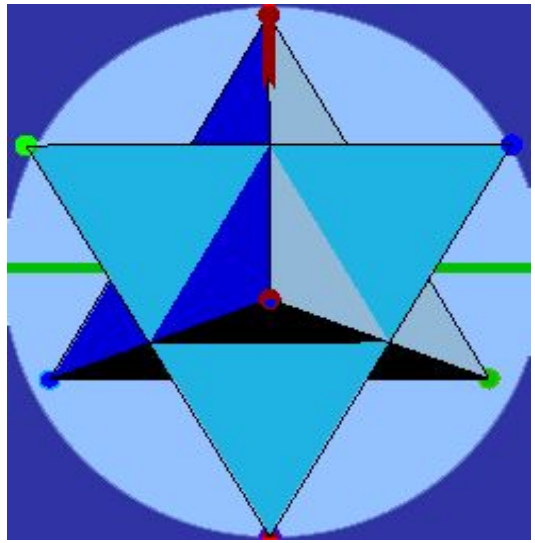
Structured Spacetime and Trialities

Ones space is the other ones time
Ones matter is the other ones radiation

Thomas Heger



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Abstract

The general concept of this paper is called 'structured spacetime'.
It's based entirely on geometrical relations within a smooth continuum, that is supposed to be the spacetime of GR. The relations are modelled with a specific kind of quaternions: a complex valued four-vector. These are ordered four-tuples like Hamilton's quaternions, but with a slightly different algebra (Pauli algebra).
Each element contains a real, imaginary or complex number. Since these four-tuples behave more like quaternions than like vectors, they are called quaternions, too, even though that isn't quite correct. They are sometimes called bi-quaternions.
The structure stems from the 'handedness' of multiplicative connections. This means a different behavior for turning clockwise than counter-clockwise.
An area swept out by a rotating vector builds a disk. This has an oriented behavior, where the vector describing the area is pointing perpendicular (normal) in the direction of the axis of rotation. These disks are multiplied by three and the rotations connected. This anti-symmetric behavior enables systems to oscillate through an outgoing aspect of rotations, that are ingoing influences to neighboring systems. This builds an imaginary circle, that is perpendicular to the axis of time for that particular system. That axis could be turned and with this turn the relations of space and time are altered.

Content

Content

Introduction

This project was started as a search for the connection between QM and GR. The connection was hypothesized and assumed to exist (without knowing it's specific features), since nature has to be understood as an undivided system. So all theories should describe the same world, but possibly different aspects. Spacetime is a physical system, hence should be build out of 'elements' (what are the 'building blocks').

Since GR needs a smooth continuum, those elements have to be pointlike. That means something like a point with features. The space they would build is assumed to exist, while the things we observe are structures within.

Spacetime is given an own existence as some kind of space, but there are no fundamental fields or particles. These terms are related to certain structures and their behavior within this space, as observed by an arbitrary observer.

Introduction

Unlike mathematical space, spacetime is a physical system, hence should consist of some kinds of 'elements'.
Those are assumed to exist and to be the foundation of observations.
From GR we have the requirement of a smooth continuum, hence the elements of spacetime (events) are point-like, but nevertheless have features (and are not just points). Since quaternions are able to model the em-field and relativity, we assume, that states are connected like a multiplicative connections of quaternions. That could be interpreted as if those elements would twist each other in a specific way. This models the world 'from inside to outside' and allows arbitrary systems to be 'real'. In this picture a particle is a certain structure, like a point, circle or a knot. Those structures have to be assumed connected. The structure stems from handedness and some kind of disturbance, that make spinning influences of an element concentrate around a certain point.
This model is related to relativity, but more or less not to QM, since it uses only geometric relations like GR upon a smooth continuum.

Method

The main method is, to search, what the branches of physics have in common and to search for something, that would behave in such a way.

There are roughly three main branches of physics: relativity, quantum-physics and classical mechanics. Since there is only one world, all of these branches should have something (unknown) in common. Whatever that is, should describe how nature actually works.

We extended the way of reasoning of these branches into something unknown. We tried to find a method to describe space, time and matter as something, that would fit to all those branches. This method was estimated as a guess. Then we searched for known models, that describe successfully the area to explore. In an iterative process, the next method with better behavior is searched from there.

Method

An other method is to transfer mathematics into graphics and then try to interpret them as physical systems and compare that with observed systems. E.g. Pi relates to something like a circle and a cross product to something spinning (and so forth).
The mathematical description is than developed according to such a picture. In any case the quantitative description should follow the qualitative. Actually our mathematical representation is not yet finished. In the meantime you may look at the paper of Jonathan Scott, that we would like to recommend.
Another technique is 'educated guessing'. The principle is, to estimate a solution of a problem as carefully as possible and treat that as proved fact, but try to defeat this solution. Certainly we'll find things, that don't really fit. Then we try to find something else and compare the results and choose the best finding and proceed from there. 'Surround' the left over problems and search for a solution already developed. Look four the most remote or obscure observations possible and ask, if that would also fit into the model. If not, than think about the validity of the observation or alter the model.

Systems

Anything we could observe could be called a system. A system consists of systems that are called elements.

Systems in nature are assumed to be generally open. 'Open' means, a system is not an isolated, well defined entity, but we had to apply some kind of filter to isolate it, what defines imaginary borders.

A system is 'something'. Anything you could imagine is a system. We turn it into a system by observation. It's our choice, what we call a system. These systems have borders of our choice. That makes the borders imaginary. These borders are infinitely thin. The elements of a system interact and influence the neighborhood of that system. The influences, that cross the border are properties of a system, because they are, what we observe of it. Those properties we give certain names and explore the rules of their behavior. Those rules we treat as physical laws (in case of physics), if we find them often enough in various situations. If we find systems with equal behavior, we say those systems are of the same kind.

Systems

Influences of elements are transmitted through direct interaction with neighboring elements.

The connections are assumed to be of a multiplicative kind between neighboring 'cells'. A 'cell' is a spherical structure with associated states, that share something called a 'time-domain'. That is throughout this text interpreted as a set of states, that are interlocked like four-vectors with complex values. This could be imagined as a rotation of some kind of pointer, that is transmitted throughout the neighborhood.

The assumption of this model is, that all kinds of systems could be related to such a behavior. But this text tries to describe the 'mechanics' of these interactions and how they are related to observations, but doesn't attempt to model all possible observations. Most of them are already known under different names. The aim of this text is to describe the connection of systems with a relatively simple mechanism.

Systems

This model is based on a few simple rules :

- systems contain systems
- systems in a system are called elements
- spacetime is a continuum build out of elements
- the elements have features (their state)
- the elements interact with their direct neighbors, through rotation and dilation
- the rotations follow the same laws as angular momentum
- energy in space is minimized
- what is outgoing from one system goes into some other systems
- these structures expand and are recreated later
- this creates a process of expansion and contraction
- this tends to stabilize structures
- timelike stable structures are, what we call matter

Observation

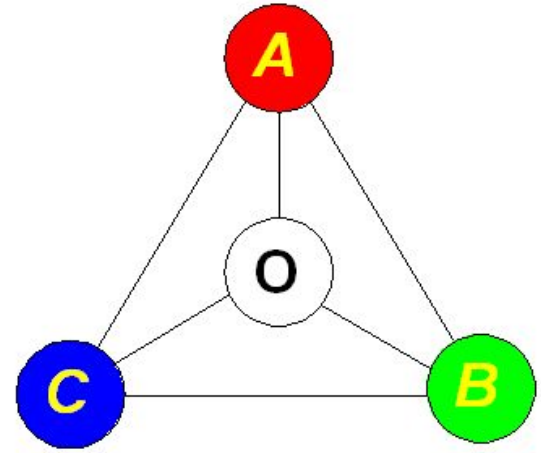
Fundamental phenomena do not depend on our observation, but our observations depend on them.

We base observations usually on certain assumptions: We treat ourselves as more or less as at rest and base observations on our own state of being. By this definitions we turn imaginary phenomena into real observations. But our observations are real only to us.

Objects are what we see moving in space. That means space, time and objects are our way to describe our observations. To make a fundamental model, we had to get rid of all those definitions, based on our own point of view, but had to think about phenomena as patterns or relations in spacetime.

In this model we use trialities and bi-quaternions, to show the relations of the imaginary 'elements of spacetime' to the world of our observations.

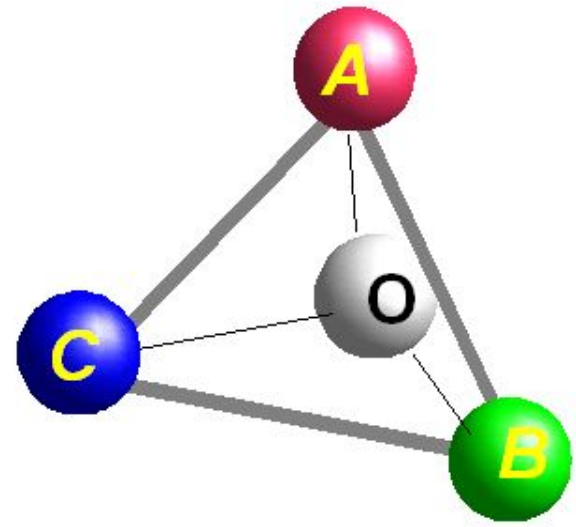
Four nodes



Trialities have four nodes: a root and three 'neighbors'.

