiples of the half effect quantum hq/2).
Now let's look at the information of the choice of one element of M. We can represent this information by a choice function f(M), whose result is a vector
f(M)=(k_6, k_4, k_2, k0, k2, k4, k6)
whose components k.. are binary variables with possible values 0 or 1. Exactly one[129] of these components is equal to 1, which means, that the corresponding element of M is selected resp. "true"; the other components are equal to 0. For example f(M)={0, 0, 0, 1, 0, 0, 0} would mean: "Element 0 is selected" resp. "Element 0 is true".

Because in this case the information concerning the choice within the set M is complete (the remaining indefiniteness resp. entropy concerning this choice is zero), M cannot contain all variables of physical reality and therefore the function f(M) can only provide a partial description of reality. There must be at least one additional free variable after the moment of perception resp. measurement of f(M) - a complementary variable. For the meaning of "after" and the *together* with time increasing number of possibilities see (RGraphTheoreticalResearch).

The creation of the set M has to be done step by step, beginning with an minimal initial set M0, e.g. with M0={0}. If creation of M and choice of an element is done very often, a probability distribution of the possible results arises. For symmetry reasons we can assume a binomial distribution of the probabilities around the initial element "0". So we get the probability distribution
`p(k)="Probability, that element k of M is true"`
of the result vectors f(M) of the above experiment, e.g. p(k)=Q0(6,k). We can regard p(k) as one of the first functions within a sequence of exact discrete state functions, which can be approximated by the currently usual continuous state functions in case of very large M. It can be easily shown (ScalarproductExample), that one can understand the values p(k) also as scalar products of probability amplitudes or (later) as probability amplitudes (from which scalar products are formed after progress of proper time). Even if the probability amplitudes are complex, their scalar product is real, if measurable.

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[129] Discrete considerations need no constructions like the Dirac delta-function (DiracDeltaFu).

5.4.1 Example for an operator on a discrete state function

Now an example for an operator on p: (discrete) differentiation. We make a discrete resp. finite difference along k. In our case |M|=7, there are 7 possibilities for k∈M:

```
 -6 , -4  ,   2  ,  0   ,   2  ,  4  ,  6  ,
```
and
```
1/64, 6/64, 15/64, 20/64, 15/64, 6/64, 1/64
```

are the corresponding values of p(k)=Q0(6,k). The sum of these is 1, so we can set p(k)=0 for k∉M. Now let's call the Operator for discrete differentiation D; it maps the function p to Dp: Dp(k):=(p(k+1)-p(k-1))/2 .

So we get

```
Dp(k)=1/128, 5/128, 9/128, 5/128, -5/128, -9/128, -5/128, -1/128 for
   k =  -7 ,   -5 ,   -3 ,   -1 ,     1 ,     3 ,     5 ,      7,
```

otherwise Dp(k)=0. We notice, that these are the values of Q1(7,k), cf. (DiscreteDiff). They aren't any longer probabilities in the ordinary meaning, but can be probability amplitudes after normalization (ProbabilityAmplitude).

5.4.2 Remark: Results of physical experiments as vectors

In the mentioned example we can interpret f(M) as sharp special case of the result vector of a physical experiment. Usually the result is not sharp - then similarly the experimental result can be represented by an probability weighted result vector pf(M) with index k, e.g. pf(M)=(1, 6, 15, 20, 15, 6, 1)/64. That's equivalent to representation as state function p(k) and can facilitate the combinatorial understanding in case of small |M|. If we "artificially" increase the dimension of pf(M) by adding zeros we can represent an operator as square matrix even if it increases |M|. Example for pf(M) and operator D as finite difference "along index" in form of a matrix, completed in suitable way with zeros:

$$
Dpf(M) = \left|\begin{array}{rrrrrrrrrrrrrrr}
0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 \\
-1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & -1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0 & 1 \\
1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -1 & 0
\end{array}\right| \cdot \frac{1}{2} \bullet \left|\begin{array}{r}
0 \\ 1 \\ 0 \\ 6 \\ 0 \\ 15 \\ 0 \\ 20 \\ 0 \\ 15 \\ 0 \\ 6 \\ 0 \\ 1 \\ 0
\end{array}\right| \cdot \frac{1}{64} = \left|\begin{array}{r}
1 \\ 0 \\ 5 \\ 0 \\ 9 \\ 0 \\ 5 \\ 0 \\ -5 \\ 0 \\ -9 \\ 0 \\ -5 \\ 0 \\ -1
\end{array}\right| \cdot \frac{1}{128}
$$

Similarly to [BinomialCoeffMatrix] also multiple powers of above matrix exhibit binomial coefficients [BinCoeffDiffMatrix].

5.5 Combinatorial considerations to entangled quantum mechanical states

Measurement is only possible when time advances. Due to our considerations to perception of time (TimePerception) we can assign each progress of proper time to the reunion of two ways within some symmetry center, a reunion which is necessarily connected with emission and absorption of free energy (photons) on rest mass. In the simplest case the symmetry center has only one dimension s (e.g. spin)[130] less that the (discrete) global surrounding space (the "global lattice"). Then after start (i.e. decision resp. separation) of the ways there is for each way-point (s,...) a corresponding (anti-)symmetric point (-s,...) "on the other side" and absorption resp. emission of energy occurs exactly in s=0.

There is a remarkable parallel to the ways of particles with entangled state: These may be spatially separated in between times, but on the ways of both particles until measurement no energy exchange with surrounding is possible, i.e. s<>0 from beginning of separation, and

---

[130] It is worth mentioning that in case of s=±1/2 the relationship remains *local* (more exactly said: *neighboring*) along this dimension.

sign of s cannot change until measurement. If we measure that s *was* greater 0 for one incoming particle, we know that s>0 *has been* true since separation (i.e. during a more or less long period of time), i.e. we gain information. We also know, that s<0 since separation must have been true for the other particle because in between crossing of s=0 is not possible for particles with entangled state or - in another formulation - due to conservation of s. So we can interpret the measurement results on entangled states as a consequence of

(anti-)symmetric behavior from start until first return

to a symmetry center. The word "first" signals, that in between times the objects with entangled state are separated from the symmetry center, i.e. in between times there is no information exchange (resp. absorption or emission of free energy on rest mass, resp. crossing of s=0). From this point of view entangled states are special cases, which are (due to missing energy exchange with rest mass in between times) simple enough, that symmetry becomes clear (symmetry around s=0, around a symmetry center, in which absorption and emission of free energy occurs).

Of course nature is not restricted to such simple cases. If there is exchange of energy with rest mass in between times, e.g. in row n0, in this moment all ways of the exchanged energy quanta (photons) pass the symmetry center s=0 of the row. Descended states can be represented as a product [of the form ∑(amplitudes of ways to n0, s=0) * ∑(amplitudes of ways starting from n0, s=0)]] and therefore aren't entangled.

If in between times, until reunion, exchange of energy (crossing of s=0) is possible with systems, which are at the moment *separated* from the measuring device (rest mass), (combinatorics) becomes more difficult, but study of these more complicated ways can become necessary to gain deeper insight.

5.6 Discrete representations

{DiscreteRepresetations}

Analytical functions with infinite power series expansion cannot have an equivalent in physical reality. But rational discrete representations of them are often possible, i.e. representations which are rational functions and which have a discrete but arbitrarily fine subdivided range of values.

5.6.1 Discrete representation of sine, cosine, rotations

Two-dimensional rotations can be represented as multiplication by rotation matrices and as multiplication by complex numbers. We choose for reasons of better clearness latter possibility, i.e. we represent the rotation with assumed[131] angle w as multiplication by a complex number with amount 1 and phase angle w. To consider probability amplitudes (instead of the resulting probabilities), we define in generalization of (Q0Pvar)

$$Q0SC(n,k,s,c) := \frac{s^{(n-k)/2} c^{(n+k)/2} \quad n!}{\left(\frac{n-k}{2}\right)! \left(\frac{n+k}{2}\right)!}$$ {DefQ0SC} ,

from which

$$Q0SC(n,k,s,c) = (4sc)^{n/2} \left(\frac{c}{s}\right)^{k/2} Q0(n,k)$$

---

[131] Due to the mentioned difficulties (RealInfinityGrowsWithTime) of the analytical construction of the rotation angle w we have to start out of the assumption that only for the components of the rotation operators exact equivalents exist in nature, i.e. for sin(w) and cos(w), but not for the angle w of rotation.

and the following distribution results:
{Q0SCTriangle}

```
n    k->        -4    -3    -2    -1     0     1     2     3     4
↓
0                                        1
1                                  s           c
2                           ss           sc          cc
3                    sss          3ssc        3scc         ccc
4              ssss       4sssc        6sscc       4sccc        cccc
...
```

The (horizontal) sum over row n just corresponds to the binomial expansion of (s+c)^n. So if we set[132]

```
s := i sin(w) und
c :=   cos(w)
```

this sum simply corresponds to (i sin(w)+cos(w))^n = e^(inw) = i sin(nw)+cos(nw), i.e. to the complex number with amount 1 and phase angle nw. The smaller |w|, the finer is the gradation of the realizable rotations. In detail we get {RowSumAsWave}

$$(i\sin(w)+\cos(w))^{2n} = e^{i2nw} = i\sin(2nw)+\cos(2nw) = \sum_{k=-n}^{n} Q0SC(2n,2k,s,c)$$

$$(i\sin(w)+\cos(w))^{2n+1} = e^{i(2n+1)w} = i\sin((2n+1)w)+\cos((2n+1)w) = \sum_{k=-n}^{n+1} Q0SC(2n+1,2k-1,s,c)$$

and the components can be separated by addition resp. subtraction of the corresponding row of the (for symmetry reasons existing) triangle with opposite phase angle {GetComp}. One receives for instance

$$\cos(2nw) = \frac{1}{2}\left(\sum_{k=-n}^{n} Q0SC(2n,2k,\ s,c) + \sum_{k=-n}^{n} Q0SC(2n,2k,\ -s,\ c)\right)$$

$$\sin(2nw) = \frac{1}{2i}\left(\sum_{k=-n}^{n} Q0SC(2n,2k,\ s,c) - \sum_{k=-n}^{n} Q0SC(2n,2k,\ -s,\ c)\right)$$

$$\cos((2n+1)w) = \frac{1}{2}\left(\sum_{k=-n}^{n+1} Q0SC(2n+1,2k-1,\ s,c) + \sum_{k=-n}^{n+1} Q0SC(2n+1,2k-1,\ -s,\ c)\right)$$

$$\sin((2n+1)w) = \frac{1}{2i}\left(\sum_{k=-n}^{n+1} Q0SC(2n+1,2k-1,\ s,c) - \sum_{k=-n}^{n+1} Q0SC(2n+1,2k-1,\ -s,\ c)\right)$$

---

[132] If we at this only allow only numbers of the form s=i(a^2-b^2)/(a^2+b^2), c=2ab/(a^2+b^2), in which i is the imaginary unit and a,b are integers (not both equal 0), we remain in the set Q+iQ.
Should s^2+c^2=1 be exactly guaranteed and should the quotient s/c be close to a real number q, we can choose a rational number v arbitrarily close to q±√(q^2+1) and set s:=(v^2-1)/(v^2+1) and c:=(2v)/(v^2+1). Then s^2+c^2=1 and the approximation s/c≈q is arbitrarily exact.
[Also i can be replaced (e.g. by 2x2 matrices) so that we need only rational numbers. The accompanying angle w is most often irrational and therefore has no (exact) equivalent in physical reality.]

For deduction of this representation only simple arguments are necessary, nevertheless it is unusual. Remarkable is the separation of the cases of even or uneven line numbers following in natural way from this (in analogy to the natural separation of the spin cases of Bosons and Fermions) and the now obvious possibility for summation also in vertical direction of the triangle.

In the case |4sc|=|2sin(2w)|=1 and therefore w∈{mπ/2 ± π/12 | m integer} the central amounts |Q0SC(2n,0,s,c)| just correspond to the central return (ReturnToK0) probabilities Q0Z(2n)=Q0(2n,0), in the case |2sin(2w)|<1 and therefore w∈{]mπ/2-π/12, mπ/2+π/12[| m integer} the vertical sum

$$\sum_{j=0}^{\infty} Q0SC(2j,0,s,c)$$

converges absolutely, otherwise (for n->∞) there is no upper bound for |Q0SC(2n,0,s,c)|. So there is convergence just if W is within a 30 degrees broad interval around the coordinate axes, a third of all possible angles.

In quantum mechanics a state with determined energy E is associated with the wave function

$e^{iEt/\hbar}$,

with [RowSumAsWave] (and TimePerception) it is fair to assume in first approximation

$Et/\hbar \approx 2nw$

and for example E∝w und n∝t .

5.6.2 Discrete representation of the exponential function

If we choose[133] s=sinh(w) und c=cosh(w), the sum over row n ([Q0SCTriangle]) corresponds to the binomial expansion of (sinh(w)+cosh(w))^n = e^(nw) and we get

$$e^{2nw} = \sinh(2nw) + \cosh(2nw) = (\sinh(w) + \cosh(w))^{2n} = \sum_{k=-n}^{n} Q0SC(2n, 2k, \sinh(w), \cosh(w))$$

$$e^{(2n+1)w} = \sinh((2n+1)w) + \cosh((2n+1)w) = (\sinh(w) + \cosh(w))^{2n+1}$$

$$= \sum_{k=-n}^{n+1} Q0SC(2n+1, 2k-1, \sinh(w), \cosh(w)).$$

The (assumed) number w can be complex (ProbabilityAmplitude). We can get the functions sinh and cosh analogously to [GetComp]. With that multiple Lorentz transformations can be chained in a clear way (cf. e.g. [limi] p. 67-68 and [lifl] p. 24-27).

5.6.3 Discrete representations of matrix exponential functions (SU(N)...)

Analogously to the normal exponential function we can construct discrete representations of matrix exponential functions by choosing s and c as matrices (e.g. matrices from SU(n) groups with numbers from Q+iQ). If the matrices commute, we get for example[134] the matrix

---

[133] Here we need only rational numbers, if we allow only numbers of the form s=2ab/(a^2-b^2), c=(a^2+b^2)/(a^2-b^2), in which a and b are integers (with |a|≠|b|).

[134] We can use

$$e^{M} = \lim_{n\to\infty}\left(1+\frac{M}{n}\right)^{n}$$

in which M is a square matrix and 1 is the unit matrix with same dimension. If we (formally) define s:=1 and c:=M/n, row n corresponds to the binomial series of (s+c)^n = (1+M/n)^n and its sum approximates the matrix exponential function exp(M) arbitrarily exact, since n can be arbitrarily great.

exponential function (cf. e.g. [lime2] p.113-115 or [liwa] p. 228). If not, nevertheless a clear discrete representation can be possible, e.g. like in case of the Pauli matrices (PauliMatrices). So discrete considerations can facilitate a deeper understanding.

5.7 Pauli matrices, quantal bits

{PauliMatrices} The three Pauli matrices are frequently used in quantum physics. Together with the 2x2 identity matrix I they are defined by

$$I=\begin{pmatrix}1&0\\0&1\end{pmatrix},\quad \sigma_1=\begin{pmatrix}0&1\\1&0\end{pmatrix},\quad \sigma_2=\begin{pmatrix}0&-i\\i&0\end{pmatrix},\quad \sigma_3=\begin{pmatrix}1&0\\0&-1\end{pmatrix}.$$

When making a symmetrical binomial distribution [Q0Triangle], per step to the right or to the left a multiplication by the accompanying probability 1/2 is done. Instead of this for

$$j,l\in\{1,2,3\},\ j\neq l$$

we can multiply by

$$\frac{\sigma_l}{\sqrt{2}}=\sin(\pi/4)\,\sigma_l$$

per step to the right and by

$$\frac{\sigma_j}{\sqrt{2}}=\cos(\pi/4)\,\sigma_j$$

per step to the left. From this results because of

$$\sigma_1^{\ 2}=\sigma_2^{\ 2}=\sigma_3^{\ 2}=I,\ \ \sigma_1\sigma_2=-\sigma_2\sigma_1,\ \sigma_1\sigma_3=-\sigma_3\sigma_1,\ \sigma_2\sigma_3=-\sigma_3\sigma_2$$

a "zoomed Q0-triangle":

n ↓ / k->	-8	-7	-6	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	
0									1'									*I
1								1		1								*σ/√2
2							1		0		1							*I/2
3						1		1		1		1						*σ/(2√2)
4					1		0		2'		0		1					*I/4
5				1		1		2		2		1		1				*σ/(4√2)
6			1		0		3		0		3		0		1			*I/8
7		1		1		3		3		3		3		1		1		*σ/(8√2)
8	1		0		4		0		6'		0		4		0		1	*I/16

...

At this σ symbolizes one of the Pauli matrices respectively.

In the general one can also multiply these by the sine and cosine of an angle different from π/4 and an asymmetrical "zoomed" triangle results. Multiplication by pre-factors whose square sum is smaller resp. greater than 1 yields exponential decrease resp. increase of the row sum in case of increasing row number n. Further modifications are possible, if instead of the hermitean Pauli matrices pseudo-hermitean or real matrices are used, from which easily different types of so-called "quantal bits" (qubits) could be derived ([ligre] p. 17). The interpretation of this might succeed best by those readers who have profound familiarity in the application and meaning of these matrices and who remember the remarks to the Q0-triangle (e.g. those to the central return events, proper time unit, cf. (ReturnToK0) , ProperTimeUnit).

Note: In the above "zoomed Q0-triangle" the occurrence of irrational numbers like 1/2 is problematic. But we can avoid these numbers by further modification with introduction of alternating pairs of multipliers, e.g. 1/2, -1/2 followed by 1, 1 according to the natural sequence of decision and perception.

5.8 (Lie algebras)

5.8.1 Cartan matrices

The rows (columns) of the m-th powers of some important Cartan matrices correspond to the 2m-th rows of the binomial coefficients. For better clearness at first an excerpt from Hazewinkel's Encyclopaedia of Mathematics ([liha2], article to "Lie algebra, semi-simple") and then an example:

```
... Simple Lie algebras that correspond to root systems of types A-D are said to be classical and have the
following form.
Type An, n>=1. g=sl(n+1,k), the algebra of linear transformations of the space k^(n+1) with trace 0; dim
g=n(n+2).
Type Bn, n>=2. g=so(2n+1,k), the algebra of linear transformations of the space k^(2n+1) that are skew-
symmetric with respect to a given non-singular symmetric bilinear form...
...
The Cartan matrix of a semi-simple Lie algebra over an algebraically closed field also determines this
algebra uniquely up to an isomorphism. The Cartan matrices of the simple Lie algebras have the following
form:

         |  2  -1   0  ...   0 |
         | -1   2  -1  ...   0 |
    An:= |  0  -1   2  ...   0 |
         |  .   .   .  ...   . |
         |  0   0   0  ...  -1 |
         |  0   0   0  ...   2 |

    Bn:= ...
...
```

For example in case the exponent m=3 and the matrix

```
         |  2  -1   0   0   0   0   0 |
         | -1   2  -1   0   0   0   0 |
         |  0  -1   2  -1   0   0   0 |
A6  :=   |  0   0  -1   2  -1   0   0 |
         |  0   0   0  -1   2  -1   0 |
         |  0   0   0   0  -1   2  -1 |
         |  0   0   0   0   0  -1   2 |
```

we get {BinomialCoeffMatrix}

```
               | 14   -14   6    -1    0     0     0   |
               | -14  20    -15   6    -1    0     0   |
  m     3      | 6    -15   20   -15   6    -1     0   |
A6 = A6    =   | -1    6    -15  20   -15    6    -1   |
               |  0   -1     6   -15  20    -15    6   |
               |  0    0    -1    6   -15   20    -14  |
               |  0    0     0   -1    6    -14   14   |
```

and we recognize the absolute values of the numbers in the rows resp. columns again in row 6 = 2m = 2*3 of the Pascal triangle (enumeration of the rows beginning with 0 like in the Q0Triangle).

6. BRIDGES TO THEORY OF RELATIVITY

6.1 Bridges to special relativity

The connections to special relativity theory are clear [BridgesToRel].

6.2 Bridges to general relativity

Due to the difficult experimental testability here much is speculative [StrongFieldExtrapolationErr] [CosmoExtrapolationErr]. Nevertheless the experiments show (statistical) proportionality of gravitating and inertial mass, so the following thoughts are worth an outline:

6.2.1 Gravitation as result of (small) correlation

{GravitationBecauseOfCorrelation} In the quantum mechanics probabilities result from scalar products (ScalarProduct). We can transfer this concept to gravitation. Here in simplified way the first step is outlined: Let be n very great and

$$Cor = \sum_{k=-n}^{n} (\frac{g}{r} + \frac{k}{r} a_{2k})(\frac{g}{r} + \frac{k}{r} b_{2k}) = n\frac{g^2}{r^2} + \sum_{k=-n}^{n} (\frac{g}{r}\frac{k}{r}(a_{2k} + b_{2k}) + \frac{k^2}{r^2} a_{2k} b_{2k}); \;\; 0 \le \frac{g}{r} << 1; \; a_{2k}, b_{2k} \in \{-1,1\}$$

proportional to the probability of interaction, with positive resp. negative sign depending on attractive or repulsive interaction. Due to symmetry we can assume (in first approximation, no charge) that a_{2k} und b_{2k} are positive and negative in equal frequency, so that the sum on the right hand side of above equation disappears and only ng^2/r^2 remains.

6.2.1.1 Gravitating mass

We can identify k and g with radial integer coordinates which are proportional to the distance to the symmetry center of a global distribution[135] and g with the initial value (offset) in the starting point of our present reference system (which is the maximal perceptible distribution). This starting point lies outside the center as a result of an initial decision, e.g. on one side (OneSide) with g>0, and n can be understood as proportional to the gravitating mass. If we furthermore assume, that the frequency of this scalar product (per proper time) is proportional to the second interacting mass N, we receive the desired result, namely a total interaction proportional to Ng^2/r^2.

6.2.1.2 Inertial mass

Let dp be a change of momentum. We can understand k also as coordinate in the momentum [xAsE0divEandkAsMomentum] space and dk∝dp as number of steps to one side corresponding to dp. With that the accompanying speed change dv results from

$$\frac{dv}{c} = \frac{dP}{mc} = \frac{dPc}{E} \propto \frac{dk}{n}$$

and dv is proportional to 1/n, i.e. n is proportional to the inertial mass.

6.2.2 (Dynamic length scale)

Preliminary note: At last this approach seemed to me less relevant than the one of (small) correlation [GravitationBecauseOfCorrelation].

The own lengths and time scale is apparently constant, the probabilities of the recombination points however aren't. Very simple model concepts [DynamicLengthScale] lead to an square increase of row number (and length scale) in comparison with proper time. At more detailed treatment of the topic the with falling relative distance increasing probability of interaction between recombination points also has to be taken into account.

7. RECOMMENDED GRAPH THEORETICAL RESEARCH

{RGraphTheoreticalResearch} Of course progress of proper time is connected with every moment of perception (of information). Only an approach {TimeConformApproach}, in which the number of possibilities of experimental results grows *together* with the duration of the observed experiment, i.e. *together* with time, can be adequate (ETmGreatEnough). Our considerations [InformationPath] (RealInfinityGrowsWithTime) suggest a graph theoretical description of the ways of information, in which the progress of proper time physically is

---

135 The Q0-triangle (Q0Triangle), where k is the horizontal coordinate, shows a simplified example with one dimension.

connected with pairs of emission/absorption of photons on rest mass [PhotonEmissionAbsorptionAsTimeUnit], mathematically with subsequent "central return events" (ReturnToK0), events in the center (the vertical symmetry axis) of a Q0-triangle (Q0Triangle) or some (e.g. differentiated, multidimensional) modification of it. Such an extending, directed graph {DirectedGraph} automatically contains the more possible ways and free variables, the more steps are done within it.
(Analytical) spacetime geometry is not a priori, but a statistical consequence (GeometryIsStatisticalConsequence) . Because meanwhile the statistik is very large, geometrical considerations lead to results which are precise enough for many applications.

7.1 Widely ramified graph - nonlocal seeming effects

The graph can also disclose (anti-)symmetries which start from the (decision (PrimaryDecision) in the) central beginning of it (of the corresponding experiment), which give evidence of conservation laws in it, which hold up to the (perception in the) central end of it (ReturnToK0) of the corresponding experiment). So effects on opposite sides of the graph are at last (anti-)correlated, even if it is widely ramified and seems to be not local.

7.2 General guidelines for reality conform algorithms

Again: It is important to realize that in physical nature the number of distinguishable possibilities of experimental results is finite at given time (http://arXiv.org/abs/quant-ph/0108121) and is increasing only *together* with time. Furthermore physical laws are by definition stable, i.e. they are valid iteratively at every time[136]. Therefore nature conform algorithms must be iterative in time [TimeConformApproach] and must operate on discrete spaces resp. numerical lattices (2003_12_23_wqps1.pdf), starting with a finite number of different (lattice) quantities and producing an increasing number of new quantities during their iteration. Furthermore the results of http://arXiv.org/abs/quant-ph/0207045 suggest that these algorithms should generate branching loops {BranchingLoops} [Loop], i.e. iteratively in the course of time (iteratively after a finite number of iterations of the algorithm) the

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[136] Important physical conversion factors result only from these laws and are dependent on today's branching structure and -depth and with this also dependent on time {NotAllPhysicalConstantsAreConstant} . According to the above considerations today's complexity and available information has arisen from an increasing number of decisions connected with perceptions (which are connected with increasing time). So it is plausible to assume that large squares of quotients of comparable large physical constants, e.g. the square of the quotient of the strength of electromagnetic and gravitational interaction, have been much nearer to 1 in much earlier time, when branching depth has been smaller. So a general mass moving "force" like gravitation very early had more influence in forming large structures of the cosmos - **this could be verifiable**. It is plausible to assume that the constants are secondary consequence of more primary laws (especially the conservation law (PrimaryConservationLaw)), which must be fulfilled (until return) at every time and associated branching structure. But because the numbers which we call constants seem to be constant within our knowable time (and measuring accuracy), only very large scale changes of (time and) branching structure can have relevant influence. This means that the branching structure (the graph) and its statistics which lead to these numbers are today very large.

quantities should have effect on quantities at other new (lattice) coordinates[137] which in turn later have effect backwards.

{EndOfMainText}

[137] More exactly: Effect on quantities at coordinates which are different resp. separated not only in time coordinate from up to now used (resp. created) coordinates. In physical nature this separation can be a measurable potential barrier.

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9. ADDENDUM

9.1 Maxwell equations

{Maxwell} Since in recombination points changes of direction [DirectionChanges] happen, which are in case of p=1/2 [orthogonal] from local point of view, on the other hand magnetic and electric fields pass into each other[138] locally[139] orthogonal, a combinatorial, multiple application of the Maxwell equations should be very interesting (***). It admittedly is difficult to keep track after multiple discrete differentiation (DiscreteDiff) under consideration of the numbers of the order possibilities, also of the vector potential of the magnetic field (combinatorial computer simulation? [lipo1], cf. also wq2). But this chapter is expandable.

9.1.1 Anti-symmetry of the combinatorial ways through magnetic dipole

There are electric charges, i.e. outflows and inflows of an electric field also can be perceived for themselves, after each other resp. temporally separated. That's not so in case of a magnetic field. Magnetic sources resp. charges (monopolies) weren't found till now[140], so let's now[141]

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[138] It is remarkable that temporally changing electric resp. magnetic fields induce "circular" magnetic resp. electric secondary fields. Such "circles" always contain way there and way back, analogous way there and way back from a central return of the temporal perception to the next (TimePerception). The exact consideration suggests, that the "circles" in reality are discrete polygons, which are branching.

[139] Due to the analytic formulation of the Maxwell equations with the word "local" is meant "within an infinitesimal surrounding". This isn't valid in the natural measuring process and unsatisfactory. Only discrete considerations would allow an exact definition of the concept "local", equivalent to "belonging to the current presence". This current presence isn't dot-like, it contains a more or less extensive area. This area can look so extensive in some directions from view of other reference systems that the combinations produced locally here result in long-distance effects there (and reverse). This of course here and there always only under preservation of the conservation laws from one perceptible constellation to the next.

[140] Because magnetic dipoles exist, magnetic charges resp. monopolies however couldn't be found, the assumption seems reasonable, that the subdivision of a magnetic dipole in two (temporally separated) monopolies therefore isn't measurable (possible), because thus also the union of consciousness resp. connection of subject to object resp. connection of the measuring instrument with the quantity to be measured would be interrupted. Necessarily for this union is the connection of information way to and way back, i.e. the union of the sequence from one central return ((ReturnToK0) , e.g. in row n) to the next (e.g. in row n+2).

[141] Some of my earlier considerations (in the download files) dealt with the supposition "observer as magnetic monopoly". For the time being, I haven't deleted them yet. Even if
(Fortsetzung nächste Seite)

start out from the assumption that there aren't any magnetic charges, i.e. that the poles of a magnet are locally, but not temporally separable. Then the combinatorial ways which go through the (locally separate) poles of a magnet should together (locally simultaneously) and anti-symmetrically flow into resp. out of the observer's point of view, relative to his local time direction. Due to a possible change of the local time direction no contradiction arises to the assignment of matter (Matter) und anti matter (Antimatter). The measurement result is namely dependent on the observer's point of view which is connected narrowly with the way of the measuring. Also remember that the common concept "point of view" of the observer is but clear but not precise since the point concept doesn't suffice for the description of the observer's "point" of view [ObserverViewPoint]. Subsequently a possibility of the change of the combination sequence in case of magnetic field measuring is mentioned.

9.1.2 Characteristic of temporally differentiated perception

The perception simultaneous in a point P1 can contain several events which are separated locally. From another point P2 seen the information ways starting out from these events may arrive subsequently, i.e. the same can be distinguishable (discretely differentiable) once in time[142], once in location, although the physics is equivalent. Such equivalences are expressed among other things[143] in physical equations. There are many such equations which assign (multiple) locally differentiated perception (measuring) to temporally differentiated perception. Due to their combinatorial information content the Maxwell equations are particularly interesting. They show e.g. that temporally varying charge (electrical current) plus a temporally varying electric field is equivalent with a magnetic rotational field. Since there aren't any magnetic sources, all magnetic fields are rotational fields i.e. every (simultaneous) magnetic field is equivalent to the temporal change of something. In this case therefore the combinatorial ways must start out from two subsequent events and flow in the observer's point of view together (locally simultaneously) and anti-symmetrically[144] (resp. symmetrically flow in and out). So it's reasonable to assume the time direction of the magnetic field measuring as orthogonal to the time direction of electric field measuring. The following outline with the first three rows of a triangle should illustrate the consideration:

```
            n0k0
      n1k-1           n1k1
```

---

there actually aren't any such monopolies, parts of the considerations still could have a little value. On the average the newer considerations are more relevant.

[142] Temporally differentiated perception always contains a local order and therefore more information than differentiation between places of equal kind. But if local differentiation is carried out along a gradient, for example a local potential difference, so the information quantity is the same and the notion equivalence permitted.

[143] They also are valid in the perception process, in the transition of presence to past: After perception of a temporal difference, i.e. temporal differentiation, the perception becomes a unit which we can remember it simultaneously (within one proper time unit), and we have decision liberty in remembering, i.e. there is also a free elementary choice possibility with p=1/2 (uncorrelated, orthogonal).
That physical equations, e.g. the Maxwell equations, are connected with the bases of memory in such immediate way, is surely a rather unusual view. Nevertheless this view seems only consequent and more detailed considerations could be worth the effort (***).

[144] "anti ", since there aren't any magnetic sources

```
n2k-2              n2k0              n2k2
```

The points n0k0 and n2k2 subsequent central returns, i.e. temporally separable resp. discretely differentiable (regarding the vertical as time axis). They are anti symmetric to n1k-1 and n1k1. We can for example n1k1 to an observer point of view of the magnetic field measuring {DecentralReturns} and understand the way n0k0 to n1k1 an inflow and the way n1k1 to n2k0 as outflow. If n0k0 and n2k0 should seem locally simultaneous we have to assume a time direction orthogonal to the vertical axis, for example horizontal to the right for the one who measures the magnetic field in n1k1 (with e.g. n0k0 as North Pole, n2k0 as South Pole). Together with this time direction one can understand n1k1 locally as central return, in which the magnetic field is perceived.
The advantage of this consideration it, that it explains the missing of magnetic monopolies, in addition is compatible with the assignment of matter Matter and antimatter Antimatter to right and left side of a primary triangle. However, it's still speculative and unsecured. If there is more security, then of course it's reasonable to carry out further combinations with the help of the Maxwell equations, also under consideration of the [Poynting] vector.

9.1.3 First steps beyond the flat model

{NotFlat} From the changes of direction[145] which are connected with the Maxwell equations we can win clues to supplement the flat Q0-triangle with further dimensions. We know that the electric field corresponds to the differentiation of an electrical potential. Of course here we make discrete considerations. In the Q0-triangle or the Q1-triangle every decision is the choice between two alternatives, which we at first called "step to the right" resp. "step to the left ".
Now every decision is the choice between two orthogonal directions of discrete differentiation of the potential which are furthermore orthogonal to the incoming direction (the direction between last and actual recombination point). If for example the z-axis is the incoming direction, a decision now is the choice between a derivative of the potential either along the x-axis or along the y-axis. A little sketch to this:

```
                                    Θ⊗
                                   n0k0
                                   /   \
                                 y       x
                                /         \
n2k-2 <- ⊗=   -z-    n1k-1               n1k1    -z-   =Θ  -> n2k2
                                \         /
                                 x       y
                                   \   /
                                   n2k0
```

Here the symbols Θ⊗ represent the positive resp. negative z-direction, orthogonal to the drawing plane, the direction from n0k0 to n1k1 represents d/dx as well as the direction from n1k-1 to n2k0, the direction from n0k0 to n1k-1 represents d/dy, as well as the direction from

---

[145] We should not forget that the primary approach starts not geometrically, but information theoretically (spacetime geometry is not cause but consequence of many iterations of the information theoretical law connected with our decisions): "uncorrelated" is mapped to "orthogonal", and from linear combination of orthogonal basis vectors results the concept "direction" [3dim].

n1k1 to n2k0. Due to the necessary orthogonality the direction from n1k-1 to n2k-2 resp. n1k2 to n2k2 now is anti-parallel or parallel to the z-axis; to take this into account by way of a hint, in the mentioned sketch the points n2k-2 resp. n2k2 are moved a little up, compared with the usual triangle.
If for example in n0k0 we decide to make a step to n1k1, we decide in favor of discrete differentiation of the potential along x, and such differentiation corresponds to the electric field E(x) along x. If we now step from n1k1 to n2k0, we differentiate along y, i.e. the electric field E(x) is differentiated along y: d/dy E(x). The stepping sequence from n0k0 over n1k-1 to n2k0 analogously yields the derivative of the electric field E(y) along x: d/dx E(y). If we now assume a sign inversion left and right of the vertical center (like in the Q1-triangle), so in n2k0 so we have
d/dx E(y) – d/dy E(x)
what just corresponds to the z-coordinate of the rotation $\nabla \times E$ of E. That, which starts out of n0k0 and doesn't arrive in n2k0, exactly arrives in n2k-2 and n2k2, it just contains the difference of n0k0 and n2k0 [146]. It is the discrete resp. finite difference along the row number n, i.e. a differentiation along time direction of something (whose the physical phenomenon is dependent on the observer point of view), if we identify the direction of increasing row number with the time direction. Also the Maxwell equations say
$\nabla \times E = -\partial / \partial t\, B = -\mu\, \partial H / \partial t$. A differentiation along time direction is found here, too. For example is valid
d/dx E(y) – d/dy E(x) = d/dt B(z) .
The mentioned sketch shows that the respectively last step to n2k-2 resp. n2k2 also means a differentiation along the z-axis[147]. If we still consider that the in n2k-2 and n2k2 yielding quantities mean a discrete differentiation (of the vertical center) along n, in which we have identified increasing n with the time direction, so the correspondence with the Maxwell equations is conspicuous (***).
The considerations surely must be made more precisely, but then it would be also interesting to look at further branchings, using the Maxwell equations repeatedly. Now this has been done, with interesting result:

9.1.4 A discrete approach to the vacuum Maxwell equations and the fine structure constant

Discretization of the Maxwell equations is usually carried out in the context of computer simulations (FDTD). However, for the purpose of simplification (after von Neumann Analysis, to avoid divergence), a direct implementation is not done, but application of additional presumptions[148].