The number three shows up in all kinds of relations in physics. So we tried to research, why those triples appear so often. There are three spatial axes, three families of particles, three types of derivatives and three types of nuclear decay. The fourth relation stems from the zero node, that is treated as a scalar.
Trialities correspond to a group called Lie group SO(8) (it's the Dynkins diagramm of this group). Complex-valued four-vectors have eight components. Spacetime-events have this topology of a triality: a node and three directions.

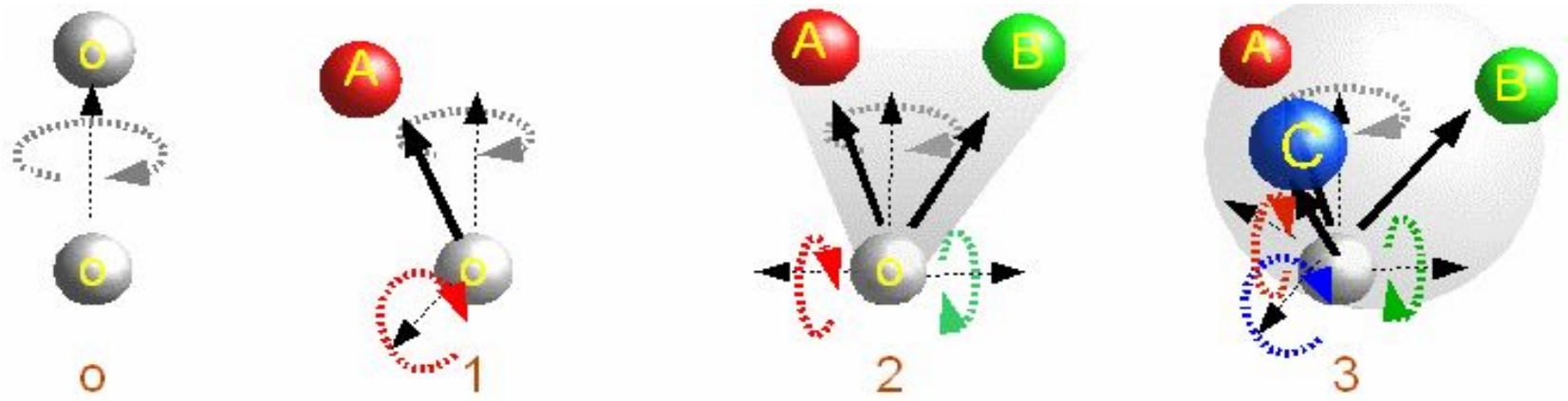
Tetrahedron



It's possibles to arrange the nodes to a tetrahedron.

The colored balls are called neighbors to the node. The relations in this tetrahedron are complex: three nodes form a plane. From o->o to o-> A we get through a rotation about an angle.
The relation is that of an inverse, if two nodes are exchanged.
In a plane you find a relation of a square. The distance to the node makes that plane act over an inverse square. The node is a point. Two nodes describe a line. Three nodes describe an area and four a volume. They form a cone with the zero-node as its tip.

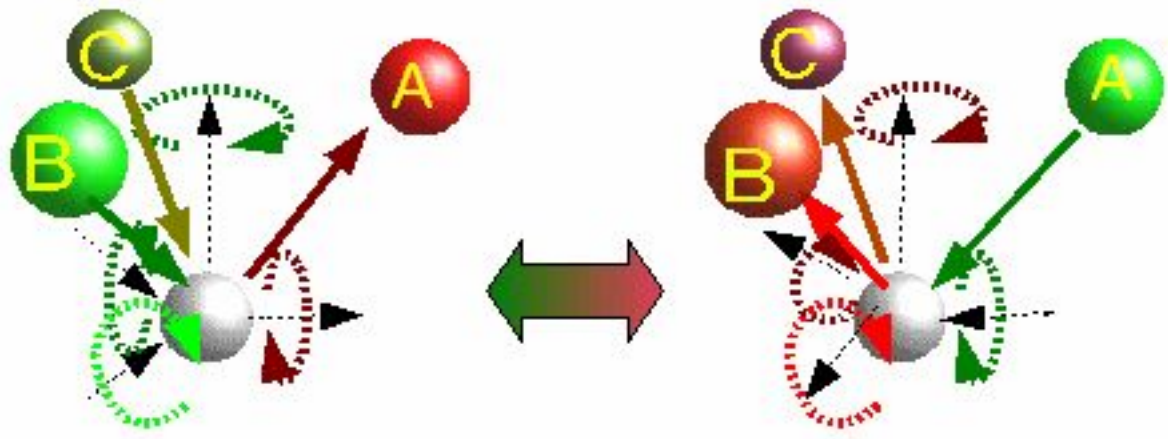
Four relations



Think about simultaneous rotations, that would gain a scalar, a linear, a quadratic and a cubic behavior.

O and A have a one-dimensional relation. That is the line through o and A. If we add B than this describes a plane through O, A and B, what is a quadratic relation. If we add C we get a volume and a cubic relation. If we think of A,B and C as a triad, than this triple has an orientation and depicts a rotation on an imaginary circle on the ABC plane, with an axis perpendicular going through o->o.

Four relations



There are many ways a system could resonate.

In the previous picture, we have drawn only arrows pointing "outwards". But the nature of complex numbers enables us to revert these directions.

That could be imagined as an overlay of ingoing and outgoing connections, what would make a system resonate and swing at certain frequencies. This frequency could be modeled as complex rotation itself and we could repeat the process on a larger scale with lower frequency. This generates a fractal structure of spacetime.

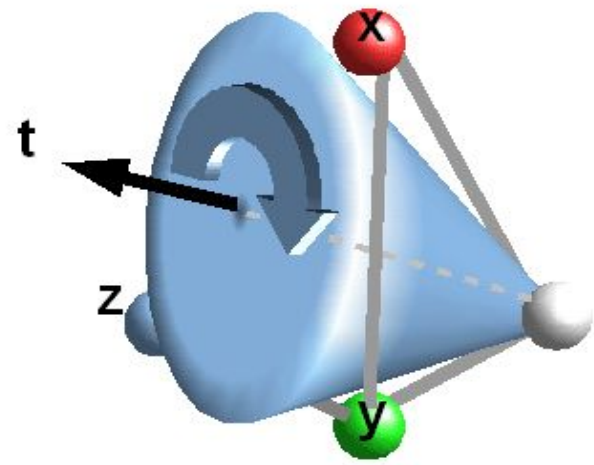
Four relations

Each relation is related to specific phenomena in nature.

The 'zero direction' is that of a timeline and denotes a timelike behavior. The inverse to timelike is spacelike and that is the characteristic of phenomena without a time dependence - for that specific timeline. These are phenomena of the type 'potential'. The idea is that we could create matter out of nothing, what leaves empty space. Than we could do the same with time and create a potential.

We use a scheme of putting phenomena into categories : Each category is based on its scale and an imaginary axis of time. This is a 'domain' of spacetime and these function as a filter, in which we categorize phenomena. The timelike axis could be shifted, what causes these behaviors to alter and turn one phenomenon into an other. This possibility is an unusual concept, but we will try to explain it in this paper.

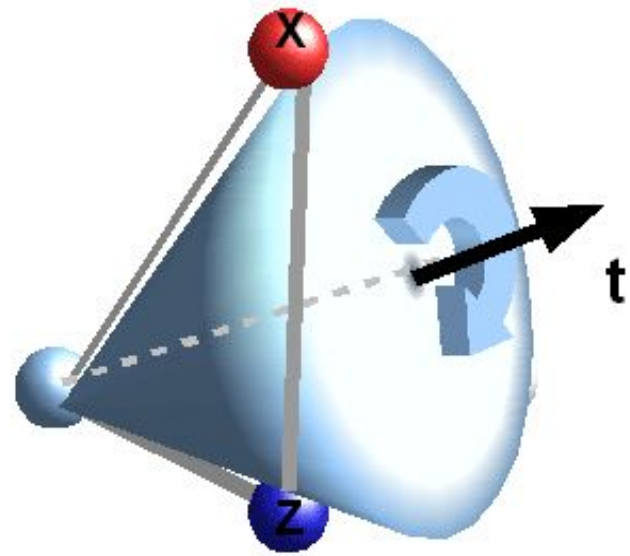
Changing the direction of time



Starting from the zero-node we can draw a cone.

The nodes have an order, that describe the orientation and rotation of a cone. A specific type is called light-cone. It depends on our definition, what we call the zero-node. This is related to the principle of relativity, stating, that any observer is of equal rights. So any cone would be possible. The advantages of quaternions are, that such a change could be done smooth in any direction.
With the change of the root node we alter our observations. But the meaning of the connections change, too, e.g as length contraction and time-dilation according to SRT .

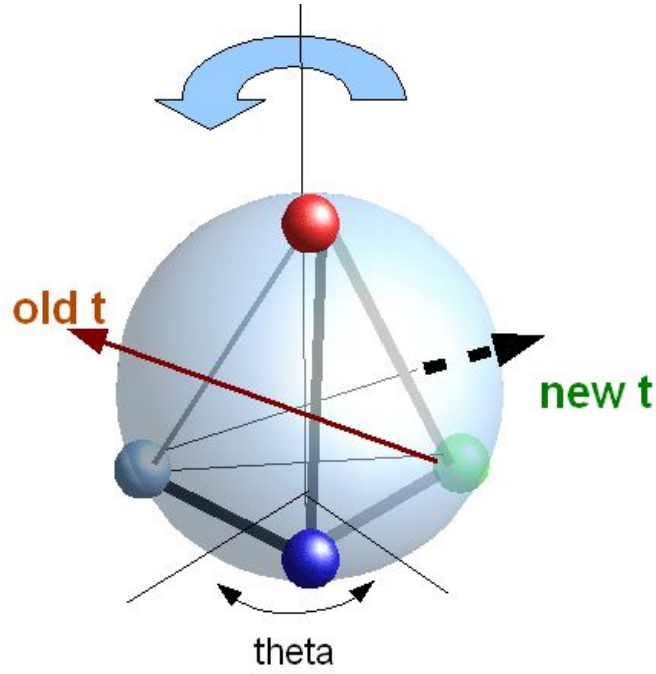
Changing the direction of time



If we start from an other node, the lightcone is pointing into an other direction and all other relations change, too.

The former blue node is then the root, the former green node is changed to blue, green is now white and red stays. Since these nodes have a meaning, the relations described by such nodes change in the same way in which we change the direction of time.
(The inverse cone is not drawn here and not the following, originating from the 'neighbors'.)

Changing the direction of time

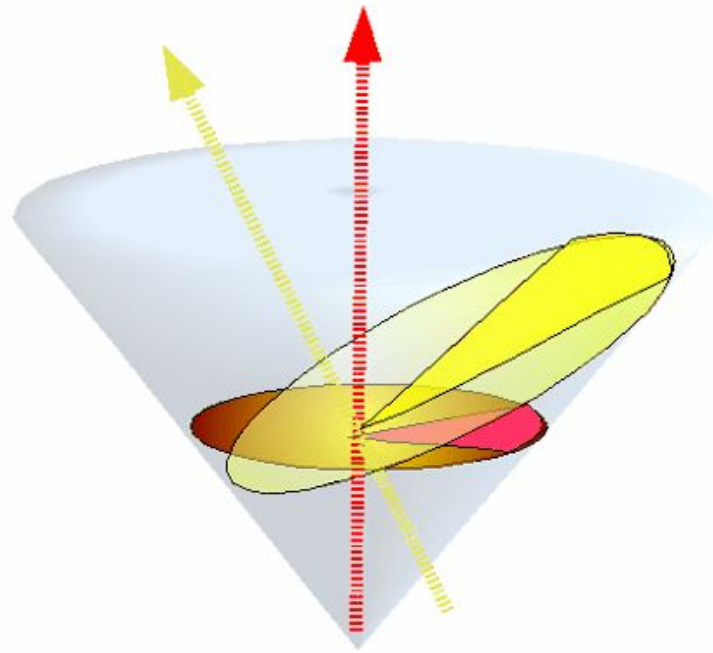


The tetrahedron defines a sphere touching it from the inside.

With three angles **η**, **θ** and **φ** we can describe the change of a system under a Lorentz-transform . **η** and θ describe the change of the polar coordinates and the new direction of time in respect to the old. **φ** describes the rotation around it.

For a distant system we have a displacement vector **r**. In SRT we only need the angle **θ**, because this relation is lying on a grand circle. So: time has a direction (rather than being a spatial dimension) in a space called spacetime.

Changing the direction of time



Kepler's second law would follow, if we change the direction of the timelike axis.

A distant system with an angle to an observer would appear as a conic section: as an ellipse, circle or hyperbola. In it's own frame of reference the orbit of a planet would be circular, but seen from a distant object we would see the same orbit in our light cone as an ellipse. The red sector represents the same relation in a circle as the yellow sector in an ellipse. The case of the circle is trivial and the ellipse would be a circle, if observed in the frame of reference, where the timeline is perpendicular to the orbit.

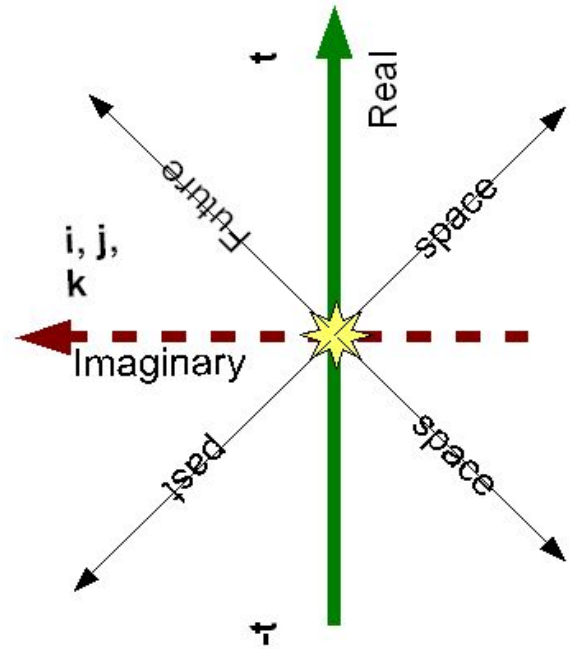
'Time-domains'

Different timelike axes define a different domain of time.

Time should be measured local, if we want to research relativistic effects. That would create different 'domains', that define a distinct context about the way, a certain system would behave.
If the time-'axis' is changed, this change has an impact on where structures move and we would observe a change of characteristic frequencies.

The 'transit' -or how the context is changed- is provided by acceleration of such a system. A rocket could do this. This would enable to interpret the so called 'Pioneer-Anomaly'. Such a different domain would look is if the timelike axis is turned away from ours. Then the craft has the expected velocity, but a different domain, where this velocity is measured. This effect would make the probe look slower than expected, what could be interpreted as acceleration towards the sun.

The complex plane



If time is treated as a real number, the complex plane could be interpreted as a spacetime diagram.

The spacelike direction is than imaginary time or time is imaginary distance, since we can see it both ways (what has far reaching consequences).
Our world has three dimensions of space and one of time. Here we have only one spacelike imaginary axis, but take that as a representative for the other directions.

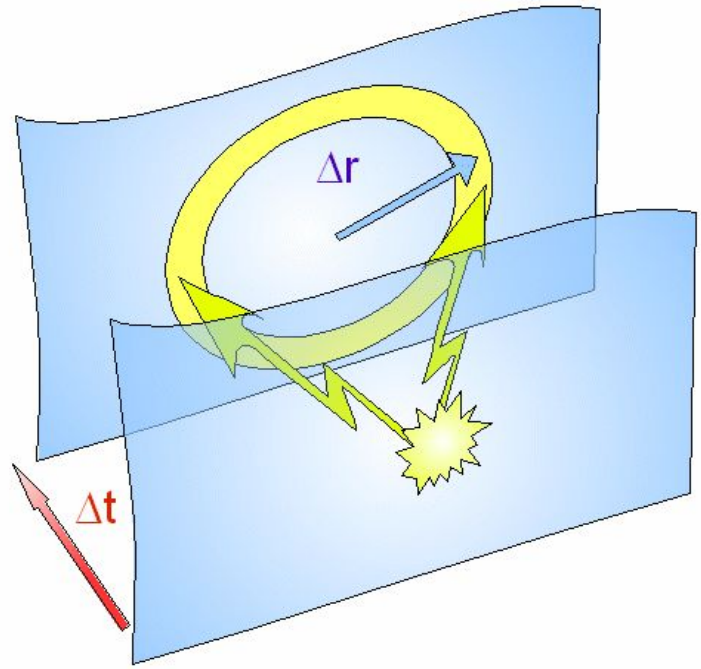
Hence we would need to multiply the complex plane by three, to raise it into volume, because there are three possible ways to combine two out of three axes.

Intervals and events

A line in spacetime is a chain of events with only one dimension.

Intervals connect events. A spacelike connection is timeless, since it would require infinite velocity to connect without time.
We need a second relation perpendicular to build a spacelike plane. Two intervals over this plane generate a 'directed area', since this space is anti-symmetric.
To curve this plane enables a volume. A volume is than 'charged', because that oriented behavior spreads over a volume.
So if an event can have a position, characterized by a quaternion, than how do we connect events? That is a quaternion, too, that would rotate one state into an other.
We would expect exponential functions of complex numbers as typical behavio, because any line actually behaves like a series of multiplications, what is a power and its length would refer to the exponents of that series.

Influences



The star represents an event, that influences its future over the light-cone.

This is how light behaves. But not all connections could be called light. In fact we have more and stronger bonds that behave spacelike. Spacelike in this picture is acting over those planes, depicted as sheets. Now we call any kind of connection 'influence'. This means the influence of a fictitious element of spacetime on its 'neighbours', be it in time or in space or both terms combined.
This is a generalization of connections, that seem to be the behavior of nature.