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[146] Also an exact equivalent of the result of the (discrete) differentiation exists: That, which is perpendicularly to the own way branching off just corresponds to the difference between before and afterwards. So strictly speaking x-axis resp. y-axis are perpendicular to the branching differences d/dx resp. d/dy.

[147] By cyclic exchange of the axes the considerations analogously are possible for the remaining direction components B(x) and B(y) of B.

[148] For example alternating validity of the Maxwell equations. The with this associated alternating algorithms like leapfrog FDTD or ADI (Alternating direct implicit techniques) are common, because they are practical to *force* stability. But in nature stability is realized by exchange of energy. The with this associated interactions at distributed space time coordinates, however, are difficult to implement. We need more information to simulate for (Fortsetzung nächste Seite)

We also carried out a discretization of the Maxwell equations and Software implementation, but for in principle reasons we have done this directly, in symmetrical way and simultaneous (central differences, simultaneous and symmetrical realization of the equations at every time step). Interesting is the delayed manner of the divergence, as well as the initial development in dependence of the propagation (resp. coupling) of the fields, particularly if the squares of the propagators correspond to the fine structure constant

$$\alpha = \frac{e^2}{\hbar c 4\pi\varepsilon_0}.$$

Also according to the experimental results this constant quantifies the coupling of the electromagnetic fields, and so of course (***) it is associated with the Maxwell equations. Therefore http://www.orthuber.com/wqpm1.pdf, which contains a more detailed description, is a possible mathematical approach to the fine structure constant.

In contrast to that the following relation to the neutron and electron mass is very speculative. I mention it only to illustrate an example for further considerations to the topic.
Equations (16) of the above mentioned paper show that the field components branch[149] from every location into the same and 4 new locations per step from t to t+1. So the probability for branching into a *new* location (and field component) is |4p|, and the probability for n subsequent new branchings is |4p|^n. [150] If we assume p=±√α and n=7 (the latter seems very arbitrary), the probability is (4√α)^7=1/1838,65991 . This number is near to the quotient Mass_electron / Mass_neutron = 1/1838,68364 (Codata values of May 2004 [licodata]).

9.2 Initial elementary considerations

9.2.1 Construction of an axiomatic system

No {a priori} existence of analytical models[151] is presumed. (***)
When we speak of renormalization {AxiomP1} , we already mentioned the (essential) axiom, which means "we are here" or:

The probability of our presence and of our present perception is 1
{ProbabilityOnePerPresence}
or
The probability of our consciousness is 1 .

This perhaps seems to be trivial at first sight, however, it isn't trivial due to the properties of consciousness resp. life. The following chapter deals with one essential property:

9.2.2 Creation of new information by decision for an order within time-unsharpness (indefiniteness) (***)

{NewInfo} Due to the lot of information which has already arisen from life, we know that life can create information. Since any information transfer is connected to a transfer of free

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example counter-developments by software which can lead to such interactions. Perhaps a first step would be the introduction of conditional probability amplitudes resp. propagators which are direction dependent due to predetermined delayed aiming coordinates (DeterminedReturnInCenter) (altogether the conservation laws must be maintained).

[149] Because of so many branchings these equations probably show a statistical superposition.

[150] Vice versa in the average 1/|4p|^n repetitions are necessary until a sequence of n subsequent new branchings occurs.

[151] That seems to be so in current physical theories (Use of are priori infinite sets instead use of sets whose growth is coupled with progressing of time). But generalized criticism would be out of place, because many of those models surely are also very helpful [helpful], interpreted correctly.

energy, this means that life or our consciousness can send out (separate) from itself positive (free) energy temporarily in the context of the energy-time-unsharpness (give information[152]), if it decides so. Due to conservation of energy this is connected to emergence of negative (bound) energy somewhere else, for example in form of any negative potential which can be noticeable e.g. as electric field[153] or gravitational field and at last as force[154] resp. acceleration. Important is the sequence order: Because we can only perceive *free* (resp. positive) energy, we as conscious units must (cf. a. [consciousness])
(***)

1. at first {give}[155] information resp. send out free (i.e. for the surroundings available, positive) energy {FreeEnergy} (means for us decision, own contribution, effort[156] {Creativity}, work {Work}, lack of information

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[152] This is parallelly possible for all conceivable places, i.e. it is tried out extremely much (per proper time) so that we as human beings can't capture it any more with looking. Therefore the enormous lot of information.

[153] The action potential of nerve cells is only a special case which shows a particularly clear correlation to a decision. It will become still more clear if it leads to actions, which we can interpret, whose language we understand (due to the fit of our memory resp. counter-pattern (CounterPattern) to the perceived pattern).

[154] Due to our decision we now identify us besides the vertical center column k = 0, i.e. we are outside the most probable area. In the general the probability gradient {ProbabilityGradient} (differentiation (DiscreteDiff) along k) to the center now isn't zero, i.e. the probability of a step to the right is different to the probability of a step to the left, which implies a force. So decisions cause forces, at first away from the current center , then (secondary) back again. This for the time being qualitative consideration also matches the conservation of impulse. Quantitative considerations are dependent on the observer point of view, renormalization (Renormalization) has to be taken into account, the orders of magnitude can be very various.

[155] Initially the deeper potential (present) means a separation of positive and negative energy, the sum of energy remains 0 [Cons0Sum]. However, information lies in the order, in the pattern of the separation according to our decisions. As human beings we already use the information of earlier primary decisions, the {reliability} of this information is impressive and exemplary (FreeEnergyAndTime), the reliability of the primary conservation laws (of the primary conservation law from which they result) is perfect.

It is not necessary to use morally arguments (which can be ok, but can be also arbitrary): Reliability has high value, because it is necessary to go enough steps according to the initial decision, to increase branching depth, to test new combinations and so to collect new experiences.

[156] Not effort against each other (which would be only waste of the time and energy due to mutual extinction at last at the decisive return to the symmetry center) but effort into the new.

New information is uncorrelated with the previous, the correlation coefficient is 0. The geometric equivalent of this is orthogonality. Nature shows this at elementary level in the propagation of electromagnetic energy within the framework of Maxwell's laws. Per time step (d/dt) are cause, mediation and effect orthogonal to each other.

{InformationGap}), thereby going into lower potential level[157] necessarily due to conservation of energy so that somewhere else free energy is available relative to us, which is

2. *then* perceptible by us.[158]

So essential steps to get new information are:

1a. at first subdivision [Subdivision] of an unit[159] (of presence resp. us) into at first two[160] parts, differentiation and taking a

1b. primary decision (PrimaryDecision) for one part [OneSide]. In this separated part we then are temporarily localized {Separation}, in the other the free energy which has been sent out by us at first.[161]

2. Perception of this free energy[162] (as present) from the other part in recombined shape and sequence {InfoBack}.

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[157] Initially the deeper potential level can lie in the "Dirac sea of negative energy". Later, hierarchically subordinate, it can lie inside, i.e. near to a local rest mass center. If within the Q1-triangle we e.g. decide initially ourselves (our inside resp. inner world) for a side k<0 [Antimatter] , so we shall perceive a surplus on the other side {SurplusOfMatter}. In addition we have determined to return from there to k=0 [DeterminedReturnInCenter], whereby in between we probably can determine certain row numbers n of different meeting points of our parts in k=0 [PhotonColumn] by localization of our counter-pattern {LocalizationOfCounterpattern}, the exact way to that points on the other side [Matter] is free, however {FreeChoiceOfWay}.

[158] "Decision *before* perception" implies directed separation, i.e. progress of time in between. So there must happen recombinations elsewhere before return to the center, i.e. our consecutive step sequences must have new direction (geometrically (orthogonal) appearance because of uncorrelated decision sequences in consecutive frames resp. time units).
"give *before* receive" {GiveBeforeReceive} implies that the present is not reclaimed at once - **that we support resp. work for improvement of common long term future**. The longer the way (e.g. the life) from start to return, the more variations are possible, the richer can be the created new information and memory. ((Also enough health is necessary for this and for a good memory.))

[159] Perhaps it would be more graphic to describe the unity as "uniform area" or (even more problematic) as "homogeneous space", but this encourages to wrong (the natural order (Order) violating) analytical conclusions, because we cannot start out from the a priori existence of any areas (or spaces). The "area" (space for decisions) is first created by the subdivision. Information theoretically seen simply is meant the creation of a choice possibility resp. the giving of decision liberty.

[160] The stepping sequence 1a and 1b can repeat before step 2 and a subdivision into more than two parts results (more than 2 distinguishable energy states).

[161] The (before 2. repeated) sequence 1a, 1b,... means creation and determination of measurement resp. experiment, i.e. creation of the set of possible experimental results.

[162] It isn't unrealistic to assume that the finiteness of consciously uninterrupted perception (awake-sleep-rhythm, cf. (FullReferenceFrameChange)) is the result of the finiteness of this free energy.
(Fortsetzung nächste Seite)

The primary decision yields information coming from us, the information about the temporal order {Order} of the parts or (equivalent) the own localization within the subdivision. We can receive now information from the surroundings (since we are localized on lower potential level). Its quantity is increased because of diversification (Diversification) due to coincidental recombination, said more exactly because of lively recombination of the free energy on the way back[163]. The cumulative effect sent out (as free energy) is diversified[164], but returns (along proper time) summarily again.

Due to the conservation laws we must (or want to) go into the other part later (so to speak we shall be decided into this part, having decision liberty in way at determined aim [FunnelOfDecision] – At last we cannot contradict ourselves.). Therefore the information about the initial order might be lost[165] or difficult to find {UncertaintyOfOrder} within the much greater quantity of information received in between.

It is tried in the following chapter to outline the initial sequence of the recombinations, which are connected to our decisions:

9.2.3 Possible initial situation in the Q1-triangle (attempt to make an initial outline)

{StartQ1} Let be k the column number, that is the integer index of the horizontal position within a row, in which k = 0 in the row center, k < 0 on the left of this, k > 0 on the right of this (k makes double-steps, there is no k = 0 in rows with odd numbers n, 2 is divisor of n+k). A (surely still correction requiring) outline of a description of the possible initial situation in the Q1-triangle follows:

The magnitude of energy is always great compared to zero - which is the total sum of energy due to conservation laws (Cons0Sum) . The magnitude of energy depends on consistency (reliability) of the decision within the chosen frame and on the duration (past time - the depth of branching) since the decision. So a contradiction free decision can lead to the appearance of great energy and potential differences after enough time {DecisionCanMoveMuchEnergy}.

[163] We probably touch thermodynamic topics here.

[164] In this context one also should think about possibilities, how the won information can be copied and stored. That is prerequisite for the construction of complex hierarchical systems which exist in the reality. Also we then describe these systems as "clearly alive". They are controlled by decisions of the primary consciousness which may primarily contain only one bit but regularly cause an avalanche of information flow. In this manner also we as human beings live from moment to moment. The hierarchy is more far-reaching for we also live from day to day. A day contains a connected sequence of conscious decisions and differentiation (work), until we run out of energy and have to perceive it again in recombined form (partially also as dreams - dream are additionally influenced by unconscious decisions, also from the interior of our body.)

The hierarchy and the superordinate connection is also noticeable when decisions (visible as simple information “this is right”) have an effect not only on one human being but on many people (often over long time), so that they are all together follow the same direction.

[165] Perhaps information can remain in the same (connected) system only temporarily and therefore must be copied resp. transmitted (for inter-storage) to be permanent.

In row n=0, k=0 [SymmetryCenter] a primary decision[166] {PrimaryDecision}, an experiment to get new information, a decision within us is done[167]. "After"[168] that one side {OneSide}, right or[169] left to column k=0 in the triangle, beginning in n=1, k=1 or n=1, k=-1, is our new localization. Due to the initial symmetry it would have come to the same, if we would have decided in favor of the other side[170]. It is questionable, whether this primary decision is perceivable in usual way. Here the word subdivision[171] {Subdivision} (distinction,

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[166] A primary decision is a "new" decision or symmetry breaking which is done without influencing advance information (without (!) preceding time as precondition). So both selectable alternatives or states before this decision are not distinguishable (equal) and have equal probability.

The primary decision defines truth, due to its maximal past position (and with this maximal branching depth and width in the following time) its influence and information dominates in the long run in the following time. Before a primary decision both possbilities are not distinguishable, they are equal (in a graph theoretical apporach before a primary decision both possibilities must have competely equal probability).

2015-02: The primary decision defines "time direction" because (after this decision) time progress correlates with every return of a part to k=0, i.e. the direction "towards" k=0 is correlated with time progress (TimePerception). Superposition of this is probably reason of physical force (***), the kind of force depends on the constellation of the associated primary decision.

[167] Often there is pre-knowledge from the past, which is decisive for us and has to be taken into account. But (also) in everyday life frequently there are situations without any (local) pre-knowledge, where we cannot recognize at the best knowledge and conscience the right choice. Then we just have to primary (as first) decide resp. determine: "it is right *so*", "*that*'s the right way". After this our decision will be decisive (also) for ourselves. The primary decision is the most fundamental level for an answer to the question "Why do I (later) perceive a certain information" (not the answer to the question "why do I perceive something").
If there is no or only minimal pre-knowledge, if both possibilities have a priori same weight, the decision for one possibility is hardest for us, it needs most information from us. Therefore always there is the trend to orientate oneself at any (sometimes even radical) sets of rules. However, these are at best valid for former constellations.

[168] {PtimePdecision} Initially proper time direction (Order) isn't defined. The primary decision can determine it by separating positive (free) from negative (bound) energy (***): Proper time is defined that with every (time-) perception positive (free) energy decreases and negative (bound) energy increases. Because "positive" and "negative" are relations to the own relative potential level, increase of proper time looks like increase of the own relative potential level, at which "potential" can be interpreted at the best information theoretically (cf. [lija] p. 86).

[169] (Matter) or (Antimatter) under certain conditions (within existing gravitation potential)

[170] It simply would be another decision prior to any perception possibility, not "better" or "worse". Quite generally we cannot judge decisions which lie outside of our perception range.

[171] That means separation from the center and effort (work), to try, to inspect.

differentiation[172]) probably meets better. Only due to this initial subdivision a complete decision in the ordinary sense, which selects one of two (different) possibilities, can be done:

In row n=1, k=1 {n1k1} (without restriction of generality we chose k=1) we take a definitive decision resp. we make the initial (imperfect) subdivision to a completed, perfect[173] decision for which there are 2 possibilities:

In row n=2 exists a distinguishable (differentiable) situation:

- k=2 means no further perception - a situation, which exists also in the following rows in the border (k=±n) respectively. Is necessary always somewhere, that new information can emerge from "decisions out of the belly" - in the reality however probably at many places: The two dimensional model is too flat, at multidimensional considerations the border would be an enlarging and complex area[174].
- k=0 means progress of proper time {TimeDependentAxiomOfChoice} and perception (measurement) of a part of the in n=0 not chosen alternative as new present (1/2 of n=1, k=-1), and a part (1/2) of the chosen alternative (n=1, k=1) becomes past[175] - this part is proportional to the past proper time, proportional to the sum the negative central outflow probabilities Q2Z(n) resp. QW(x) (***).

So in row n=2 a part of the present not chosen in n=0 becomes own present (the part becomes more and more complete with increasing n.) Therefore that, which we would have measured, if we would have had the other alternative (the alternative of our environment) as present time in n=0, is not perceptibly and/or presently, but potential future, perceptibly in following rows after return to the middle (the vertical column of the central outflow probabilities, marked

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[172] Most important example for this probably is the differentiation d/dt between past and presence and d/dt between presence and future, more clearly discrete is the one between charges with opposite sign and the subtraction of the fermion amplitudes.

[173] The word "perfect" because of local irreversibility: In the double action resp. necessity of pairing way-there and way-back for (temporal) perception lies the reason for the appearance of non-linear square quantities in the taylor series expansion and in the with probabilities weighted quantities -Q2Z(n), if one sets x^2=4*Pl*Pr , in which Pl resp. Pr are the probability amplitudes for decisions to the left resp. to the right (or decisions forward resp. backward depending on point of view). Thereby the function loses injectivity within the definition range - locally in the possible destination points of the following row (in n=2, k=-2,0,2 see below) the information for inversion is missing, a locally irreversible process due to branching of information.