Influences

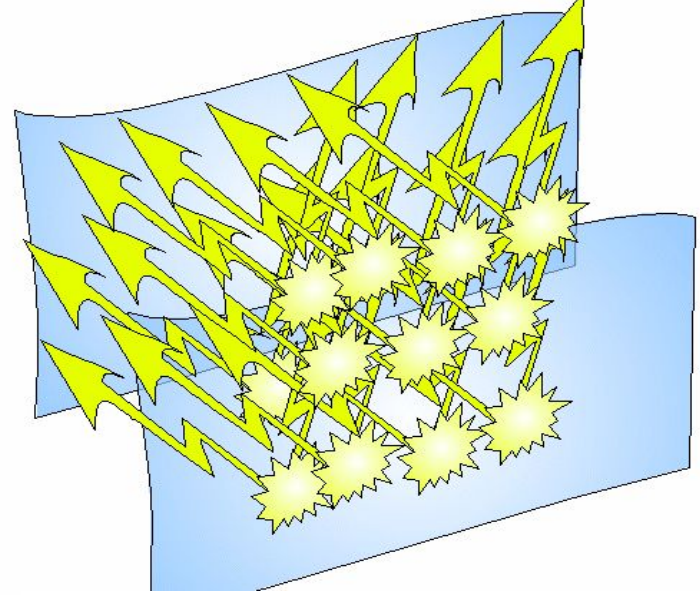
The connections don't act through space alone and not through a single line.

The concept of generalizing connections is based on the idea of spacetime as fundamental or prior to our observations. We perceive only certain aspects, as we ourselves are part of the universe and see it from where we are.

Nature is assumed to behave on a fundamental level like spacetime and not in the way we usually look at things. The assumed mechanism is relatively simple. So we invert the introduction of complexity and try to show, that nature acts on a very low level very simple.

To achieve this, we had to generalize connections of any kind in space or time to 'influences', what would mean any kind of effect influenced by an event. There are no single causes, since every outcome has a lot of input and every event could influence many other. The amount of randomness is different and depends on the neighborhood.

Influences



There are -of course- many events in timelike equal, but space-like separated realms.

The relations could be very complex in this multitude of systems acting upon each other. The reason is, that all the neighboring events are influencing, too. To utilize this model is difficult, because only a small part of the systems acting parallel could be known and there would be only the possibility of making plausible assumptions about that neighborhood. But most important is, that not all influences act parallel, but could have an angle. This means, that systems, that are imaginary to a certain observer could have a real impact on him.

Handedness

Spacetime has a feature called 'handedness'.

This is the order of the three spacelike axes.
It means the order we give to the axes: x,y,z or y,x,z.
That are two possible orders.

The scalar part is not included, since time is oriented itself.
The handedness of spacetime is most important, since spacetime is an antisymmetric system. That means you have to move twice around an object to return. In our world of observation this would be a bit strange, since our space is symmetric. That is important, too.

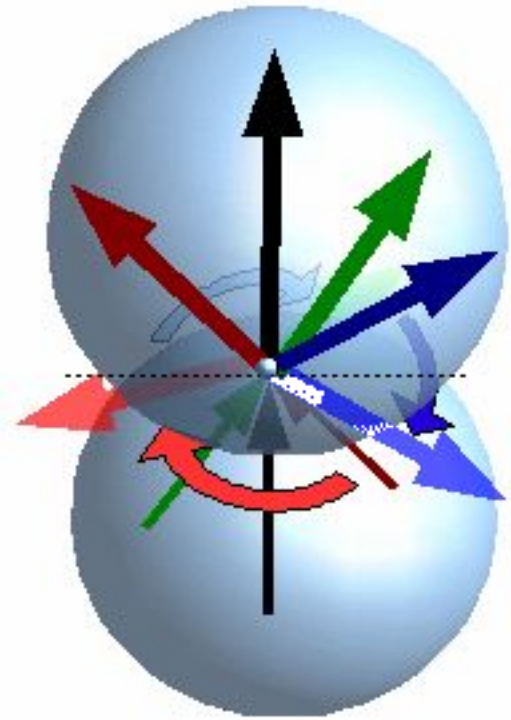
Our world is left-handed for some unknown reason. But this is the case almost entirely and for everything. So left-handed relations would be expected in all kinds of phenomena**.**

Air on the Dirac string.

Handedness

Spacetime is oriented at any point.

Related to an arbitrary observer we give certain names to orientations. This is the scheme for the orientation of the axes.
An event is influenced by its past and influences its future.
The balls depict the antisymmetric aspect of spacetime as past space and future space.
The timelike orientation is pointing up.
The spacelike orientation is the imaginary plane perpendicular and spinning.



Handedness

This picture shall illustrate handedness.

The aspect of orientation is depicted as double-headed arrows. (Note: the symbol is simply copied and rotated) That has an anti-symmetric behaviour, that is symbolized as a mirror.

We could see the splitting effect with reconnection, that is assumed to be the reason for feedback loops. We also see the unrevertible behavior of time, because the feed-back loops could be disturbed and the connections would leave the system, without the possibility to recover them.

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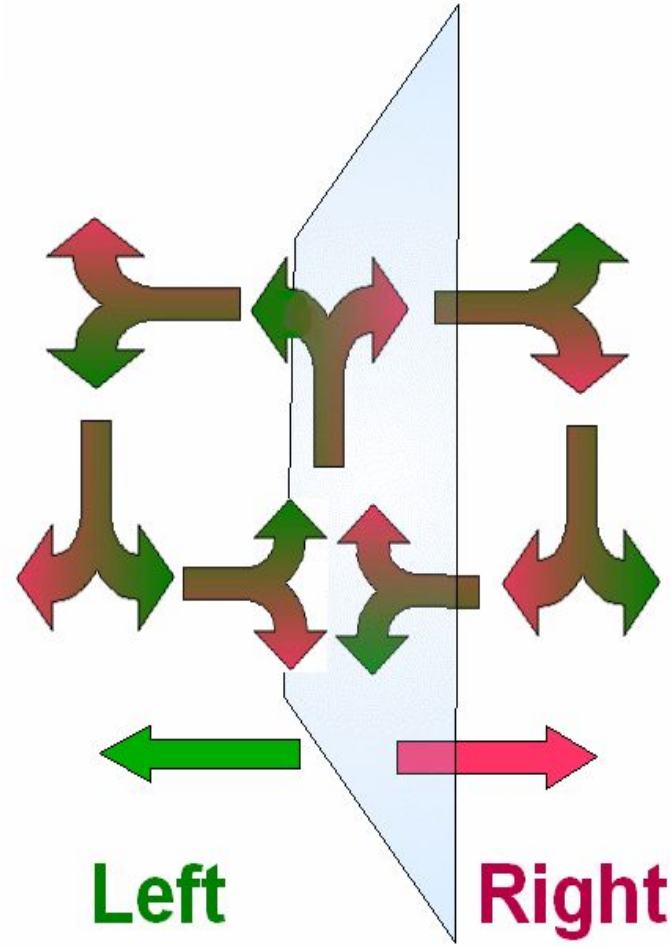
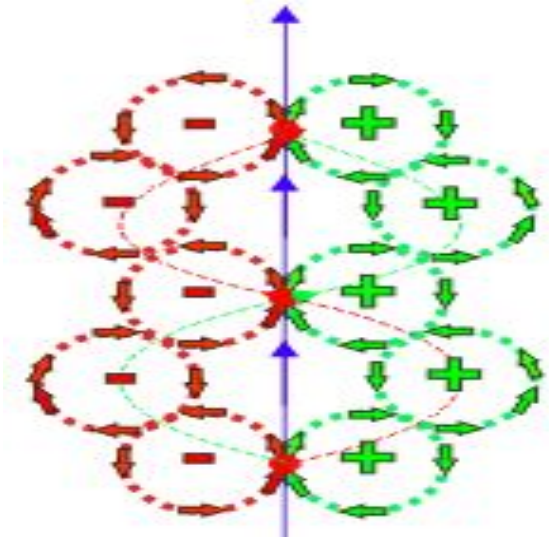
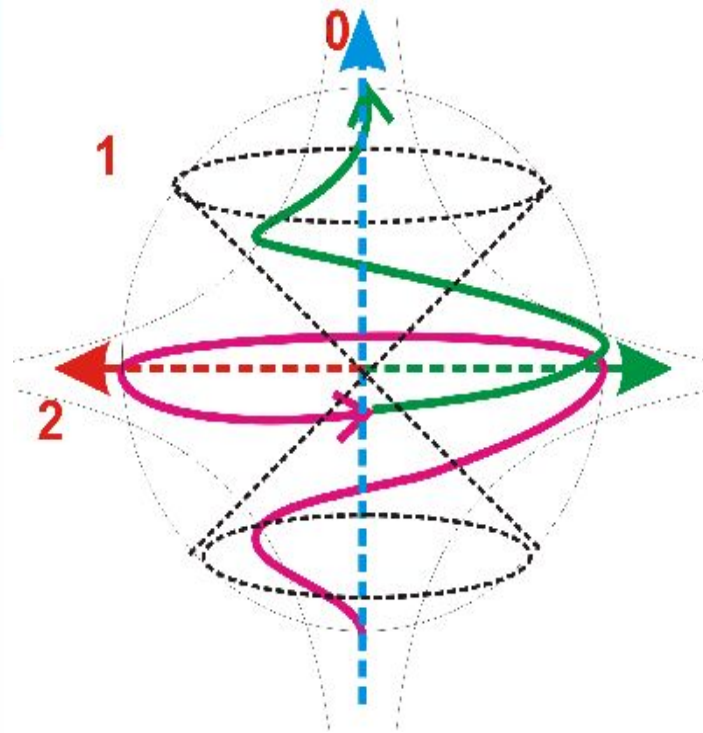


Rotations



The idea is, that an element of spacetime has an aspect of rotation, that twist the spacelike neighbour.
The rule is, that in a timelike 'step' (actually it is assumed to be continuous) the spacelike neighboring elements are twisted. In that timelike step, the neighbor is the state itself, but in the future. The direction is antisymmetric, what makes elements spin in the same direction (not like gears in a gearbox- those spin in opposite direction). The spacelike neighbors are twisted around their timelike axis. What direction is spacelike depends on the rotation. Timelike is the normal-vector of the rotation. This direction changes, because the spacelike direction is always perpendicular, what generates screwlike curves. The greater the 'speed' of the rotation, the smaller the timelike interval and the greater the spacelike influences.

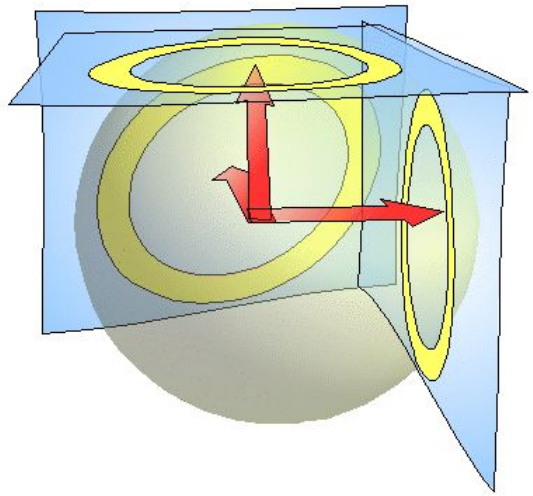
Expansion and Contraction

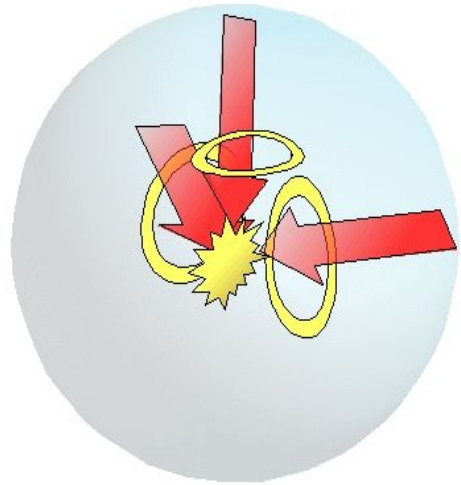


An expansation is acconpanied by a contraction as antagonistic behaviour.

Handedness generates structures in 'volume', or three-dimensional 'patterns', with a fractal behavior. One is expanding - depicted as red arrow and one contracting - drawn as green arrow. If along the equator we need two rounds to return, along the 45° cone one round and zero along the pole. We get a standing wave - for a certain axis of time. Other forms would appear, if the axis is changed and put into an angle.

Expansion and Contraction

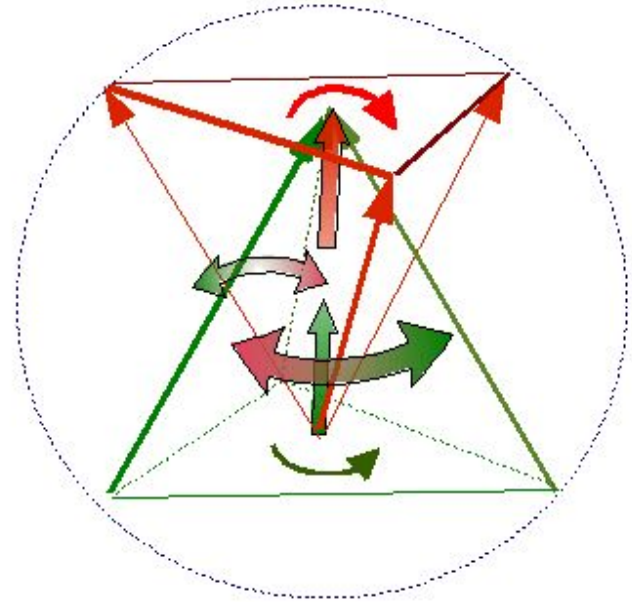




The whole universe does not move along the time-line, but the observer does.

Here we see three perpendicular planes. But the universe can't move in all directions at the same time. The whole universe can't 'move' along any line, but certainly some parts. What we actually see is an expansion of an event into the spatial directions, while the inverse of contraction is the antagonistic counterpart.

Double Tetrahedron



This double tetrahedron 'cell' shall provide the appropriate symbol for bi-quaternions.

Here we see the eight components as the eight corners of this geometric figure, touching a sphere. These two tetrahedrons represent the ingoing and outgoing aspect and should be imagined rotating in opposite directions. The outcome could best be described as a vortex with fractal behavior in spacetime, that we perceive from different angles and assign different names to the various aspects. The green arrows are perpendicular to the red triangles and vice versa.

Units in Spacetime

We explain the world by defining entities and their relations. To those relations we assign names and units.

It's not obvious, that we don't have physical units like mass or length as primordial entities. But how could nature possibly know about those? They are our human artifacts and the way we explain the world to us. In fact we can measure those quantities by useful apparatuses.
In this way we have constructed a network of self supporting units, that gives us means to describe what's happening. The anchor point is time, that could be treated as a counting of some structures, that we find repeatedly.

The counting is depending on our state of movement. Velocity in this picture is an angle: the angle of an object in respect to worldline of the observer.

Units in Spacetime

$$ds^2=(cdt)^2-(dx^2+dy^2+dz^2)$$

Spacetime is assumed to be coordinates free. That means, you can define a position in spacetime only as an interval based on a given point and based on a given direction. This direction is defined by the observer. It's his timelike direction of his worldline. An observer is any point of choice 'moving' on its worldline. From there you have positions that are well defined.

This position is described through the interval r.
If $|\mathbf{ds}|^2<0$ than the direction is spacelike, if $|\mathbf{ds}|^2=0$ than the direction is lightlike and if $|\mathbf{ds}|^2>0$ than the direction is timelike.
A negative value means, light would need negative time to go there. So, what connects into this realm could not be called light, but as it appears timeless (=static), we could call it a field.

Units in Spacetime

$$(cdt)^2 - ds^2 = dx^2 + dy^2 + dz^2$$

Along the lightcone we have **ds=0**, hence could take the square root of the right side and get units of meters for intervals.

For **dx=dy=dz=0** we get $\mathbf{ds^2 = c^2dt^2}$ and **ds= c*dt**. The integral along the timeline gains units of seconds for c=1.

For **dt=0** we have a negative ds^2. In spacelike direction we have $\mathbf{sqrt(-1*ds^2) = sqrt(dx^2 + dy^2 + dz^2)}$, what has units of meters*i^-1.

The term ds seems to be the magnitude of a matrix.

A four vectors **a=a0 + a1 e1 + a2 e2 + a3 e3**,

then $\mathbf{det(a) = |a|2 = a0^2 - a1^2 - a2^2 - a3^2}$

Since the formula for the interval looks like that for the magnitude of a matrix, we could interpret ds as the amount of change in spacetime.

Units in Spacetime

We treat objects as self-centered (at rest in respect to themselves) and make the angle zero along its timeline and the circle perpendicular timeless.

A full circle provides a tick of some kind of clock. Since it has an anti-symmetric behavior, the clock behaves like a pendulum, swinging back and forth. In the spacetime picture, the pointer is pointing up and down. That behaves as if this pointer would perform a circle around a spacelike axis.

Since there are three spacelike axes, every one could provide a clock. We have to add the change in space along each axis to get the total change in time.

The scale has to be put in by hand, according to the scale of the system observed. Even as this seems to be unsatisfactory, the world we live in, looks like having such a fractal structure. This behavior generates distinct 'time-domains', with all having their own specific timelike

Four vector multiplication

We compare this relation with the multiplication of two four-vectors and find a scalar part, a vector part and a cross product.

These parts could be associated with three relations: timelike, lightlike and spacelike. The cross-product is the part, that is anti-symmetric. It changes sign, if the multiplicands would be exchanged. Since cross products describe a spinning system (e.g. a gyroscope), that part is assumed to spin around the time-axis and is associated with the field and carries the angular momentum. The vector part is symmetric, if the timeline is not changed. The timeline itself is not effected by spin, but directs the movement.