[174] One could speculate, how far our own reference system lies there, due to the so frequently necessary new decisions during lack of information. It may be consolatory that the probability to remain there becomes very small when n increases.

[175] Perception means realization of information (in k=0). The chosen *order* (Order) past before presence before future contains information per double step. The greater n, the longer is the order which is determined by chaining double steps, the greater is the information quantity. So in case of great n (in k=0) the simultaneous perception of a great information quantity per proper time unit (ProperTimeUnit) is possible.

with ´) with increasing probability. The sum of the |Q2Z(2n)| over n, starting from row 2n=2, goes against 1.
Since for the present (in n=0) always only a part[176] of the not chosen, free alternative is perceived (and therefore flowing out, therefore becoming fixated past with delay), in between remains enough decision liberty for new information, without contradictions to us (to the information existing in us, to our past and present). So by deciding *ourselves* we simultaneously create separated (for our present) unknown areas and therefore liberty for further decisions (DecisionFreedom) and new way possibilities. Later we can perceive (represent) also these areas again after such magnification and diversification {Diversification}, step-by-step in small portions. This is quantifiable by the number of way possibilities which lead back to the (common) presence (center column). Interesting is , that this number of remained way possibilities gains with growing row number n {IncreasingWayCount} also in the Q1-triangle (the Q0-triangle differentiated in horizontal direction), in which the center column k=0 is taken away [The number of way possibilities to row 2n of the Q1-triangle is for great n approximately $4^n/\sqrt{(\pi n)}$]. So decision liberty resp. (increasingly growing) possibility for gaining information remains despite perception, if the perception is done after delay (after n=2) {DelayedPerception}; even potentiation is possible, the more, the bigger delay is[177].

(Probably a similar argumentation also can serve as objective proof, that it's nearsighted or even stupid to tear everything (information, safety) back to himself, that voluntary renunciation automatically is worth it and even necessary for a (more extensive) future. If we would know everything (complete future), there would be no freedom for decisions. Every decision needs an information gap [InformationGap] . Acceptance of temporary information gaps resp. delayed feedback also requires confidence {ConfidenceNecessary} because it means the renunciation of unnecessary[178]

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[176] The part appears as difference: our perception is characterized by the registration of differences e.g. between before and afterwards, between row 2n and row 2n+2. The Q1-triangle fits mathematically better to this differentiating e.g. along time. For example form the difference Q0Z(2n)-Q0Z(2n-2) and compare it with Q2Z (2n).

[177] The greater the product [ETcosts] of the at first given energy (subjectively: work resp. effort) and of the proper time up to the return is, the greater can be the the effect. This product is correlated with the information quantity (EtmGreatEnough).
From this arise even mathematical (!) possibilities for deeper foundation of ethical and also health regarding rules which more or less directly state that temporary renunciation resp. control of mental and bodily basic instincts are necessary. Mental basic instincts are: Striving for free available energy resp. information resp. safety resp. calculability of future, i.e. striving for things like money, power etc.; bodily basic instincts are: striving for free available energy resp. food, avoidance of pain e.g. due to oxygen deficiency.
If we currently cannot remember something, this does not mean that we are not responsible for it. Moreover complete forgetting of information is probably impossible after it has become conscious somewhere (Due to the fast increase of the count of branchings); after the accompanying central return it's irreversible. But complete clarification in the course of time is plausible (due to the conservation law also the own frame must return to the center). So "bad" decisions will be interpreted neutrally (forgiven) for learning und are (because clarified without open questions) in the course of time no longer an impairment of the whole.

[178] In complex hierarchical systems self-control is necessary. It can replace mutual control (supervision) and makes it possible that we can leave greater tasks to each other, with confidence and in freedom. This is prerequisite for productivity.

(hindering) control. So confidence is part of every decision - and lack of confidence means a lack of initiative in form of missing ability to release[179]. The magnitude of information which we already can perceive shows that confidence is not only necessary but also well-founded [ConfidenceWellFounded].)

The liberty connected to information gaps[180] is a chance for new information (for ideas [Idea], for more richness in details between start and aim). Just if there is enough confidence, the period "in between" without full information don't need to be a hard slog. Understood correctly (if easily possible for all together), it of course also can (should) mean fun[181] - the possibility for the immediate fast-forward key would contradict the life.

9.2.3.1 Past

By implication (sure) past is defined as information which is no longer changeable. Then we can copy it and measure it repeatedly in the physical reality. But by perception of information we change the physical reality. So something new (the information created by a new decision) is only then (sure) past, if its perception is carried out after delay [DelayedPerception], late enough, that the number of the way possibilities starting out from the decision increase more quickly [IncreasingWayCount] than the number of the ways which lead back to a (consuming) measurement resp. perception.

9.2.4 Creation of free energy and proper time (by a decision) as basic prerequisite for information transfer - a quantitative consideration

The close connection between (creation of) free energy (FreeEnergy), proper time and (creation of) information can also be shown by quantum physical argumentation:

9.2.4.1 Transferable information quantity in dependence of available free energy, time and number of information channels

{ETmGreatEnough} Free energy is necessary for information transfer. Every information transmission means the transfer of free energy from a transmitter to a receiver. A short quantum physical consideration can give more quantitative details. Let's denote by E the available free energy, by T the total available proper time, by m the maximal number of parallelly available information channels (systems with rest mass like atoms, which can emit

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[179] Strictly speaking the separations associated with our decisions occur with every progress of proper time (so also in small scales) [TemporarySeparationNecessary]. We need confidence that we have made it good in the past ("that we have left everything at home well"). So we can allow free play to the left and progress into future.
To be able to make our everyday decisions we permanently need confidence in the reliability of our memories and perceptions. Our memories permanently arise from our perceptions by unconscious decisions. Only a small portion of our information input gets conscious to us and we trust it. This is usually justified because our perceptions contain a so large quantity of information that a large number of (unconscious) decision steps is necessary for their genesis and interpretation (sloppily said: it is improbable that this large sequence of steps is "pure chance"). Recall that for a Bernoulli random walk (resp. the corresponding binomial distribution) the number of the possible outcomes is equal to the number of steps (+1), but the spread resp. standard deviation is only proportional to the square root of this number. Therefore the sparse consciously differentiable interpretation possibilities are usually separated high significantly, i.e. a wrong interpretation is improbable i.e. we can trust our conscious interpretation. This is also the reason why visual perceptions with much information content are regarded as reliable and are often used as "proofs".

[180] Knowledge gaps are normal and it would be an error to forget or not to admit them.

[181] The good memory of the way belongs to the aim. Again here the restrictedness of ruthless behavior gets clear (EgoismIsStupid). It doesn't leave any durable good memory. What remains (even magnifies) resp. in the long run counts is the good memory and it's both the own and the common interest.

and absorb free energy). We show a minimum of the product ETm necessary for transmission of a given quantity of information:
At elementary level information is transferred by photons which are emitted and absorbed, simultaneously at most one photon per information channel. We assume the best case, that the probabilities of absorption and non absorption are the same (maximal information capacity of the code; cf. [lifa] p. 61), that all information channels are distinguishable, entirely used and all photons have the same minimal energy, so that absorption of them is possible just within time T. Let's denote by j the number of photons, which can be absorbed by every information channel during this time. The maximal time for emission resp. absorption of a photon is t:=T/j, i.e. the minimal energy of the photon is (hq)/t=j(hq)/T, in which (hq) is the effect quantum. With that maximal l:=jm photons can be transferred, in which jm j(hq)/T ≤ E . In the best case jm j(hq)/T=E, from which follows (jm)^2=l^2=ETm/(hq). Since there isn't an a priori preferential treatment of absorption or non absorption and the distinction of smaller energy differences than u:=(hq)/t isn't possible during time t, we can gain at most 1 bit information in the receiver per photon with energy u. This means, that even in case of usage of photons with minimal energy u at most √(ETm/(hq)) bits can be transferred, and the transfer of n bits is only possible in case of ETm ≥ (hq)n^2.
The square of n is interesting. Is ETm/(hq) a square number? E and T may be proportional because of simultaneous determination by our decision (PtimePdecision), but I haven't engrossed this.

9.2.5 Potential for information acquisition and information creation as essential feature of consciousness

{consciousness} Consciousness isn't static but a (time-dependent) process from and back to the origin (DecisionCenter) of decision. This shows already the fact that it (the accompanying asymmetry (OneSide)) can be maintained only for finite time, then a complete change (FullReferenceFrameChange) of the frame is necessary (e.g. dreams), former or later followed by return to the original (superior) reference system. Conscious knowledge implies the ability to active remember, therefore also decision liberty is part of consciousness. It can also decide to new ways, and these decisions influence the environment (e.g. the EEG) and so show themselves as new information. Only after I have written about information creation by (our) decisions, I noticed an interesting "definition"[182] of consciousness in [ligre] on p. 203: There consciousness is "defined" (described) as a synthesis of information acquisition (hence perception resp. measurement) and information creation (hence decision with accompanying expression of will) (of course a complete description isn't possible). There is written literally:

- *"Consciousness* is a synthesis of *awareness* and *volition"*
- *"Awareness* is the acquisition of information*"*
- *"Volition* is the creation of new information*"*

{ConApproach}
So the approach there is similar to the one here. Here in addition further details are given, also to the *primary* order (decision resp. information acquisition *before* perception resp. information giving), to proper time (connection of proper time progress with central return events (TimePerception) (ProperTimeUnit)), to concrete physically measurable equivalents (assignment of decision resp. information giving to allocation of free energy (FreeEnergy)).
With this approach also is suggested, that the first possibility for the *complete* perception of all results of a decision again lays in the in the location resp. center of gravity of the decision [DecisionCenter]. That's quite

[182] I use parentheses because a complete definition isn't possible, at most an approach. Consciousness is unique, unequalled.

natural because everybody is the first who becomes aware of the own (at first mental) decisions resp. thoughts. Everybody is the fastest resp. first in the individual local system {MaxLocalFrequency}.

9.2.5.1 Consciousness in computersystems???

Let's use the term *computersystem* for any fault-free working computer with software. A computersystem can be (exactly) copied because it is working completely determined, without place for own free decisions or chance in it. But that's also the reason that it cannot create new information. Information quantity is well defined. Assume a computer system S1 with given input data creates x Bit information during the time interval dt. There might be an exact copy S2 of S1 at another location, starting with the same input data and working at the same time (parallelly). So S1 and S2 are equal computersystems and because of assumption S2 also creates x Bit information during the time interval dt. We know, that S1 and S2 are doing exactly the same calculations, so they come to the same result and therefore together produce as much information like one of them, namely x Bit during the time interval dt. So x+x=x from which follows x=0. No new information has been created. Computer systems therefore cannot create new information[183], in contrast to consciousness [ConApproach].

Shortly: Because computersystems are working in a determined way, they can be copied, but for the same reason they cannot make own free decisions and so cannot create new information. So there is no place for consciousness in computersystems.

Also without usage of (ConApproach) this is immediately plausible: Consciousness has the ability to think, i.e. the ability to choose thoughts, i.e. the ability to make decisions. Because computer systems cannot do this, there is no place in them for (free) thoughts and therefore also no place for consciousness.
(We know, that every computersystem can only exist for a finite time. No computer can work fault-free infinitely long.)

To avoid many misunderstandings connected with the concept "determinism", I suggest the following definition:

9.2.5.2 Definition of determinism resp. "determined development"

{determinism} A development Q in System B is determined (deterministic) relative to System A,

(a) if Q has a result (which means that Q is completed after finite time) and
(b) if in System A is the full (1:1) Information about the result of Q already *before* completion of Q in System B, i.e. if there is early enough a stabile pattern in System A, which can be mapped 1:1 to the full pattern of the result of Q in B (perfect correlation) after completion of the development Q (roughly said: "if A is faster and/or earlier.").

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[183] Beyond the shown simple argumentation also basic prerequisites should be mentioned: Computersystems are examples for deterministic systems, but before we can speak of [determinism] at all, there must be a time coordinate (defined together with free (positive, available) energy [FreeEnergyAndTime] by a primary decision [PtimePdecision] and with [ETmGreatEnough] the product ETm must be great enough). Only after this a deterministic system can exist at all, and also this only during finite time, in which it at the most can convert (decode) some information into a language we understand. This decoding resp. leading (adapting) to our counter-code (CounterPattern) consumes free energy, which results in an overall increase of entropy resp. loss of information.

If the development Q has no end, or if there is no system A which fulfills (b), the development Q is not determined.

We cannot neglect the fact, that we need time and energy for information transfer (EtmGreatEnough) and therefore for constructing equivalents of observable results. It is worth mentioning, that according to this definition the process of calculating an *exact* (1:1) representation of an irrational number (starting from 1) is not determined (deterministic), because this needs infinite time and energy. The calculation is never completed, the result never exists.

9.3 The concept "probability" in relation to the measuring proper time

The measuring proper time is defined in dependence to the respective arrangement as the proper time interval of the beginning of a measuring up to the perception of the measurement result, that is the time of a decision (to measuring) up to the accompanying perception. The concept "probability" implicitly is connected to this, because the total probability of all possible measurement results only after the variable measuring proper time is 1.

9.3.1 The proper time unit

We mentioned [TimePerception], that proper time progress is connected to central return events [ReturnToK0] . Now we can define the proper time unit {ProperTimeUnit} as the shortest possible proper time interval, as the time interval mathematically lying between two subsequent own central returns[184] (physically lying e.g. between emission and absorption of a photon {PhotonEmissionAbsorptionAsTimeUnit} [185]. The probability of these central returns differs from system to system, it depends also on the energy of the photon, therefore different systems have different proper time units).

Longer time intervals arise from joining of such central return events resp. proper time units. A finer subdivision of proper time isn't possible[186]. The experimental results also confirm this. For example in the double slit experiment all way possibilities are equal not only with regard to location but also with regard to time. So it turns out, that we cannot say that the passage of the slits is done "before" absorption at the detector (possibility

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[184] This means exchange of energy (PhotonColumn). So proper time is (locally) constant, if there is no energy exchange. From outer point of view this can last "very long" (***), e.g. in case of stable particles, in case of long ways of photons (WayTimeConstantTillNextReturn) .

[185] To get a graph theoretical approach to "rest mass", it is first necessary to go back to its minimal stable manifestations, the elementary particles. Because every elementary particle of the same kind has the same physical properties, it is plausible to map *all* particles of the same kind to *one and the same* structure of the graph {OneStructureForOneKindOfParticle} starting relatively to the symmetry center. If there are many particles of the same kind, many branchings are starting from the structure (and on the other side of the symmetry center flowing into the antisymmetric structure). The relative energy necessary for a new particle separation (Matter/Antimatter) is the higher, the later (***) [ConnectionIsTimeDependent] or the nearer to the center ends the structure (the more information the separation contains), probably proportional to the density of way possibilities there (and approximately proportional to the reciprocal of 1/r^n, r=0 is not measurable). - üüüü refinement worthwhile, recall that time density is proportional to sum of probabilities of return -

[186] There may be a connection with the impossibility of the separation of the poles of a magnetic dipole. Till now I couldn't deepen this further.

of the destruction and reconstruction of interference) - after emission the way of the photon together with the event of absorption is one unified moment of simultaneity. So causality violation is impossible. For example think of astronomical observations of the light of far away objects, e.g. quasars, which passes a gravitation lens (e.g. a big galaxy). By the manner, in which the astronomers register the photons of the quasar, they are able to determine, whether the photon has taken both ways round the gravitation lens or only one way "billions of years ago". The photon just doesn't has taken this or that way "billions of years ago" and then was absorbed, instead of this after emission the complete way of the photon together with the moment of absorption is equal in time, since no other central returns (e.g. absorption) occur in between {WayTimeConstantTillNextReturn} - quantum phenomena aren't determined until the moment at which they are measured.

The mentioned axiom [ProbabilityOnePerPresence] then shortly means "one (central) return per proper time unit". Hereby the central return probability Q0Z(2n), which is valid for a current row number 2n, becomes renormalizated to 1. At this has to be noticed, that for the probabilities within the Q1-triangle (FormulaQ1) and for the horizontal scalar product of the Q0(n,2k) is valid:

$$Q0Z(2n) = \sum_{m=0}^{n} Q2Z(2m) = 2\sum_{k=-n}^{-1} Q1(2n,2k) = \sum_{k=-n/2}^{n/2} Q0(n,2k)^{\,2}$$

The formula permits several interpretation possibilities. One is mentioned:
With the renormalization of Q0Z(2n) also the altogether probability of perception from an multitude of outer (not central but by us caused) returns totals 1, in the gyroscope model (GyrocospeModel) one would say "the probability of the reception of one (recombined) light pulse per emission totals 1" [OneOutOneIn].

So the frequency concept can be a reality near expansion of the probability concept, which is related more clearly to proper time and also permits results greater than 1.

9.3.2 Unity of consciousness and necessity of non-contradiction

Unity and uniqueness of consciousness (the conscious presence) are connected to the unity and uniqueness of every proper time unit resp. of every recombination point. The singular position relative to the origin (GlobalSymmetryCenter) indicates the uniqueness of every recombination point, the indivisibility of this point indicates its unity. Non-contradiction means that the unit of the consciousness holds, that the conservation laws fully apply (Cons0Sum). This requires a more exact explanation:

The concept of information stands before the concept of contradiction, with contradiction we mean "contradictory information" in which the simultaneity is important. Important quality of information is

(1) temporary constancy.

Since with every central return, i.e. with every even row number a growth of proper time is connected, (sure, exact) information has to be assigned to the rows with uneven row number n.

Further essential quality of information is

(2) assignment to the past

because we have (sure) information only about the past, i.e. sure information comes of recombination points from rows with smaller row number than the current row number[187]. Concretely this information can lie in the value of k, which was true in row n.

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[187] One can understand the central returns (ReturnToK0) as *the* irreversible events (the measurements resp. perceptions, cf. [QuantumPhysicalObservation]) whose sequence defines the time direction. Causality is maintained since only information from above (previous) rows is available for every central return.

If we localize ourselves for example in row n=2, k=0, we can assign sure information only to row n=1, for example the statement "we were in row n=1 in point k=1" (and not in k=-1), i.e. "k=1 is true. We cannot say, we were in point k=1 and k=-1 simultaneously, the separation of the two points would contradict the unity of consciousness. With the previous decision in n=0, k=0 we had to decide for exactly one value of k=1 or k=-1 and both possibilities are respectively unique.

Possible analogy: Only a single fermion can have one and the same state. This also fits to the assignment of fermions [Fermions] to rows with uneven row number.

9.3.2.1 To the principle of the excluded third

Here still a remark to the principle of the excluded third and possible unnecessary misunderstandings which are connected with it:
We look again at (exactly) one (simultaneous) row n, which contains information (therefore n odd, n smaller than current row number), so is valid either "we were in k=1" resp. "k=1 is true" or "we weren't in k=1" resp. "k=1 isn't true". So the principle of the excluded third is valid in case of simultaneity in past; the past up to the fixed row n is finite, its construction already is completed and so proved also from intuitionistic point of view {IntuitN3}. Without simultaneity in past this principle isn't assured. For example from view of row n=2 we can say "k=-1 isn't true" (in row n=1) and "k=1 isn't true" (in row n=3 due to our decision just taken). Essential is the time coordinate which grows because of our decisions. This coordinate isn't negligible.

9.4 No alternative to primary (initial) symmetry

Physical laws are either not valid or they are valid in all coordinate systems, i.e. everywhere and at every time. So we have to assume a total sum equivalent to 0 and therefore symmetry with regard to physical quantities[188], to which conservation laws[189] apply {Cons0Sum}[190] [191] [Q1RowSumIs0]. Well, 0= -0, i.e. 0 is symmetric in itself, so necessarily there is an initial, primary symmetry[192].

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[188] The affected physical units anyway cannot be defined initially.

[189] This also means that the (never simultaneously measurable) total sum of energy is 0 (under consideration of the negative field potentials). In analogous way this applies to all directional physical quantities.
A consideration of the (negative) gravitation potential which is caused by all surrounding masses (of our universe) could enlarge insight. Astronomical observations indicate that a mass m has a gravitation potential -mc^2. The total energy (relative to the "outside") of a free particle then would be just mc^2-mc^2 = 0 (or nearly to the "outside" nearly 0, so that e.g. in case of photons very red-shifted electromagnetic quanta remain for transport of effects). For such total considerations one has to modify the derivations of the Lagrangian and of the energy of a free particle (see e.g. [lilan] p. 30 (8,2) and p. 31 (9,5)).
The gravitation "constant" is probably a function of many variables, so that the from gravitation resulting negative energy always compensates the remaining positive energy and the total sum of energy is zero.
Due to very large statistics current single subordinated decisions seem to have no influence on such constants.

[190] Total sum of 0 (symmetry) is long term nature of consciousness. The by a conscious unit (after decisions) within short time intervalls perceived asymmetries are in the long run just the consequences which restore the total (long term) symmetry.

[191] So the "own" contribution (its non-contradictory part on the whole [GlobalGain]) is decisive in the end {OwnDecisiveContribution}. Even if all (temporarily separated) conscious
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On the way of a central return (ReturnToK0) to the next always also decentral returns [DecentralReturns] happen, which can cause asymmetric perception. But our asymmetric perception also is result of our own last start point outside[193] the primary (initial) symmetry center (AsymmetryAsPreconditionOfGeo) {AsymPosToAim}. This makes it so difficult for us human beings to recognize the primary symmetry {FullPrimarySymmetry}. Our starting point again results from prior decisions. So these cause with temporarily asymmetric perception also (physical) facts, which are the more generally (e.g. parity violation in β-decay, CP-violation) valid, the greater priority of the causing decision is.

Besides the special role of the return probabilities also the experimental results of quantum physics indicate the fundamental symmetry of nature. We for example know in case of symmetric "annihilation" of matter and antimatter into two photons alone by measuring or perception the state of one photon also the simultaneous state of the other, even if it seems to be separated in location. So if we measure one side, we measure also the other side, what information theoretically means unification of both sides (e.g. of row 3 in the [ScalarproductExample]) because of a perception in the a symmetry center (point B [194] in the center of row 6 in the ScalarproductExample.

9.4.1 Presence as center of the horizontal ("left-right") symmetry

The ScalarproductExample also shows the nature of the symmetry. Point B forms the symmetry center between right and left half of row 6, but only row 3 is completely accessible there as presence. The horizontal symmetry between left and right side besides B most likely has to be interpreted purely information theoretically, i.e. |k| quantifies (as minimal number of required elementary decisions) the length of the (not necessarily straight) information way to the center. The information of the two sides is equivalent, even synchronized due to the symmetry (however only perceptible from row 12 on).

9.4.2 No vertical ("before"-"afterward") symmetry, no conservation but increase of information quantity

The in B (ScalarproductExample) present row 3 forms the center of gravity of rows 0 to 6 only with regard to the *sum* of the probabilities. There isn't vertical symmetry [DirectedGraph], the future (n > 3) is of course different from the past (n < 3). The greater n, the greater the path length is (with regard to the number of the decisions), the more way possibilities to and back exist. Therefore every way contains the more information, the greater n is. There isn't a conservation of information quantity, an increase of (per proper time unit (ProperTimeUnit) perceptible) information quantity is possible.

9.4.2.1 Vertically reflected scalar product (point symmetry?)

In the ScalarproductExample one can in case of fixed sum s:=m+n sum vertically (cf. [skahove]). Also valid is

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units claim this, no contradiction arises if their contributions are mutually dependent in the end (according to "If I aim at this in the end, the others also, and reverse") - this shows the importance of the "own" long term contribution. (***)

[192] One could assign the symmetry center of a dimension respectively to the vertical center column k=0 of the Q1-triangle [Q1Triangle] (or of an along k in higher uneven order discretely differentiated Q0-triangle).

[193] For example in k=±1 [n1k1] due to a primary decision (PrimaryDecision)

[194] From view point A in row 0 the two halves of row 3 might represent matter (Matter) and antimatter (Antimatter).

$$\sum_{k=0}^{n} Q2Z(2k)Q2Z(2n-2k) = \left(\sum_{k=1}^{n} Q2Z(2k)Q2Z(2n-2k)\right) + Q2Z(2n) = 0.$$

Summation before scalar product formation also has interesting results, for example

$$\sum_{k=0}^{n}\left(\sum_{j=0}^{k} Q2Z(2j)\right)\left(\sum_{j=0}^{n-k} Q2Z(2j)\right) = \sum_{k=0}^{n} Q0Z(2k)Q0Z(2n-2k) = 1.$$

Regarding possible physical interpretation I had only vague, too speculative ideas till now.

9.5 Elementary particles as defined constellations relative to the origin (GlobalSymmetryCenter) - asymmetry as precondition of all geometrical appearances

{ElementaryCoordinates} Vectorial (numeric) representations are clearer than names and recommendable also for elementary particles.

A hierarchical constellation of (decisions making) systems is a reasonable assumption [hierarchical]. One may identify elementary "particles" with defined (coordinate sets of) recombination points [OneStructureForOneKindOfParticle] relatively to the origin. The nearer to the global symmetry center, the higher in the hierarchy, because branchings starting nearer from the center are more widely spread. There is a lot of free variables. One could for example assign matter {Matter} to branching possibilities[195] going out from the right side of the primary triangle, antimatter {Antimatter} analogous to those from the left, for photons one could assume (vertical) columns with k=0 [196] {PhotonColumn} (***), as (only asymmetrically [AsymmetryAsPreconditionOfGeo] from one side[197] visible) "location" of photon absorption {PhotonAbsorption}. Within subordinate triangles which are starting out of the superordinated triangle respectively orthogonal[198] one could assume for bosons (horizontal) rows with even row number, for fermions[199] {Fermions} rows with uneven row

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[195] They spread out within subordinate triangles (binomial distributions in the simple case). From them it indirectly always goes back again some*time*, i.e. generating a time step (ProperTimeUnit) - a *branching loop* resp. *branching feedback* [BranchingLoops]. So also the subordinate (local) triangles are parts of the primary triangle. Probably due to the start points (in k not equal 0) of the subordinate triangle besides the center (in k=0) *initially* the global symmetry is hardly or only heavily recognizably there.

[196] Very speculative due to missing information. But it is **plausible to identify increasing n with increasing time and constant column with constant states**, e.g. (states of) elementary particles. In this one dimensional approach only one coordinate k is used to describe a column, as entrance. It may be interesting to think about situations depending on (relations between) column coordinate(s) and compare this to elementary particles and their states.

[197] So under certain conditions there is a relationship between the separation of inside and outside, and the separation of matter and antimatter.

[198] How large is the number of different dimensions? Hints may be won also from computer simulations of different combination possibilities.

[199] Consider also, that the -Q2Z(n), which are incompatible with each other, first appear in row n-1 in k=±1 (before the flow out in n, k=0) [DistinguishableOrder].
In connection with this a further variant of the Q0-triangle, the "Q0M-triangle" is mentioned. It can be derived from the Q0-triangle, if for every step to the right a multiplication by -1/2 (instead of 1/2) is done. The "Q0M-triangle" is defined by
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number (n/2 as total angular momentum, k/2 as angular momentum component orthogonal triangle). It has to be considered that single "particles" can have several degrees of freedom (e.g. polarization), so that a point can certainly play a special role (e.g. as center) in the description, but the relation of several points (especially start, destination point[200]) must be taken into account. A couple of initial considerations to this are also found in wq3. Special states of particles e.g. quantum numbers of atom electrons might correspond to the branching possibilities within further subordinate triangles. Also the periodic table of the elements could give hints to this.

9.6 Thoughts to extreme astrophysical extrapolations

To avoid misunderstandings: I don't want to ban speculations - these can be helpful or even necessary for progress. Also simplifications and analytical models can be useful to get an entrance. But their overestimation or even confusion with reality leads to errors, therefore I decided for this chapter.

9.6.1 Extrapolation of approximative models leads to errors

{ExtrAstroPhys} It is quite difficult to get free from the familiar lokal geometrical view and e.g. to turn the consideration way inside out. But the geometric approach uses analytical and therefore approximative models [AnalysisAtBestApproximative]. Therefore extensive extrapolation of the geometrical appearance (which is only a secondary consequence of rest mass (AsymmetryAsPreconditionOfGeo)) leads to a wrong imagination. For example one speaks of the (by implication absolute, "rigid, frozen") diameter[201] of the border (horizon) of black holes. On the other hand one speaks about gravitational lenses: In the proximity of black holes light beams are turning into the hole. What is (our impression of) the diameter of

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$$QM(n,k) := \frac{(-0.5)^{(n+k)/2}\ 0.5^{(n-k)/2}\ n!}{\left(\frac{n+k}{2}\right)!\left(\frac{n-k}{2}\right)!} = (-1)^{(n+k)/2}\ QP(n,k)$$

The signs of the numbers Q0M(n, k) alternate, especially Q0M(2n,2k) = Q0M(2n,-2k) and Q0M(2n+1,2k+1) = - Q0M(2n+1,-(2k+1)), i.e. the Q0M(n,k) in case of uneven row number add like the amplitudes of fermions and in case of uneven row number add like the amplitudes of bosons. The numbers Q0M(2n,0) are the taylor coefficients of QV(ix)=1/√(1+x^2). Of course the function Q0M(n,k) also permits further-reaching considerations with regard to discrete differentiation and sum formation. Some are mentioned in the compendium of formulas wqm. It is difficult for me to estimate the relevance, but at present the Q0M-triangle seems to me quite constructed, therefore this is small printed within footnote.

[200] If one defines start and destination point so that no further interaction (recombination) of the particle takes place in between {FollowingReturn} (even if in the observer system proper time passes), so (because of the necessary, discrete consideration) it's only consequent to regard a linear (continuous) connecting line between these points merely as artificial model, which doesn't it have an equivalent in the reality and can (must) be ignored in the description of the particle. The relevance of this consideration becomes particularly clear in case of minimally interacting particles (photons in vacuum, neutrinos).

[201] One calculates it from the gravitational potential, which actually is definable only relative to us. The “diameter” therefore is also dependent of our own point of view. “Sphere” is an (approximative) analytical concept and therefore not appropriate for extreme extrapolations. Already because of symmetry reasons we cannot exclude, that we are inside a (large) black hole. Remembering this one gets clear that the concept of spherical "black hole" is very simplified.

Moreover the gravitation constant is not constant but depends on branching depth of the discrete decision tree, it can be e.g. the consequence of a small correlation (GravitationBecauseOfCorrelation).

the hole particularly if it is very heavy (visible universe) and it's border is close to us or if we are even in the border (to another hole)? What's real in the decisive (***) situation in the border between two holes? Here we make a decision on which hole forms the future of our proper time coordinate (starting from present, from the current recombination point). Isn't just here[202] an exact calculation necessary again?

If we want to use common formulas: Are masses still almost constant, if there is a great[203] potential difference? Are for example radiation losses adequately taken into account? Do higher degree derivations along special directions become great relevance? There are many open questions. So the probability of great mistakes grows towards 1, if one calculates too far using approximative (analytical) methods.

Analytical models allow usage of infinite sequences of numbers, functions, operators, etc., independently of any time coordinate. This separation (of time) is not realistic (RealInfinityGrowsWithTime). We should not make (like in frequently used cosmological theories) an isolated extreme extrapolation of a single aspect into areas far away from the experimentally checkable, particularly if this extrapolation leads to a dead end[204]. I think, that similar to the big[205] bang model also the model of a point-like, isolated black hole with spherical[206] gravitational field is so simplified that the danger of misunderstandings is great. One remember that all experimental tests of general relativity theory exclusively refer to very weak gravitational fields ([lifl] S. 178) {StrongFieldExtrapolationErr}. I frequently won the impression that models which describe a (restricted) part of reality, are confused with reality, particularly from laymen (and everybody is layman almost everywhere). This is problematic because the consequences can be unnecessarily restricted views of the world and restricted philosophies (EgoismIsStupid).

Evidently the usual geometric approach leads to errors in the end. Of course in astrophysics also relativistic calculations are carried out, but these (4D) geometric analytic approaches also are approximative[207]. Naturally particularly at observations of far away objects with partially very indirect interpretation possibility of measuring results there is a large probability, that the measurement result also is influenced in relevant way by factors, which remained

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[202] a possibly quite everyday situation

[203] Locally measured masses might appear nearly constant, locally the situation could look ordinary.

[204] Formerly one used to think that the world is a disk. The blind end of this model was the disk rim. The blind end of the big bang model is the situation "diameter of universe=0".

[205] The word “big” means extreme physical quantities, i.e. today’s “normal” physical quantities multiplied by large numbers. We should view such large (very discriminable) numbers not as a priori given, but as expression of large branching depth, which is arising together with time.

[206] spherical means geometrical (so analytical) and therefore approximative, not exact consideration (AnalysisAtBestApproximative).

[207] The calculations use approximative (analytic) formulae in essential parts, e.g. of QW(x) or QV(x).

unconsidered in often heavily checkable, on the current state of knowledge based interpretations. This can lead to extreme distorted results. Caution is appropriate especially at extreme results whose physics is hardly known because there is no experimental possibility for verification. It would be helpful, if the widespread[208] publications exhibit the difficulties joined with the models clearly enough and uncoded: then it's easier for a broad readership to find aimed suggestions for improvements and we altogether can advance better. Of course many astrophysical considerations are valuable, even if they contain gaps. The approved four-dimensional approaches give interesting hints.

Remark 2012: The until now usual (Big Bang) Models extrapolate until "Diameter of Universe is 0" with a priori n-dimensional geometry. Better would be an information and graph theoretical approach which starts discretely with a hierarchical sequence of temporary symmetry breakings of conserved quantities, in which spacetime geometry secondary statistically results as approximation after a large number of branchings [GeometryIsStatisticalConsequence] . Important physical constants (e.g. the quotient of the strengths of electromagnetic and gravitation interaction) are time dependent functions which ensure at any time the exact validity of conservation laws. Probably the conservation laws can be deduced from a primary conservation law (PrimaryConservationLaw), which leads on different stages of branching depth to appearance of conserved quantities.

9.6.2 Perhaps discrete extrapolation can give hints

Astrophysical observations can be also helpful to close gaps in other branches of physics. For example basal appearances like the electron mass are unexplained. In a discrete model units of rest-mass can represent possibilities for start and return of information paths (of photons). The finite and discrete distribution of rest mass coordinates and states determines the finite and discrete set of possible results of all physical experiments (with finite duration) (DeterminedReturnInCenter).

It would be surprising, if *globally*[209] seen the long-standing creation of rest mass (the long-standing separation of matter (Matter) and antimatter (Antimatter)) is restricted to a unique moment of time. Because the total sum of energy should remain 0 (Cons0sum), consideration of gravitation potential is essential. Astrophysics has best expertise for this subject.