It seems unlikely, but nature shows precisely this behavior. So we assume a multiplicative connection of neighboring point-like 'elements' of spacetime, that could be interpreted as a twist of the neighbors, simultaneous and in all directions, but only the spacelike neighbors are twisted.

four vector multiplication

ab = a0.b0 + a1.b1 + a2.b2 + a3.b3
+ a0.(b1e1 + b2e2 + b3e3) + (a1e1 + a2e2 + a3e3).b0
+ i (a2.b3 – a3.b2)e1 + i (a3.b1 – a1.b3)e2 + i (a1.b2 – a2.b1)e3

shortened to:

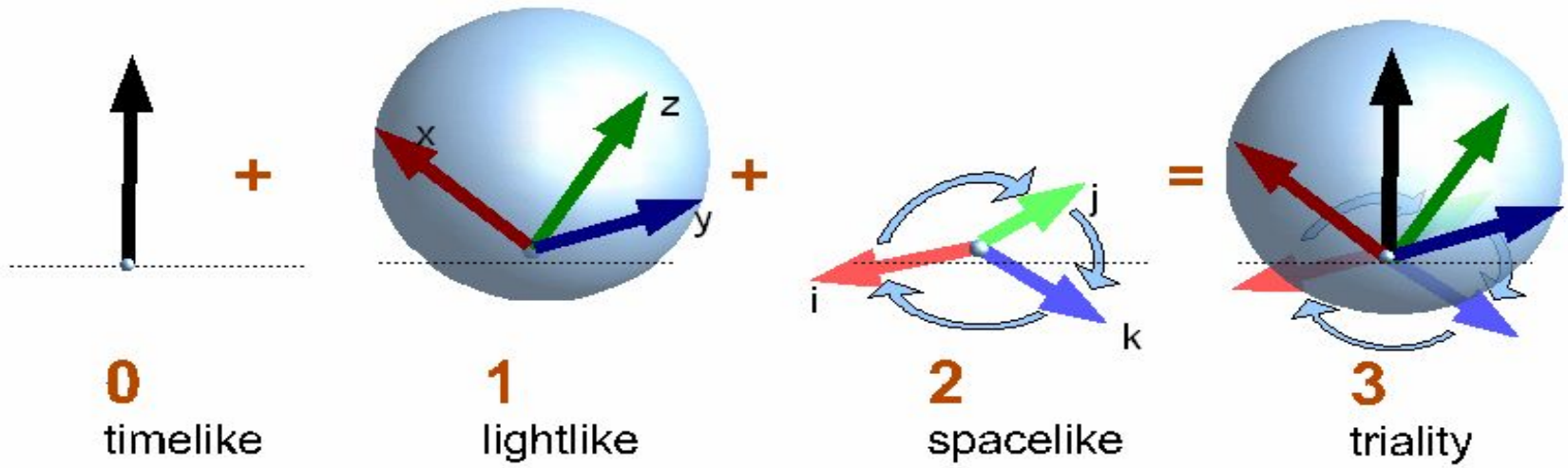
ab =

1.) a_0*b_0 + a_123*b_123
2.) + a_0*b_123 + a_123*b_0
3.) + i * a_123 × b_123

(from Jonathan Scott's book)

The first line is the scalar part, the second line is the vector part and the third line the cross product. Those are the three part of a product of two complex four-vectors.

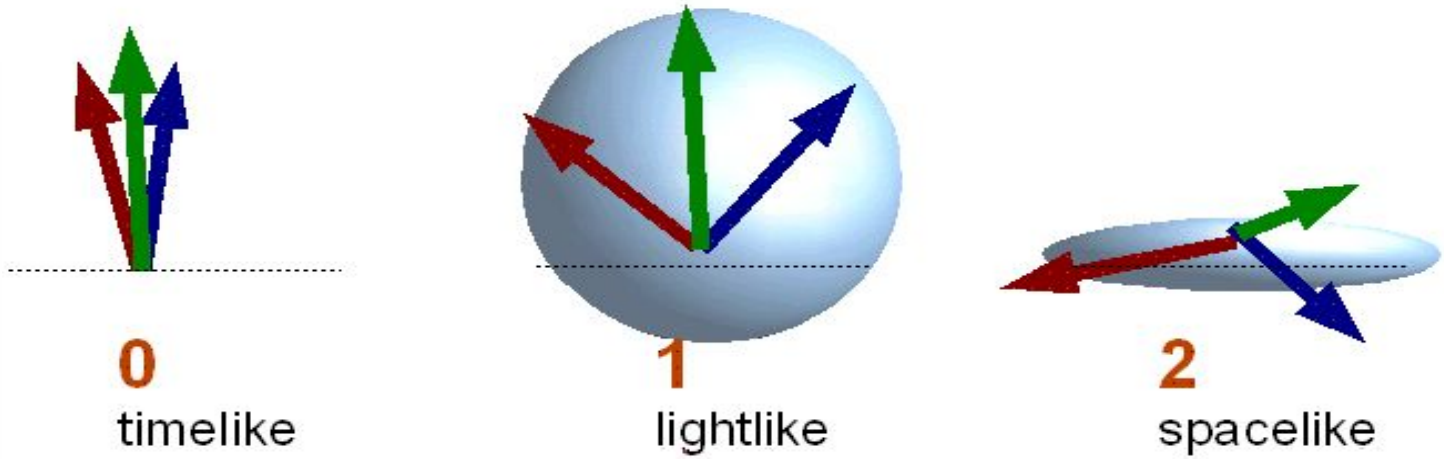
Trialities



We could add the three relations together and get the properties of a state.

A state is a structure of connected events in spacetime. If that is identifiable and timelike stable, we call that a system. The behavior of matter is an object, that is stable in time, moving through space and could influence it's neighborhood through fields. This could be imagined as a spinning tiny ball or 'cell', consisting of the two tetrahedrons and we get a scheme for counting: 1, 2, 3 plus a zero node providing a scalar.

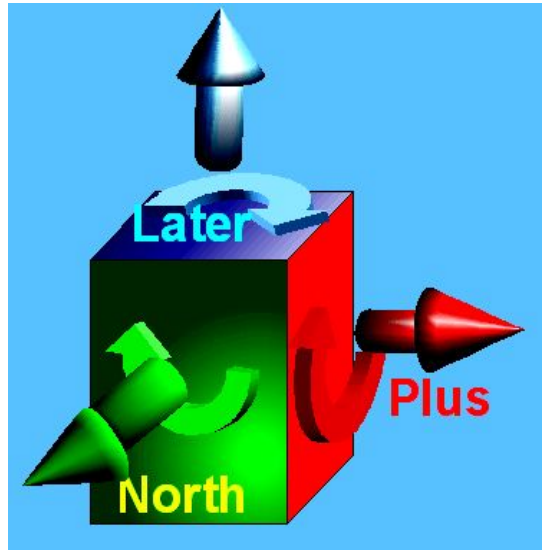
Trialities



We have three types of symmetry, that could be imagined as deformation of the axes x,y and z.

Those are the three parts in their geometric interpretation. The scalar part represents the amount, the vector part the direction and the cross product part generates things like spin or angular momentum. These could be associated with bosons along the light cone (that act over space) and fermions (carrying mass). The massive particles have spin of a half (n*1/2), because the cross product is anti-symmetric, while the vector part is symmetric (hence have spin n*1).

Trialities

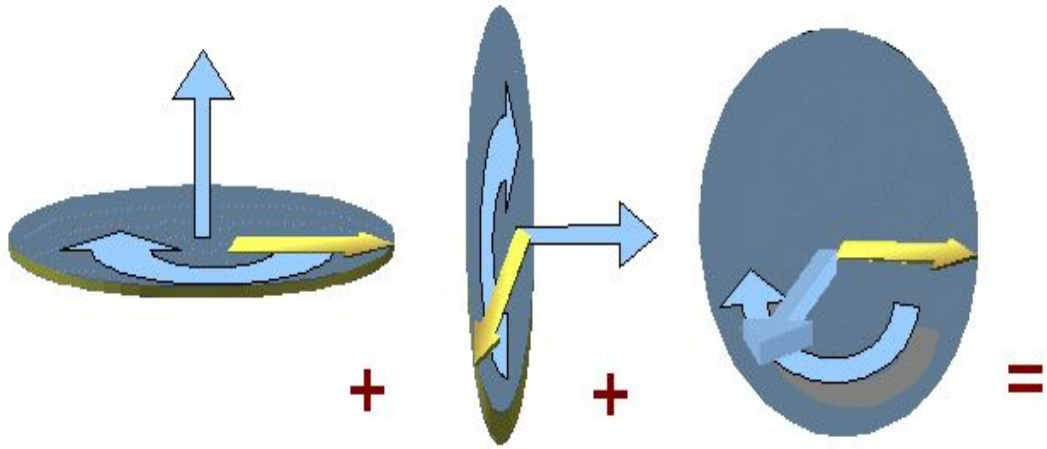


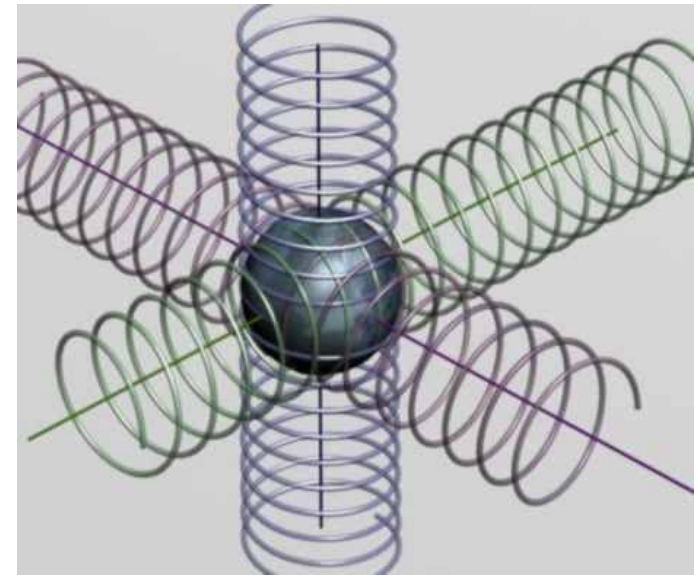
An other symbol is this cube, that illustrates the behavior of trialities.