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[208] Of course already today there are insider books which honestly point out the limitations of the models and which even admit that the models are often inadmissibly extrapolated, e.g. in the context of cosmological considerations {CosmoExtrapolationErr}.
An example (Translated citation of the end of §130, "The central symmetrical gravitational field", on page 584 in [lira])):

> "We do not at all make any claims that we have grasped geometric characteristics of the whole world. The at present established experimental material doesn't give us the possibility to draw any well-founded conclusions yet. In contrast to this in literature there are many attempts to make a geometry of the four-dimensional world on the whole. Without experimental basis these tests are bare, albeit mathematically veiled, speculations".

[209] The moment of the creation could indeed *locally*, i.e. seen from an at this created new frame of reference, mark the unique point which lies furthermost back within the there perceptible past.

Cosmology always requires extrapolations and is more ore less speculative[210]. There has been overestimation of several models, though they are at best a relocation[211] of explanation. But there are also many scientists who don't forget the limitations of the models and do their best to recognize global relationships. This earns respect, even if it is more or less speculative - due to missing information there is simply no other choice. There are also important secure results, e.g. we got clues about the huge dimensions of the visible universe, and we know that we can see only a (very small) part.

9.7 No contradictions because of (simultaneous) perception of multiplicity

Each sort of elementary particles, atoms, etc. appears repeatedly in our time frame. In the strict sense the (repeated) completely identical behavior of congeneric particles can be explained only by the fact, that their appearance emerges from the (repeated) application of the same sequence of steps within a fundamental (combinatorial) law.
{PerceptionOfMultiplicity} Here a crude outline to the topic multiplicity and consistency:
As before, QW(x) and QV(x) are defined by

$$QW(x) := \sqrt{1-x^2}, \quad QV(x) := \frac{1}{\sqrt{1-x^2}} .$$

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[210] It is worth mentioning that we also don't know very much about the long term stability of frequently used physical constants. For example the gravitation constant G can be a function of time. Remembering such difficulties repeatedly the question comes up: Is our knowledge sufficient for detailed cosmology?
If it doesn't suffice, a detailed engagement in this is a waste of time - unless afterwards it has been at least a nice common experience...

Of course I have done speculations, too, e.g. concerning some "large numbers": Using the classical electron radius 2,8e-15 m we could define a minimal time unit t_min as "electron circumference"/(speed of light), i.e. t_min = 2,8e-15*2Pi/C = 5,9e-23 s. If we define as in our frame past time t_max=15 billions years, we obtain t_max/t_min=8,01e39. According to (NPropT2) the accompanying step number n_max = (t_max/t_min)^2 * π/2 = 1,0e80. This order of magnitude is near to astronomical statements about the number of nucleons in the visible area. Because we postulate conservation of energy, i.e. 0 as total sum of energy (Cons0Sum), we assume a negative gravitation potential which compensates rest mass energy at any time, also today, i.e. we obtain G*n_max/C^2 ∝ C*t_max and with this G*(t_max)^2/C^2 ∝ C*t_max resp. G*t_max ∝ C^3.
If we assume a constant speed of light, this means that G is proportional to 1/t_max, i.e. G is decreasing in the course of time.
(This decrease should be put into relation to another interaction. It is interesting that the relationship of the strengths of gravitation and electromagnetism has an order of magnitude near t_min/tmax.≈1e-40)
I noticed also that in case of G∝1/t_max the term $n*g^2/r^2$ in (GravitationBecauseOfCorrelation) would be constant if we identify n with n_max and G/(C*t_max) with g^2/r^2 because due to above considerations n_max*G/(C*t_max) ∝ (t_max^2*1/t_max)/(C*t_max), but I got the impression that it becomes too speculative and that my knowledge is not sufficient. So I have not engrossed these thoughts.

[211] For example it is only a relocation if we explain this or that phenomenon by potential differences (e.g. by gravitation), because we don't know their real origin. It is more satisfactory to presuppose zero as total sum of energy due to conservation laws and symmetry considerations (Cons0Sum), from which follows the appearance of (negative and positive) potentials. To be consequent we also have to think about the meaning of "positive and negative potentials" or "positive and negative energy". Here an information theoretical approach is adequate: This separation in necessary for creation of new information (after separation the definition of "positive" and "negative" contains 1 bit information). Creation of information is necessarily connected with (consciousness). The latter is no further relocation, it is final.

We now study a symmetric arrangement (a simplified, flat "gyroscope model" {GyroscopeModel}): Two relatively small transmitter-receivers spin around a very heavy black hole between them, located in the center of gravity (sphere and point concept simplified). The centrifugal force compensates the gravity, therefore each of them forms roughly an inertial frame (since each is relatively small). Each moves with speed v/c:=x (about as quickly as in the border of a nucleon) relative to the other and (after one has begun[212]) sends out a light pulse to everywhere (he "expressed himself") as soon as he has received a light pulse[213] (from the "other").
Due to the symmetry of the arrangement each says about the other: "the other sends only QW(x) times as often to me as I to everywhere send, and I receive only QW(x) times as often as the other to everywhere[214] sends (because of time dilation). So each would have the impression, that from the other only (QW(x))^2 times as many spectral shifted[215] light pulses come back as he to everywhere sends out. How can this be compatible with the fact, that by definition each sends once per reception?

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[212] It's important that one begins (to *express* oneself, to decide to a light pulse, to release free energy (FreeEnergy), information), otherwise it remains dark. If however this happens then because of symmetry reasons one can start out from the assumption that the other also does this. Everybody then has the same perception, namely having sent first and then received, i.e. the same reality. These realities of the two (or more) are compatible, they therefore can be or become the same with the memory of these realities, without contradictions.

[213] The model only shall serve as clue and surely is simplified. In the borderline case v/c->1 it contains extreme conditions for which up to now at most theoretical approaches exist, which aren't experimentally checkable. Some approaches of the general relativity theory would come to the conclusion, that the arrangement is unstable and would spirally collapse. These approaches include a lot of uncertainties, they start from prerequisites which don't necessarily correspond to reality or simply are undefined. So for example one could assume the arrangement as maximum large in the sense, that there is no outside, so that one cannot speak of a "spiral" because there is no standard of comparison which is necessary to measure radius. The light propagation from transmitter to receiver isn't straight in the conventional sense, the black hole between transmitter and receiver works as gravitation lens. Also to mention is, that the direction of the light, which has been transmitted perpendicularly to v from view of the transmitter-receiver might turn forward from view of the center of gravity (from π/2 to arcsin(QW(x)); the "everywhere" gets a preferred direction: Effect analogous to synchrotron radiation.
Since however light is sent out to everywhere (also to behind), it arrives at the other.
So (speculative) details aren't essential, the principle is essential: everybody transmits exactly once, as soon as he receives and there is sufficient long a symmetric time dilation.

[214] A discrete, exact consideration way would allow only a finite number of directions.

[215] The light arriving from "the front" (from the future) has shorter wavelength and is more briefly (e.g. very short X-ray pulse) than his light pulse, the light arriving of behind has longer wavelength and is longer (microwaves). However, the initial source is the same.

The contradiction dissolves, if one imagines, that each sees 1/QW(x))^2=(QV(x))^2 copies of the other simultaneously (per proper time unit (ProperTimeUnit)) or successively[216]. So he receives altogether just as many light pulses, as he sends out {OneOutOneIn} and can say nevertheless, that each copy sends only (QW(x))^2 times as often.

$$Well,\ for\ v \to c\ resp.\ x \to 1\ is\ valid: \qquad n \to \infty\ and$$

$$0 < QW(x)^2 = \left(\sqrt{1-x^2}\right)^2 = 1-x^2 \xleftarrow{n\to\infty} \left(\sum_{m=0}^{n/2} Q2Z(2m)\right)^2 = \left(Q0Z(n)\right)^2$$

with

$$\left(Q0Z(n)\right)^2 \frac{\pi n}{2} \xrightarrow{n\to\infty} 1$$

(The last limit value results, if we insert the Stirling formula into [DefQ0Z])

Therefore each sees 1/(QW(x))^2=(QV(x))^2 resp. approximately πn/2 copies of the "other", which is as much, as on a quadrant with radius n (or on a circle with radius n/4) has place. The circle is the two-dimensional[217] approximative area of the simultaneously perceptible (***). It's also interesting that the black hole can have the effect of a gravitation lens and so can cause (for n-> ∞) the impression of a circular distribution of the light pulses coming back, because the light beams from the transmitter to the receiver don't run "straight" (the hole stands in the way) but "bend around"[218] the hole and therefore lay rotation symmetric around the "straight" connecting line through the hole between the two.[219]

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[216] The direction of rotation may determine an order. The origin of the lightning just received corresponds to a choice decision (from the set of copies) and so contains information [InfoBack]. At this is the information quantity it the larger, the greater the number of copies (resp. resolution or sharpness) is.

[217] The three-dimensional area of the simultaneously perceptible is the spherical surface which squarely grows with the spherical radius. At this it's worth mentioning, that in the next to the last expression of

$$\left(\sqrt{1-x^2}\right)^2 = 1-x^2 \xleftarrow{n\to\infty} \left(\sum_{m=0}^{n/2} Q2Z(2m)\right)^2 = \left(-\sum_{m=0}^{n/2}\ \sum_{k=-m/2}^{m/2} Q1(m,2k)^2\right)^2 \xrightarrow{n\to\infty} \frac{2}{\pi n} > 0$$

the number of the sum members squarely increases with n. The number of electrons per period arises in similar way, if one identifies n/2 with the angular momentum quantum number and m/2 with the magnetic quantum number.

[218] Locally one could also define "straight" according to the way of the light.

[219] Would a bridging be possible here to the interference of waves? If e.g. a double slit is illuminated by a monochromatic source, also there are in the interference picture behind the double slit more or less many minima and maxima at the same time although the light descends only from one source. The temporal sequence of the wave amplitude on the way from the source (it's order isn't perceptible in case of interference) became simultaneous multiplicity in the interference picture. In this context one could formulate therefore: Geometric appearance (here especially the surrounding multiplicity) as necessary consequence (to guarantee non-contradictoriness).
(Fortsetzung nächste Seite)

(Interesting can also be to think about the minimum number of (independent) decisions necessary to realize the mentioned two-dimensional arrangement from a unit or a "point". Is it in the 2D-model two and therefore one per model dimension)?

Because n is integer, implicitly the mentioned analogy of (QV(x))^2=1/(QW(x))^2 and $n\pi/2$ raises the question, what shall be valid in the case of inter-results on the left side. Conceivable would be a bridging to quantum physics, e.g. in the form that in the case of inter-results the left side is unstable and transmission/reception of energy results up to next integer level.

Similar, more comprehensive considerations could lead further. Of course the geometrical model can give hints, but not a primary explanation, because spacetime geometry itself is secondary statistical consequence (GeometryIsStatisticalConsequence) .
In the end all statements should alone base on primary axioms of our decision and perception process. It would already be remarkable, if we succeed always better.
To demand for more may be too much because it is probably in principle impossible for us human beings to recognize[220] these bases exactly and completely (again).

Recognition (perception) in everyday life is incomplete. It refers to patterns from parts of our lokal past or to associated (partially copied) patterns. A complete perception would also include ourselves as perceiving human beings and therefore is impossible for us.

9.8 Experiment to check deflection (return) of electromagnetic quanta in case of very large distances

It seems not sure that light or electromagnetic quanta propagate "straight" in case of very large astronomical distances (e.g. due to large gravitational potential differences). If there is even return (180 degree deviation) in case maximal astronomical distance, electromagnetic quanta from all sides could come from the same source. The microwave background can be an example for this. Because the electromagnetic quanta of the microwave background are coming from all sides, it is plausible to assume that the way of these quanta has not been straight but deflected. In case of large deflection angles we can use the word "reflection" (gradual reflection during the way to and from maximal distance with maximal redshift).

If the effect is measurable also in case of lower redshift:
If in case of very large distances some objects with electromagnetic radiation seem to be magnified (or the size of similar objects shows a larger scattering than in case of middle distances), could confirm that in case of very large distance there is a greater probability for distortion of electromagnetic quanta. If the result is positive, more detailed quantitative measurements could follow, and conclusions.

Here still some speculation to the gyroscope model in the case x=v/c<<1: Then holds $1 > (QW(x))^2 > 1/2$, but nobody can see (regularly) $1/(QW(x))^2$, i.e. more than one and less than two copies of the "other" at the same time because this wouldn't be an integer number. Here is the contradiction possibly avoided by unsharpness of the perception which perhaps is connected with a more or less strongly noticeable tractive force within the observer as result of the differential gravitation working now (observer isn't an inertial frame any longer, arriving photons have unsharp wavelength dependently on the unsharp place of the measuring).

[220] Perhaps a description can be given, which for us human beings is at most understandable as approach (step by step derivable), which however isn't exactly comprehensible in the same moment like one of our models. Models are at best copies, they never agree exactly with the whole. Already because of the reason, that the copier belongs to the whole.

9.9 Some supplementary philosophical aspects

9.9.1 Why a neutral standpoint (as starting point for explanation of decisions) is desirable

Strictly speaking something is neutral only without past. "Then" there is a "spontaneous symmetry breaking " or "primary decision" (PrimaryDecision) and the part which we can see is (due to the conservation law temporarily) not neutral. Such considerations are usually to far reaching for everyday language. But we can try to approach an as neutral as possible standpoint, so that as far as possible only objectifiable (by all perceptible, understandable) facts (as past) influence a decision. Description of the objectifiable (by all understandable) facts (as basis for a specific decision) is called explanation. We cannot make this completely, but the more completely we can, the more neutral was our starting point resp. standpoint. Therefore a neutral standpoint is desirable.

9.9.2 Clustered Science

Because science cannot cover "all" (topics or) domains of existence, it is deepened in partially connected clusters (A), and there is much more empty space than there are clusters. There are also clusters (B) of (topics or) domains which are important and useful for us, and these are partially overlapping with the clusters (A) of science. But only partially, a great part (C) of (B) ($C \subset B$) is not covered by clusters (A) of science. This part tends to be neglected, because currently scientific framework privileges papers within an existing cluster (A) (e.g. with special nomenclature, mutual citations). Nevertheless part (C) is needed (because important and useful by definition) and it has deep potential (because not worn out). So it would be efficient for science to put more emphasis on (C). It should be clear, that especially in the beginning research in (C) cannot be clearly connected with a single part of (A), because (C) is localized outside of (A).

If science overemphasizes (A), peer pressure can result and relevant reality can be neglected. Initially I started with much confidence in science, but step by step I noticed that it would be very good for science and every scientist to know the story "The Emperor's New Clothes".

9.9.3 Desire for prestige interferes science

It seems that much time and energy gets lost in dealing with short time results like prestige. There are templates which promotes this, e.g. titles like "Dr" or "Professor" which can be connected with the own name. But the own name should be only an identifier, not a grading (which is an arbitrary feature extraction).

Unfortunately today it is often still necessary to use these titles to cause something, so it is understandable that someone uses these titles. But if this necessity is eliminated (step by step) or (even better) these titles would not exist, less time would be wasted in obtaining and "representing" these titles and scientists could get more motivation to concentrate efficiently to relevant topics which they are really convinced in.

Competence in teaching and/or science can be shown individually according to the individual requirements, also (if necessary) using a multidimensional feature vector, in which the current measure "...Dr...Prof..." resp. scientific publication quantity resp. impact factor sum may be included as one of many dimensions. If (a dimension which represents) a single criterion is overrated, this can be very inefficient and hindering in fulfillment of the individual requirements.

We can be sure that a really helpful contribution to science can be prohibited if there is the necessity to waste too much time with formalities (e.g. repeated publishing). We know that one relevant publication can be more helpful than thousands of "impact factor publications". So impact factor is far away from measuring the correct value.

Measurements can be very useful *on condition* that they measure the correct value - and can be very hindering if they measure the wrong value. There is the danger that authors start action and waste energy and time (also of readers) to increase "impact factor" without increasing (but reducing) the real usefulness of their total work. It is recommendable (also for authors) to increase the real usefulness in all conscience.

During the years it became clear that there is wrong motivation (for useful results) if someone publishes (or has to publish) to move up the scientific career ladder. Much flatter hierarchy would be better in science. Then automatically those remain who publish due to conviction.

9.9.3.1 2015: Why is there still closed access in science?

Step by step also other contradictions become clear, e.g. closed access journals. Today there are no more relevant costs connected with a publication. Obviously publication is hindered if there is closed access. So it is obvious that a "scientific" journal with closed access is a contradiction in itself. So why are there still closed access journals in science? What is the primary motivation of a closed access journal? Are today such journals advantageous?
If a journal is closed access, it should warn authors clearly from the beginning, else the author invests time and at last is compelled to sign an agreement which he/she does not want.

9.9.3.2 (Some) evaluation by experiment is not a proof

In many scientific areas the evaluation by experiment is necessary due to our limited understanding. So in many areas it has become usual to combine every publication with some (by author chosen) experiment, as (partial) evaluation. This is done even in areas (e.g. in parts of informatics) where clear argumentation is possible.
We should not forget that evaluation by (some author chosen) experiment is at best a compromise and not as good as a mathematical proof or an equivalent (well defined) sequence of clear arguments.

9.9.3.3 Genetic science: Danger of manipulated viruses is probably underestimated

Genetic research about diseases can have many benefits. But it is important to keep in mind also the risks when viruses are manipulated e.g. for transport of genetic material. There can be long term consequences which become obvious too late. It is possible that a certain virus is first distributed and a delayed damage (e.g. concerning genetic material of future generations) only becomes visible after distribution.
So in genetic research it seems important to get early enough knowledge how to reverse genetic manipulations. If new DNA can be inserted (without knowing the long-term consequences e.g. by using RNA viruses) it seems important to know also how to remove it. How can certain (pathologic) parts of DNA located and how can these removed?

9.9.4 At important considerations more consequence is necessary

It is necessary, to deepen important things with high priority, to tidy up and systematize them. At important considerations more consequence[221] is necessary. We can help ourselves mutually in doing this.

9.9.5 Uncertainty (lack of information or free energy) multiplied by proper time[222]

This is an elementary cost concept {ETcosts}. At this lack of information is closely connected with lack of free energy [FreeEnergyAndInformation].
Long "dry spells" are not attractive. There is the trend to decisions, which yield with great probability a maximum (of "security" back from the center)[223].
It is a fundamental drive of our consciousness to keep these costs as little as possible. During lack of information[224] we don't want to make decisions. However, this is necessary (ConfidenceNecessary) for advancement. We should choose an effective way, which alltogether is as harmless as possible.

9.9.6 After recombination the own given information pattern returns

{OwnPerception} I am occasionally also surprised, in how far-reaching way this rule applies, particularly at longer-term consideration. Experiences from everyday life seem to confirm that it concerns all decisions and so already starts with thinking (inside us).
The clear correlation between inner and outer information resp. emotion is obvious in every dream, it is the consequence of the primary conjoint starting point and of the following secondary moments of information exchange. Also in the awake state the correlation is more strongly than at first sight visible[225], even if the conjoint origin lies farther away in the past. We meet ourselves - in various faces and ways, at last (in progress of time) ever in a symmetry center (Cons0Sum).

9.9.7 Free energy and responsibility {FreeEnergyAndResponsibility}

Obviously free energy is necessary for life[226]. Energy is free (FreeEnergy) (i.e. freely available) if its (back-) ways are (like a reliably fulfilling prediction) calculable and determinable (there is enough time {FreeEnergyAndTime} to measure its preferred ways, and, using this information {FreeEnergyAndInformation}, to determine them repeatedly e.g. by a switch in a DC electric circuit). We can use this for example to copy our information and to make it available to several (by energy resp. potential barriers separated) reference systems simultaneously. Because we have these possibilities, we are also responsible. Prerequisite that these possibilities (power over free energy, our body and our sphere of influence) are given to us is confidence that we use them reasonably {FreeEnergyNeedsConfidence}.

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[221] This applies not only to thinking (concentration) but also to life. Having recognized the right direction we proceed better with enduring determination.

[222] Proper time outside the original symmetry center

[223] At this initially the superficial appearance is decisive (not only in case of charges). Money for example has a safe and reliable appearance.

[224] Sometimes it is intimidating to think of possible temporary disastrous variants of personal future and it is insecure, how far this will become reality. Anyway, sure is that the conservation laws are 100% reliable and we know the average development (ConfidenceWellFounded).
In addition we know the "own" motivation and we are aware of the symmetry (FullPrimarySymmetry).

[225] You may recognize it as common spirit.

[226] Living entities have the drive to steer the (back-) ways of as much as possible free energy according to the own purposes.

This implies that free energy should be used far-sighted, considering also the interests of future generations.
Of course this also means that free energy should not be wasted (search for maximal effect at minimal consumption of energy).

9.9.8 Faster than (Darwin's) selection principle: First parallel approximative foresight within small units, then large-scale experiment

From quantum physics we have learned (cf. e.g. [AllPossibleWays]), that also the possible influences the ways of nature. Just the possible is that, which is fast detected by parallel foresight within many small units,
(i.e. by quick extrapolation the local[227] inner (partial) models or maps[228] of reality[229], for preselection),
faster than it could be done alone by a "global experiment". By combination of the "global large-scale experiment" with many parallel running (approximative) local experiments in thoughts optimization can be done very fast.
Only a small (consistent) portion of the thought experiments' results becomes conscious[230] as information. If this information is new relative to the outer surroundings, we often call it idea {Idea}.

9.9.8.1 In the long run the good memory is decisive

The concept "only the strongest will survive" may be correct for the short term within a restricted frame (in case of restricted definition of "survival"). In the long run thoughts are decisive, because they initiate all decisions. They are dominated by that which we freely like[231] to remember. At this we don't like to remember contradictory unresolved things[232], we like the [truth] (because only truth in the long run contains useful information).

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[227] Potential barriers (PotentialBarrier) may be the physical boundaries between the local units.

[228] These maps only are more or less good approximations. Units (or individuals) whose inner map (or model) agrees with reality relatively well (i.e. units, who have a relatively good overview) have a relatively good chance to make the right choice and have an advantage with that.

[229] Of course also our human imagination of reality can be only a rough approximation of the truth (AsymmetryAsPreconditionOfGeo).

[230] It reaches the top of the inner hierarchy (hierarchical). Concerning inner hierarchy I made the experience that being fearless is good if in a dream there is a threatening situation. If I don't run away but go up to the threat to disclose it, the threat is defeated. There may be an unpleasant awake, but the threat comes less frequently and at last never again.

[231] Also pleasure depends on conservation law. For example a joke is only funny if nonsense is temporary and then resolved (realized as unimportant). Also (usual) music builds temporarily tension which repeatedly after very short time is resolved or after short time is resolved.

[232] The individual knowledge about reality differs. Therefore conflicts can result if individuals overestimate their knowledge. Such individuals may think that they can be judges. They may even think that they have the right to perform exaggerated punishment and at this even violate bodily integrity, but they have not a hunch about the long term consequences of
(Fortsetzung nächste Seite)

So in case of conflicts we should search the truth and meet there at soon as possible.

9.9.8.2 Objective reasons for confidence

{ConfidenceWellFounded} Perceiving the great quantity of information already created we see that in the long run the altogether non-contradictory (the truth, and the number of observable bits per proper time unit (ProperTimeUnit)) dominates over the contradictory, and increases, even if interim temporarily painful steps backwards are possible.
Determined by a primary decision (PrimaryDecision) in a new direction, {truth} has the greatest branching depth (RGraphTheoreticalResearch) and therefore cannot be eliminated.

2016: This can be even the information theoretical origin of the (PrimaryConservationLaw) (energy): After a primary decision (PrimaryDecision) long term progress of time is necessarily connected with return events, i.e. "central returns" (in the symmetry center of a symmetric binomial distribution, cf. (Q0Triangle)). If there would be in the long run no return to the original symmetry center, there would be no conservation law. So the primary conservation law (of energy) together with the primary decision (PrimaryDecision) (which determines the (truth)) even determines long term progress of time and shows the "true" information (as mirrored direction). So the conservation law (PrimaryConservationLaw) in the long run ensures perception of the primary decision (PrimaryDecision) (truth).

9.9.8.3 Inevitability of conscious existence

It is improbable, that our conscious existence was only possible due to the (long) chain of past coincidental[233] events which led to our birth, already due to the (from initial view) statistical improbability of our pedigree. Rather it is reasonable to assume that our consciousness also would exist (in other form), if there wasn't this pedigree (but another) (ProbabilityOnePerPresence). Therefore we don't need to ask *whether* it proceeds after a change of the reference frame (FullReferenceFrameChange), but *how* it proceeds[234]. This "how" contains information which is again result of decisions - which are influenced by memory.
Briefly said: It proceeds, and memory significantly controls, how it proceeds.

9.9.8.4 Perfect equitableness

At first perfect equitableness seems to be farfetched, simply because the own fate is influenced by decisions of others, which appear to lie outside the own sphere of influence. This is correct however only for short-term considerations. In the long run even the concept "own" becomes undefined, furthermore we do not know, how far the current "own" has been formerly involved in decisions, which influence the current decisions of "others". Taking into account the volatileness of the current definition of "own" in the long run summary

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this. They would be much more careful if they would know about the long term consequences of this, also for their (temporary "own") consciousness with its (contradictory) memory on its inescapable way. This way must lead in the long term average nearer and nearer back towards the origin with conjoint consciousness with contradiction free conjoint memory [ConjointMemory].

233 If no explanation is available, or lack of information exists, the term coincidence {coincidence} is often misused as “explanation”. It is better to regard the term as reminder, that the information available to us (such as the relatively short decision sequence of a human life) is only a tiny part in a much larger (and with maximal speed growing) whole.

234 Experience shows that the number of separated conscious individuals isn't constant in this process.

considerations should become decisive, whereby temporarily even "many" later individuals can bear responsibility (and so have to expect consequences) for the decision of one earlier. The exact observation of the conservation laws indicates that in the long run equitableness (Cons0Sum) becomes more and more perfect for "everyone" (and for "all together").

9.9.9 Cause and consequence – hen and egg

{RemarkToHeadline} Initially one can say that recombinations are the caused by a primary decision (PrimaryDecision). But subsequently decisions are also consequence of recombinations (of recognition resp. perception connected with them). Because of separation which is caused by decisions (differentiations) then a definition of location is possible. As human beings we are already separated resp. located. So every moment there is exactly one local (individual, inner) reality resp. presence for each of us, depending on our localized (individual) point of view[235]. That's quite usual, it's everyday occurrence. Our inner realities are separated according to our decisions[236]. Because of vast speed of light the macroscopic outer reality seems to permit an location independent definition of outer time direction[237] and therefore an location independent definition[238] of "before" and "afterwards". But the fact, that

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[235] Strictly speaking our (individual) point of view again is the consequence of our (individual) decisions (which determine the constellation of information barriers between us). It would contradict our (individual) freedom of choice to demand the same perception of (resp. the same access to) reality for all (separated) individuals. Nevertheless a general (global) reality is possible (but it's accessible not before exchange of information, at another time, at the earliest [earliest] in the center {PerceptionInCenter}). It not only includes the individual realities but also the individual decisions (together with lines of thought, past), which lead to individual (lokal) realities.

[236] From moment to moment we assign ourselves to selected areas (with information), e.g. to inspect more details within those areas. This process also is accessible by elementary considerations [SubDivisionWithinChoice].

[237] Direction of out- or ingoing photons after a subjective short moment: If I hold two torches and beam to the moon for example, so there (after a subjective short moment) ingoing photons nearly have the same direction.
An analogous "inner time direction" (as direction of the information flow from consciousness to skin and back) is apparently very individual, dependent on our localization and surely not straight in the geometrical sense. Of course one could also define "straight" as direction of the quickest possible information propagation in the respective system.

[238] In the start this definition is determined by a primary decision together with our location (our point of view), cf. [UncertaintyOfOrder].
This definition of the time direction is indeed decisive. The usual everyday macroscopic interactions are examples. The following example is not outstanding, too, but it shows a little the perceptible connection between elementary consideration and (ordered) macroscopic phenomenon and perhaps motivates to follow up the thought:
Let's look at an ergometer fan who owns a bicycle ergometer with eddy current brake having permanent magnets. These braking magnets are however still unmagnetized, i.e. the electrons in them don't spin in a preferential direction. He pedals for one year with 60 U/min daily 1/2 hour, of course what no problem and rather useless is since brake is deactivated. To this of course nothing changes, if *after* this year the magnets are magnetized strongly e.g. by an electromagnet. However, if they would have got magnetized *before*, i.e. if the electrons would already have spun in a direction preferentially before, he would have absolved an possibly exhausting training and much sweat and energy might have flowed.
In connection with this is remarkable, that in ferromagnetism the local energy minimum (the target of proper time) is reached if the electron spins point towards the same direction. That's greater order. Unlike thermodynamically usual the time direction goes to greater order here. Our decisions along this time direction also have ordering effect. May be that here (in the orientation of spins of loaded units) a possible physical target of our decisions lies. Under
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speed of light is finite, is enough that *as long as*[239] the observed systems are separated (by a potential barrier, locally) there is no location independent possibility to define "before" and "afterwards" exactly. In the end that's enough to avoid contradictions (because we know, that small causes/results can mean great results/causes at another time)[240].

9.9.10 No exact anticipation of future

{NoAnticipation} The following argumentation is not new, it's repeated here only because of some references to the other text:
The classical physical models (before introduction of quantum physics) theoretically would have permitted the exact calculation of future measuring results. But (theoretical) models which permit an exact anticipation of the future are from the beginning unsuitable for elementary (exact) descriptions of natural occurrences because this anticipation doesn't happen in nature. If this would be possible, there wouldn't exist any liberty. One can also say conversely: Since we can predict the approximative (short-term) future, restraints (basic conditions) exist for our freedom.
Inertia (and therefore even gravitation) plays an important role in the mediation of elementary decisions, for instance decisions between "spin positive" and "spin negative" (At the moment we don't need more exact definitions.). One should not be disturbed about different orders of magnitude - the elapsed time between decision and perception implies a (depending on duration of time, more exactly said depending on number of elementary times or recombinations in between, more or less large) lot of (way)possibilities and therefore small probabilities per possibility, so that a great renormalization factor [Renormalization] results. (Some considerations to this topic (special role of the third power) also can be found in the download files. If you are interested, please search for (***) particularly, as usual)
By the fact that we (as most future observer in our own individual, local system) determine definite destination points by localization of our counter pattern [LocalizationOfCounterpattern] due to our decisions (FunnelOfDecision) allowing in between only free choice of way [FreeChoiceOfWay], somewhere else restraints of freedom[241] arise,

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suitable basic conditions minimal own energy (Work) could be enough to distinguish a direction according to which the spins *then* (one behind the other) could gradually line up, what reinforcement causes.

[239] This is valid only during finite time intervals up to the next central return in a superordinated triangle, because the central returns are associated to scopes with simultaneity and so define an order. If one starts out of a hierarchical constellation of "triangles" {hierarchical}, then there can be a global time direction which results from the sequence of the central returns in the primary triangle (in its global symmetry center {SymmetryCenter}). Because this center is (like infinity) not ascertainable, it is most accurate to orientate on the truth (defined by primary decisions (PrimaryDecision)).

[240] Meant are not only buttons resp. measuring results of quantum physics, which can cause everything possible, meant are also (the energy equivalents of) our thoughts, which can cause actions. Even rough measurements of those energy equivalents can be done (EEG). They are very small, but of course they cannot be neglected (OwnDecisiveContribution). Even from our (subjective) point of view it means (brain)work [Work] resp. effort of energy for us, to make (initial mental) decisions.

[241] From this a local (bounded, not global) symmetry breaking results. It is maximal in the border of the decision funnel {DecisionFunnelBorder}, because there only one of two (usually almost equal) alternatives can be chosen, namely the alternative which is directed to the funnel center, which points to the determined aim. An example of a possible physical (Fortsetzung nächste Seite)

which affect a moment later also us personally - as soon as our decision becomes irreversible also for us because of our interaction with surroundings.

Important destination points of our life are already decided (predetermined), primary decisions (PrimaryDecision) specify not only the constellation of our birth, they also cause the obvious[242] disposition and flows, which lead to a significant hindrance or preferential treatment of certain way directions.

9.9.11 Quantity of the own long-term effect

It is clear that the own decisions are the more directive to surroundings, the more non-contradictory they are. The non-contradictory part[243] magnifies itself in the long run[244] (Diversification), and many things, also symmetry considerations (cf. [OwnDecisiveContribution]), signal particularly, that we should avoid contradictions[245] to the greatest possible extent, if we want to have long term effect.
This also implies consistency (along time coordinate) and therefore [reliability].

9.9.11.1 Local and global gain

Our life here is associated with a finite (and also short) sequence of "own" decisions, and a finite (and also small) amount (in bits) of perceived information. It starts not at 0 and it ends after short time. It is embedded in a maximal large, with maximal speed growing whole (attribute of infinity). So the whole is more important and the global gain is more important than the local gain also for the "own" long term future. If we work for the global gain (if our aim is global gain, i.e. the altogether richest[246] memory and remembrance for the whole), there is no contradiction between local and global gain {GlobalGain}. The value and relevance of our "own" decision sequence depends on its long term (contradiction free) contribution[247] to global gain (to a rich altogether contradiction free memory).

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equivalent is the maximal parity violation of the weak nuclear interaction, e.g. during beta decay.
Usually the symmetry break isn't maximal but only partial. At this (directed) forces can appear: By the fact that as *condition* a determined destination point (more precisely: a determined destination constellation) is given, probabilities become *conditiona*l probabilities. Different directions can have distinguishable orientation relative to the destination and as consequence steps in different directions can have different probabilities [AsymPosToAim].

[242] Again and again we notice that some things edge down, but other (not necessarily more complex) things don't succeed, even if we invest relevant time.

[243] (give) *before* receive. More exactly: When making a decision, we have to separate something (give) and after that there must be progress of time. It would contradict our decision, if we recall it at once.

[244] "Good" decisions are aimed at the best (richest) result in the long run, while "bad" decisions aim at short-term benefits at the cost of the long-term outcome.

[245] within ourselves, as community and as part of the whole (GlobalGain).

[246] At this we can save energy concerning outer appearances, if this does not bother.

[247] It seems difficult to quantify this. But if the own thoughts (as origin) are positive and altogether without relevant contradiction to the entirety, it is clear that the own contribution is positive.

This also implies (as good as we can and know[248]) avoidance of arbitrariness.

9.9.11.2 Why violence is inefficient

The term “violence” is used for quick superficial effects and usually painful, i.e. contradictory to former decisions of participants (disregarding the original hierarchy). An only superficial effect at high price is (of course) inefficient. Violence is not only inefficient, it has in case of relevant damage an adverse effect also for the causer[249].

Violence is often answered by violence[250]. The best would be to prevent this early enough: If (two) sequences of decisions (of two decision makers) have contradictory[251] aims, the most efficient way would be to clear the contradictions as soon as possible by early information exchange. Else more and more contradictory decisions will happen. When in the long run these must be cleared, it is more painful.