We have various triples of behavior in natural systems. The idea of the cube is, that we could morph one behavior into the other if the main axis is changed. (just imagine to 'grab' it and turn it around).

The connections should be imagined in volume, since an area is an abstraction, that we don't find in nature. But even a volume is an abstraction, since we have the influence of time and nothing exists, that stays as it is. So we have to think about connections, that pass through space and time and have a structure. Gravity acts in the time domain, hence it is kind of inverse to the electrical effects (what are spacelike) and the triple is: charge, magnetism and mass.

Trialities





With rotation around three axes we get a sphere.

This sphere is oriented, due to the rotations, it is composed of. We have an anti-symmetric behavior in spacelike direction, perpendicular to the timeline. If we would think about the normals to a plane, than those normals would spread apart in case of a curved surface. The effect would increase with curvature, hence would get larger for small structures.

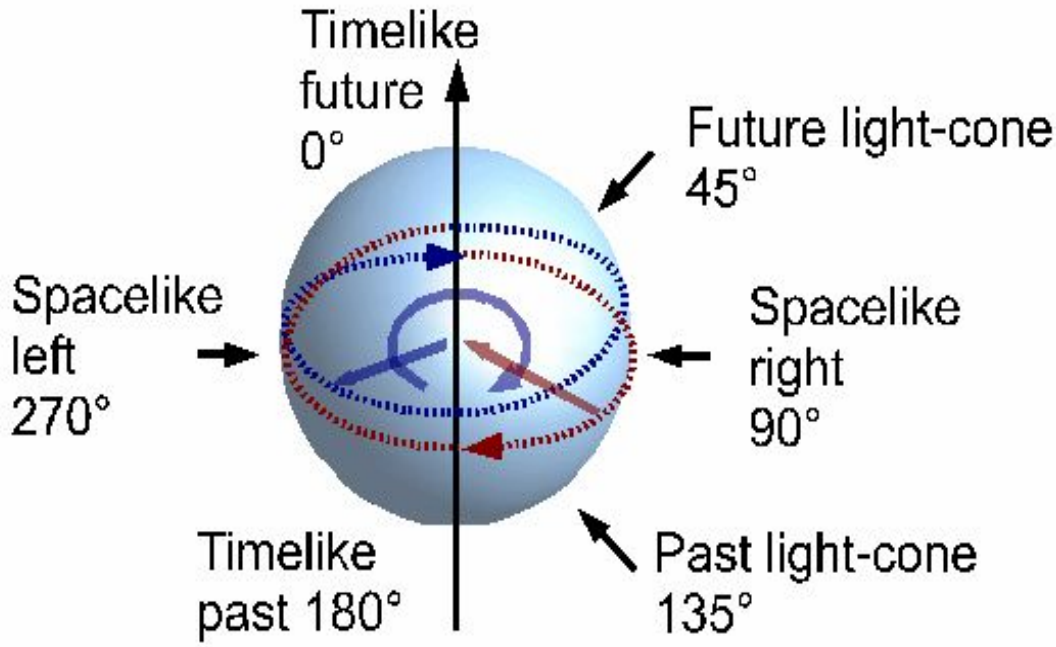
Unit sphere

We define an imaginary sphere with extension of unity, representing an equal full turn around all axes, called a unit sphere.

The Planck h constant has units of an action, similar to angular momentum. The unit cell could be interpreted as a tiny sphere. The frequency of this cell is depending on the size and the energetic content. Larger spheres have lower frequencies than smaller ones and h seems to be a proportional factor connecting energy and frequency of such a cell.

Such spheres behave like little droplets or tiny gyroscopes (because of the cross product properties). These droplets are a structure within spacetime, build out of pointlike elements, that return their axis to its initial state after performing two full turns of the equator. We give those spheres properties of orientation and spin. The observer we give an orientation, too.

Unit Sphere



This diagram illustrates the relations of a unit (hyper-) sphere in spacetime.

The equator is a flat double helix and the other relations have certain angles to the timelike axis.
There are three types of behavior for ball-like structures: a stable (massive), a symmetric and a anti-symmetric ('charged') behavior.
This picture could be interpreted as a sphere of influences of a core on its neighborhood.
Hypersphere

Spacetime

Space and time are the way we observe spacetime .

We treat all observers as at rest, because we can always find a spot where an observer is at rest. That is the point (0,0,0) of its own reference frame. So we call that reference frame 'observer'.

If we are researching a particle, we could attach the frame to that particle. That is called free fall, if not within a solid structure.
Time is now some counting on that worldline. What are counted are events in a clock. So we get time-units and assign the rhythm of causality to our counting.

For distant observers we need SRT to convert the free falling FoR into that of the observer.

The 'Aether'

If everything moves, something should be at rest: the 'aether'.

This model is related to aether ideas, but most aether ideas try to defy relativity and construct something, that would be ultimately stable and provide an absolute frame of reference. So 'spacetime' and 'aether' are not meant equivalent. Instead the idea of an aether had to be made 'relativistic'. That means, what is stable in one frame of reference is in motion in an other one.

So, if there would be some aether in a model as we observe the world, than this should be stable. But in an other frame it is not, hence not an aether. So the aether idea is in itself contradictory, but not entirely wrong. So we assume, that in an arbitrary frame of reference the aspect of ultimate stability could be called an aether.

The 'Aether'

Spacetime could be more a 'nothing' than a thing.

Guess, that space and time are in fact infinite. Than an aether would hinder that development, since it had to exist in advance. So 'nothing' is really a concept worth to explore, but a 'nothing', that could be split apart. That is space and time as antagonistic entities, containing mass and charge as antagonistic behaviour of its content.

Spacetime and 'relativistic aether' could be the same thing, but not in the sense of matter, but as a placeholder term for something unknown. It seems inherently four-dimensional with dimensions not meant as space or time. Those are the parts we split off in respect to our own point of view, which serves as a 'cut' through spacetime. That means that neither time nor space could be considered as 'real' entities, but must both be replaced with distance and duration, along with all other physical behavior, that have to be treated relativistic, too.

Zero, Pi and infinity

There are five 'natural' numbers: i, pi, 0, 1, e.

If we had multiplicative connections, we could multiply 0 by 1^-1, what is infinity. Space is infinite, so mass could be the inverse of space. If we do the same with time, than a static potential is the inverse of time. As space and times are antagonistic (with **dx=i*c*dt**), mass and charge are antagonistic behaviour of its content: mass is timelike and charge is spacelike. (The antagonism is provided by the i, what shifts the relation by 90°).

Both behaviours are in a way extremal points of a continuous field. So charge is the outermost point of a kind of wave, while mass represents the aspect of stability of that wave. The change of such a wave we call radiation, since it extends the rotations it is composed of into the nearby space.

Real and imaginary space

There are two distinct entities: a field and a space and every single point within that space has two aspects:
a position and some other properties, that we call field.

Than we could put those properties into an angle to the space, because space is, what we denote with **r**, the timeline with **i*r** and the field with **r*i^-1**. (The space of observations we find in the middle, hence carries no **i**, but a **1**.).
Since i is related to an imaginary rotation, the field would rotate while the space would not (because it's fixed to the observer).
Intrinsic curvature could be related to an angle, that is rather small and the movement points into a real direction of space, hence acts symmetrically and not on the anti-symmetric field. The angle is between the timeline (of an observer) and the axis of this invisible rotation.
An angle between the two entities would move a structure within the field in a real direction of space. The highest possible speed is c, compared to the restframe of the observer.

Real and imaginary space

Relativity means, that we can rotate the imaginary 'axis' of the timelike path and we would get a real space, that we can't see, where our timeline is an axis of space and we are invisible from there. This would enable many mysterious phenomena, if those spaces would interact somehow, since such phenomena would have no obvious source and seem to come out of nothing.

If our axis of time provides a filter for what we could possibly see, there could be something, what is real, but invisible to us. If we would alter our timelike direction, than we would could look into an other space, unseen before. If this change is possible at all, it is certainly not an easy task. But we could imagine, there would be other ways to look at the universe than ours and ours isn't that special. This view is very counter-intuitive as it suggest, there could be entire galaxies hidden to our vision. The possibility itself stems from the four-dimensional behavior and stars or the earth are three-dimensional. If we would alter our timeline, than frequencies shift and light becomes something different, since this kind of radiation is only a small part of the spectrum.

Wick rotation

Wick rotation shifts a relation by multiplying with i between the real space and an imaginary space.

The axis of time is multiplied with i, the imaginary unit, and is then perpendicular to the timeline. Actually we call this direction spacelike and time is treated as a scalar, composed out of the rotations around spacelike axes.

Wick rotation could be applied to various problems in relativity and connects them to problems in an euclidean space.