It would be most efficient to first define[252] the common aim and then approach it (together) from the beginning without contradictions. The foundation is most important.

If there is no well founded uninterrupted chain of reasoning for a (expensive) aim, it is questionable whether the aim is desirable.

9.9.11.3 Efficient long-term conflict resolution

How are conservation laws related to "explanation"?
There is the "compensatory" or "explanatory" information as a counterweight.
As long as it is not recognized, the incomplete (unbalanced) information spreads more and

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[248] This implies that preference of short time interests is behind the preference of long term interests (which are defined by the truth and not by arbitrary models). Of course as human beings often we don't know the truth, or the truth is not yet defined (in case of a primary decision (PrimaryDecision) we simply have to choose one of two alternatives, which had before the decision equal probabilities due to missing knowledge). It is for us as human beings also impossible to orientate every decision perfectly on that rule due to limited capacity of our brain. Knowing this it seems most efficient to concentrate especially in case of important (i.e. long term) decisions on that rule, as good as we can and know.

[249] If not at once, then in the long run.

[250] If violence already has started, the best remaining decisions aim at the *altogether* most harmless solution. The decisions are difficult, because for us human beings information is missing. We should not forget that we usually have not enough information for the best decisions. Important: Up to now (2014) often forgotten is, that (as early as possible) positive decisions can be most efficient, i.e. to inform and to help the (surrounding of the) "enemy", so that it becomes clear that there is no reason or argumentation for violence.

[251] Two states are contradictory {contradictory}, if they cannot exist together in a system with complete information exchange.

[252] This needs information exchange. The preconditions for this are better than in past.

more (which can lead to violence for those who think this information is well-balanced and complete or true).
So the most effective way to resolve a conflict in the long term is not to eliminate (by quick action some visible) consequences of incomplete information, but to **complete the (imbalanced, incomplete) information itself by targeted exchange of information on both sides as quickly as possible (especially concerning the foundations, because the foundations have the largest branching width)**.

Is the information on both sides as consequence at last complete and balanced, on both sides the justification for further attacks is missing.
(Due to the conservation laws on both sides of the imbalance of information cannot last forever, but can take long. Therefore in case of conflicts it is recommendable to accelerate the development of balance by better and faster information exchange.)

9.9.11.4 Long-term importance of the "own" non-contradictory contribution (despite huge differences of the orders of magnitude)

Faced with the huge size differences of different reference systems already within the visible universe the short-term size of the own sphere of influence is not very important, more important however is a durable orientation to the right guideline (give), that it leads our decisions consistently and permanently.
Also this can be justified more exactly: We know that the conservation laws are fulfilled perfectly in the end (the long-term approach is essential here). Since therefore the total sum of all conserved quantities is 0 (Cons0Sum), the overall non-contradictory part of the "own" effect is at last decisive in the "own"[253] frame of reference. Therefore it is so important that our decisions altogether follow the "right algorithm" [GiveBeforeReceive] to generate ongoing value (ConjointMemory).
So on average the number of new possibilities and the quantity of new non contradictory information per common proper time (ProperTimeUnit) can grow permanently [RealInfinity], even if there are clear "statistical" fluctuations in between. This means long-term improvement. At this the branching width[254] of in past started contradiction free decision sequences (truth) exceeds the branching width of in present starting (also "own"[255]) decision sequences. So there is an order, which implies for our own role:

Get in line!

9.9.11.5 What means "Get in line!"

If instead of
"We currently know better about ourselves than about the outside (the "other")"
the following (frequent) simplification is done:
"we are better than the outside (the "other")"
(in which "we" may be e.g. I, family, friends, community, company, country, human kind) then contradictions become clear former or later during interaction with the "outside" or "other". These contradictions lead to conflicts, which are the worse, the longer and more seriously parts (of the whole) follow the assumption "we are better" without regarding the

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[253] In the long run the separation from the surroundings disappears more and more.

[254] The branching width of a set of decision sequences is the maximal branching depth between two nodes of these sequences.

[255] The current “own“ is only temporarily defined.

truth (if parts don't get in line but say "we are the first" without regarding the original order of knowledge of truth)

If we accept that our knowledge is only a small part (if we as soon as possible accept[256] the original truth (truth) as prior to own knowledge[257], i.e. if we "**get in line**") we can avoid conflicts or (in case of incomplete or late knowledge of truth) minimize conflicts.

This acceptance of the original truth as prior to own knowledge is possible the earlier, the earlier there is precise information exchange of the truth.

9.9.11.6 Maximal long term effect

A contradiction free (consistent) decision sequence starting from the primary (true) origin (in the [GlobalSymmetryCenter]) has maximal branching width and so maximal long term effect. This is out of range for us as human beings; reintegration of (the with the whole consistent part of) consciousness into a superior decision sequence can be possible.
This means that our decisions should orientate on the truth (defined by primary decisions), as good as we know, and not on subordinate (arbitrary) models. If we don't know the truth, we have to make a decision (give) into a for us new direction. We should keep on this decision, as long as we don't perceive a contradiction to a previous primary decision. In this case we should correct our way as good as possible and in future orientate on the previous primary decision to minimize contradictions of our decision sequence to the truth.
If we orientate on the truth (which we don't know fully, but better and better), our decisions lead due to the conservation laws to a compensation and with this nearer to the global symmetry center (GlobalSymmetryCenter).

9.9.12 Perception in favor of the prettier alternative

We don't know the truth fully (because it grows more quickly than our knowledge). We know that every perception is connected with a finite sequence of decisions (FiniteRecombinationSequence). We can influence them the more, the greater the natural room for interpretation of the truth is. Often in case of doubt there is the possibility to choose the prettier alternative, without fooling oneself, for example at estimation of the thoughts of other human beings. If we use this with best knowledge and conscience, we create a new even prettier (and also more detailed) truth.

9.9.13 We can be valuable

One often hears phrases like as "everybody only thinks of himself" etc..
But this is only short-term thinking. Short-term thinking proves to be stupid in the long run. We (mankind and also every - temporary - "individual") would harm in the long run ourselves, if we plunder earth. Instead of this we have the possibility to correct errors and to

[256] If we are open to better (objectively nearer to the truth) knowledge from "outside", and correct own knowledge as soon possible.

[257] Even if we try to do the best within our (restricted) knowledge, after some time further branchings of truth can become perceptible (also in everyday live) which show that our prior knowledge is wrong (compared to original in more past started truth), with derived decisions. This is consequence of the current asymmetric position. The earlier we accept truth and orientate our decisions on it, the better we can avoid contradictions (conflicts) during our way along time which leads on long term average nearer and nearer to the original symmetry center.

live in harmony with nature [EnvProt] [258]. As complex creatures we can create a rich common memory (ConjointMemory) which is valuable (which doesn't contradict the surroundings and which starts out from own effort[259]), so we can be valuable.

9.9.14 Remark: Money and responsibility

This chapter is here because more and more people pay increasing attention to money: Money is not necessarily advantageous for the owner, especially if much money is not used responsibly. Money is defined by human beings to provide an increase of "security about short term future" of individuals relatively to other individuals. So if individuals own clearly more than necessary money and not use it responsibly[260], it is perceptibly missing in the system and therefore damage of conjoint memory (ConjointMemory) results (which in the long run returns as damage to the causer (EgoismIsStupid)). So money implies responsibility.

Origin of responsibility is freely available energy [FreeEnergyAndResponsibility] . Money is to it in a small tradable area in the short term proportional. A reliable definition (with conservation law) exists for money only in the short term in small areas {MoneyNotWellDefined} . This is better than nothing[261], but usually the range of these areas is overestimated. It seems that often too much time is wasted (or required) to hold or increase an nearly[262] arbitrarily defined "own" number which is called "money" (or something analogous als "property").

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[258] This requires a steady state concerning the amount of usable raw materials on the earth, not exploitation or contamination at an expense of future generations. There is a growing relevant danger, which results from exploitation of environment and population explosion. It should be said clearly that without solving this problem by choice mankind is running into painful future. One first step to a solution could be an international fund which ensures, starting with in underdeveloped nations, better schooling (starting with young motivated people) and which ensures pension of older people, starting with those who have no supporting descendants.

[259] We later frequently classify things as valuable, which start out of us and which require own (often exertive) effort (Work).

[260] The framework conditions could be improved. For example **transparency of market and belongings** (money, shares, value papers etc.) could increase motivation to handle own things responsible. Such transparency would be also adequate to provide information for voters. (also for competent (domain specific) "dayvotes" (defined as (one vote per person) per day))

[261] Without measurement there is even more danger that loud and violent decision makers arbitrarily reign.

Nevertheless the measurement and definition of money could be better, if it would be more clearly proportional to long term effects, not only to short term effects. This means for example that waste which is toxic for 50 years has 5 times negative value of waste which is equivalent toxic for only 10 years. This requires also more quantitative (precise) transparency. If we disregard the long term consequences, we fool ourselves.

[262] At least, it remains constant as long as nothing happens (despite inflation) which is much better than nothing. Once money (or another property) changes hands, it is usually more or less inequitable, even if all agree, for all have not the same knowledge (i.e. not the same
(Fortsetzung nächste Seite)

9.9.14.1 We cannot define money well justified, so we have to perform routinely checks and corrections

Money is just a help for better justice by being conserved during short times in restricted areas. Due to these restrictions it cannot provide reliable information for long term justice. A well founded definition of money would require a (global) conservation law, i.e. globally a (summarily exact) *long term* return of all investment. But we are not in the central position, we don't know the directions of all primary decisions (PrimaryDecision), at the present time we don't know the future distribution. So we need constantly information.

Therefore, to get more information about the future distribution, we need checks along time. From industry we know that complex processes need follow-up checks. Of course we need also for the distribution of money follow-up checks. If we do this [NoSecretsAboutMoneyAndBelongings], we can correct mistakes[263]. We should do this internationally and efficiently, with tolerance as harmless as possible, starting with obviously unnecessary (for luxury used) highest concentrations of money and belongings and use these stepwise and carefully, first for important international needs (InternationalProjects), also for compensation of too large inequity[264], which at last indicates injustice.

For well justified definition of money and property we need information, clarity and transparency, emancipated and equally for all.

9.9.14.2 There is motivation but no international coordination

If one would ask rich parents whether they like to invest their money in unnecessary luxury or better in a secure future for their children, they would usually prefer to invest their money in a secure future for their children. But up to now every individual receives the impression that the solution of global problems, which endanger the safety of the own children, is so expensive that alone (as individual) it is impossible to do enough.

But all together could solve these problems - if they act together.

9.9.14.3 Do humans control money or does money control humans?

A common approach is necessary because the substantial global problems (population explosion due to missing pension funds and missing schooling, connected with this

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conditions) for approval. Usually this is tolerated and not severe, as long as this is compensated on the average.

[263] One important mistake is the possibility for (uncontrolled) government debts. This enhances the possibility that a (even democratically elected) government deceives the own voters.

[264] Better financial transparency paves the way for rules (e.g. maximal ratio between minimal and maximal income per hour) which compensate too large inequity. This is clearly better than freedom combined with half violence (ruthless dealers, governors, employers, but also ruthless strikes). If selfish groups get in the long run more money (resp. advantages) than unselfish groups, this shows an error in the framework for distribution of money (resp. advantages), which should be corrected.

summing up of contamination[265] and destruction of the environment) would lead to a painful future if not solved in time. Efficient international projects {InternationalProjects} are necessary for resolution of these problems. These projects are very expensive and without *quick individual* return on investment. So up to now most individuals see no reason to provide own money for these necessary projects[266]. So the usual *short term individual* return on investment rule of money would lead into painful future. The simple conclusion: **If money controls us, we go to painful future in the long run.**

So adequate (efficient) control of money is necessary. For this money must not be hidden:

It would be adequate, if (periodically by all people internationally elected) human experts provide rules which efficiently govern global money (and fortune) flows and branch of enough money for important joint projects [InternationalProjects] (so that helpful engagement remains worthwhile, but abuse is not worthwhile). The better they know the distribution of money, the better (the more differentiated) they can do this. It is recommendable to prepare for a stepwise[267] reduction of secrets[268] about handling of money and ownership. Of course this new information should be interpreted with tolerance. Primary aim is not accusation, but efficient (as harmless as possible) solution of problems. Humans can advance so that they recognize bank secrecy as temporary illusion and senseless temptation towards self deception[269].

The reduction of secrets about the distribution and handling of money and other belongings {NoSecretsAboutMoneyAndBelongings} must be valid equally for all (especially decision makers, e.g. politicians). Less secrets does not mean that larger interventions are the long term consequence. On the contrary, *without* sufficient knowledge the probability for belated rough inefficient interventions grows (due to growing problems, missing (InternationalProjects)).

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[265] Due to the arbitrary short term definition of money it is "cheaper" to hide long-term toxic waste than to detoxicate it. But former or later this waste returns. Real physical debts are piled up due to the arbitrary not reality-conform definition of money.

[266] But there is temptation to abuse the arbitrary definition of money [MoneyNotWellDefined] .

[267] At first cash money must be replaced by electronic transfers. These can be accessible by courts and tax authorities and for statistical (anonymous) evaluation. The criteria which describe the transfers can be improved step by step according to the requirements to provide fine enough information for politicians, so that these can define efficient (automatic) tax so that there is enough money e.g. also for (InternationalProjects) without hindering activity and motivation. Despite optimized control automation of processes is appropriate, so that minimal time is wasted with thoughts of money, because money has no intrinsic value.

[268] For all, especially also for people in leading (governing) position. It is important that there is internationally no exception. Also currency should not allow exceptions. Hidden parallel currencies are not necessary and these are a temptation for abuse.

[269] Relevant problems can arise when people behave inconsistently. The bank secrecy is an important temptation to this: One can use money in a completely different way than the wished own example for other people. Gradually from this stressful contradictions can result.

The better the knowledge of the government is, the better differentiated and careful and efficient rules it can develop, and the quicker it can correct possible errors. Voters of the government better know whom they vote (they need the relevant information for realization of democracy). An efficient computational approach should also reduce bureaucracy and administrative workload, also for ordinary things like tax declaration. Less waste of time. Less fraud (and less manipulation) in trade. Before deciding for a trade you could get immediately more reality conform and detailed information. It is strange and unproductive that up to now (2013) artificial secrets obstruct these possibilities.

A stepwise reduction of secrets could mean e.g. annulation of cash, internationally simplified access for tax authorities, helpful interfaces for reduction of bureaucracy, simplified investigation for funding of international projects (InternationalProjects). Then more transparency in trade, publication of the relevant sums. Then see how it goes. From this follows valuable information which is usable for careful and well-founded decisions. If this information is not used, there is high probability for inefficient decisions.

9.9.14.4 Data security, privacy

The term "data security" is often handled as something advantageous. But strictly speaking instead of "data security" more desirable is: tolerance and prevention of unfair and unequal distribution of knowledge.

2015: Especially concerning financial data it has clear disadvantages. We cannot make a fair definition of "money" due to unequal and missing knowledge. We can at best try to make an as fair as possible definition. How can we do this without financial transparency? How can we see without transparency about ownership, where real need is, or where theatrical acting. Financial intransparency is an important precondition for fraud. If full financial transparency contradicts freedom, there are technical possibilities for statistical control without direct usage of individual data.

Concerning medical data: It seems that 2015 even pseudonymous medical data of deceased patients are usually hidden and destroyed. But it is obvious, that medical data are valuable and important for other (future) patients and therefore should be collected and used. If a patient opens the own data for future generations, this shows goodwill and can be only advantageous. Anonymized (statistical) evaluation is possible. So the usual (default) case for pseudonymous medical data of deceased patients should be that these data are not deleted and can be used permanently and analyzed at least statistically for improvement of common medical knowledge.

If all (past) data would be hidden, we could not extend past. The more (past) data are hidden, the more difficult it is to learn from past. Hiding and suppressing problems does not solve problems. If data security is handled as something advantageous or necessary, than this indicates, that there is (assumption of) intolerance in thinking (even concerning harmless human imperfection), so that people are afraid of this intolerance and therefore think that they need data security or privacy.

So better than data security is tolerance and transparency, *equally available for all*, as long as transparency does not cause contradictions which restrict basic freedom. Nature shows that there is a need for temporary data security [Separation], else there would be no freedom of choice[270].

9.9.14.5 Patents and Copyright are artificial (temporary) constructions

Natural proliferation of information means, that we can use and copy information as soon as it is available. Patents and exclusive copyright are artificial, because they deviate from this. Artificial constructions need effort (energy) to be preserved. Therefore these represent at best a temporary state.
For patents already a time limit has been introduced (less than 20 years seems recommendable). This has been forgotten for copyright up to now (2016).

9.9.15 Approaching compatibility

What we see of individual life is only the short term end (surface) resulting from finite decision sequences from and to the origin (in the (GlobalSymmetryCenter)). When approaching back again to the origin in the long run, due to increasing information exchange incompatible contradictory standpoints must become resolved (explained = well founded relatively to the origin (PrimaryDecision)) former or later (ConjointMemory) .

9.9.16 The most efficient position

A durable effect is possible only if the average position is neutral (in the (GlobalSymmetryCenter)) with creative order of decisions [Creativity] . The more neutral the own position is at this, the less changes of the position are necessary (the smaller is the necessary energy consumption for definition of an effect relatively (for transport of information forth and back) to zero).

9.9.17 Good reasons for gratitude

There are good reasons to be grateful. One of them:
We have reason to be grateful for the great diversity which we perceive, and for the large effort (Work) which has been necessary to create this diversity.

--- End of Addendum ---

Goto [EndOfMainText]

[270] Probably this is the reason for the finite speed of light.