Wick rotation

The observer

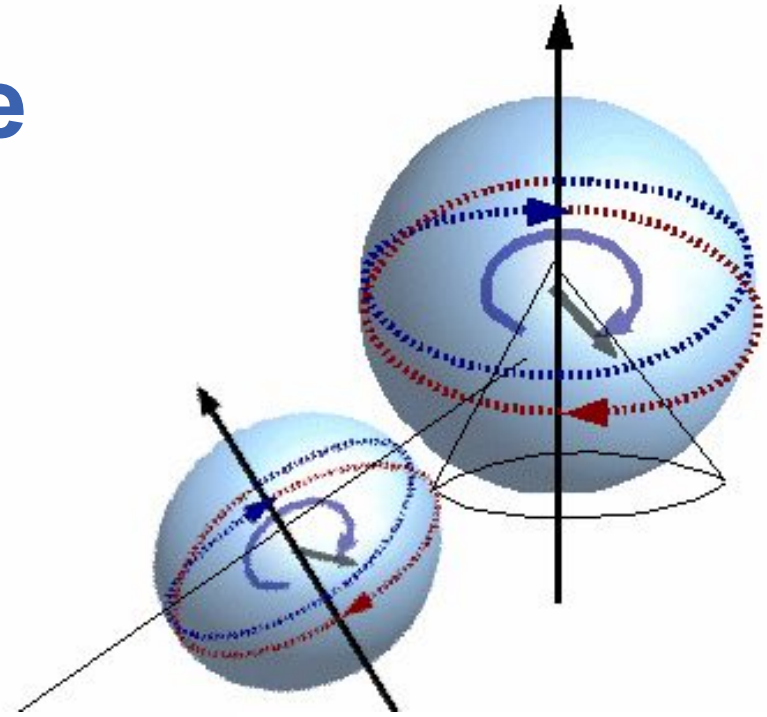
The observer has a certain role in this model.

The state of the observer determines his observations (needless to say). The observer is the connection between spacetime and space. Observer is used equivalent to the reference frame of a free-falling body. That covers all kinds of reference frames.

We use only one observer and one object of interest. This single object represents all kinds of structures, that should be assumed as overlay pattern of influences connecting elements of spacetime. Those elements are in a way the equivalent to a point. If we sum over points in space defined by an arbitrary timeline, we get the space of observations, governed by sums.

Observation

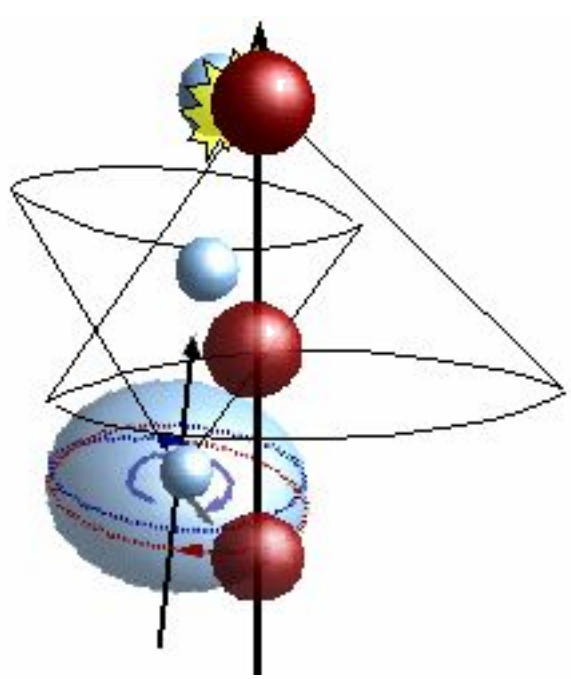
Relations in Spacetime

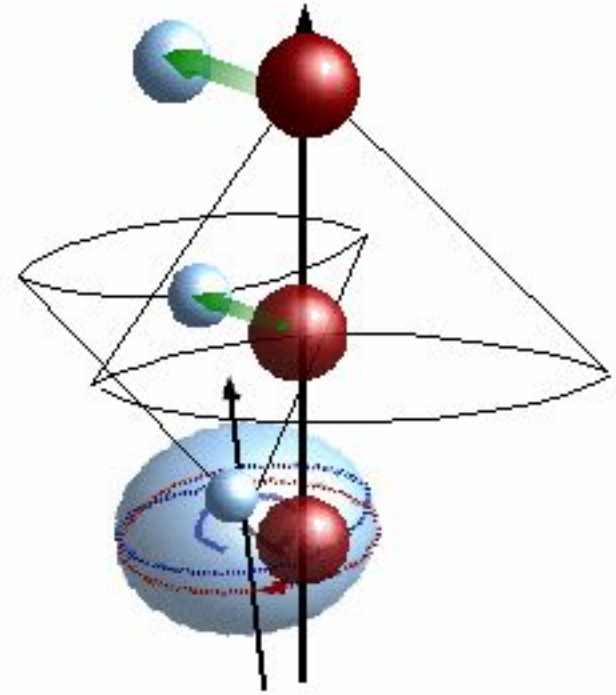


A state has features like size, orientation, angular velocity and a relation to the observer.

The past light cone is how we receive light and there are various ways to combine the observer and an observed system.
We could see all of these combinations, but assign different names to their behavior. Now a simple shift of the timelike axis could be the reason for very different observations.

Relative velocity

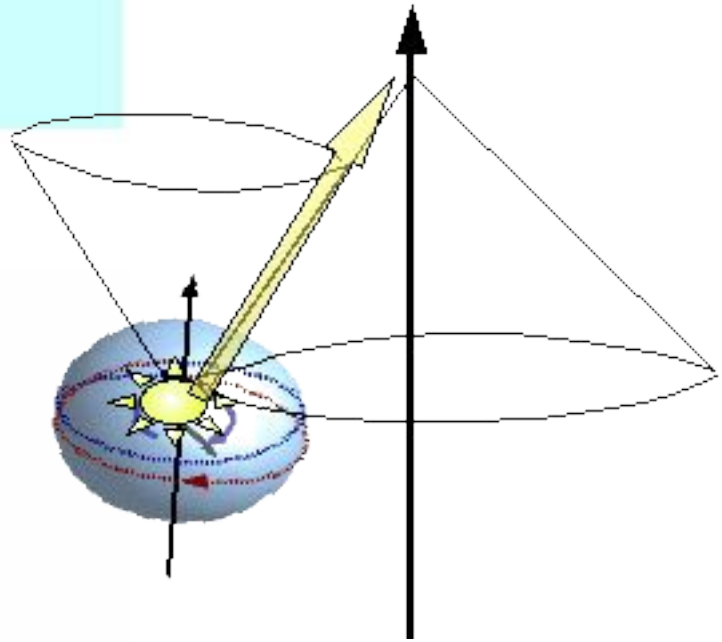




If two objects have a worldline pointing towards each other, this would allow a collision.

In our daily live of slow moving objects this angle is very (!) small. If the line meet at a certain spot, two objects would collide.
On the other hand, if worldlines diverge, the objects would move apart from each other with a certain velocity.

Starlight

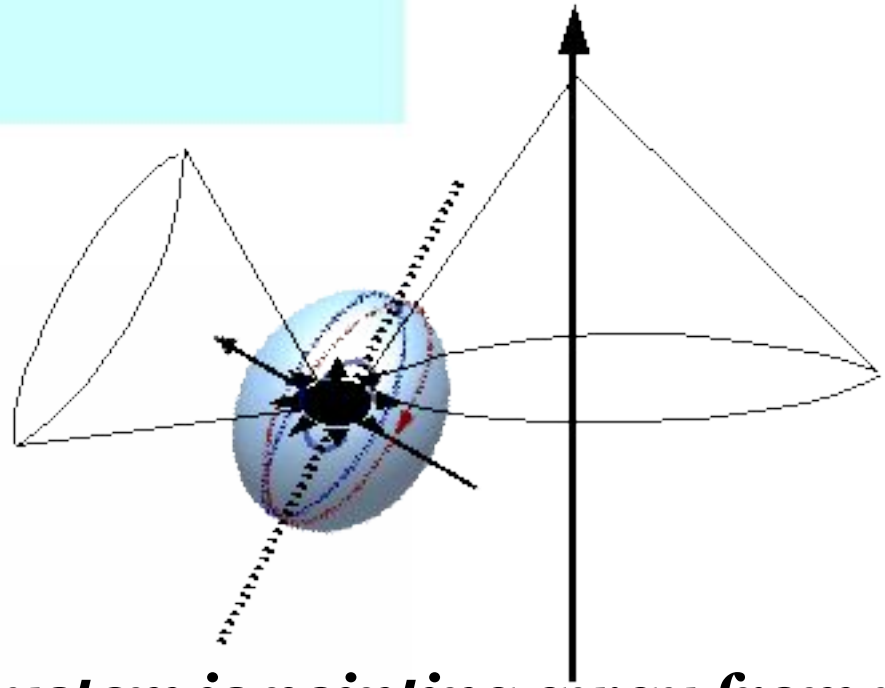


To receive starlight it would be necessary, that a distant object has a certain orientation to the observer.

The future light cone of a distant object shines into the past light cone of the observer, if the world lines are relatively parallel. An angle would be a relative velocity and would distort the emitted light.

This parallel behavior limits the possibilities for observations, since not all worldlines have to be parallel. Actually all combinations of directions for distant systems and observers should be possible.

Black holes

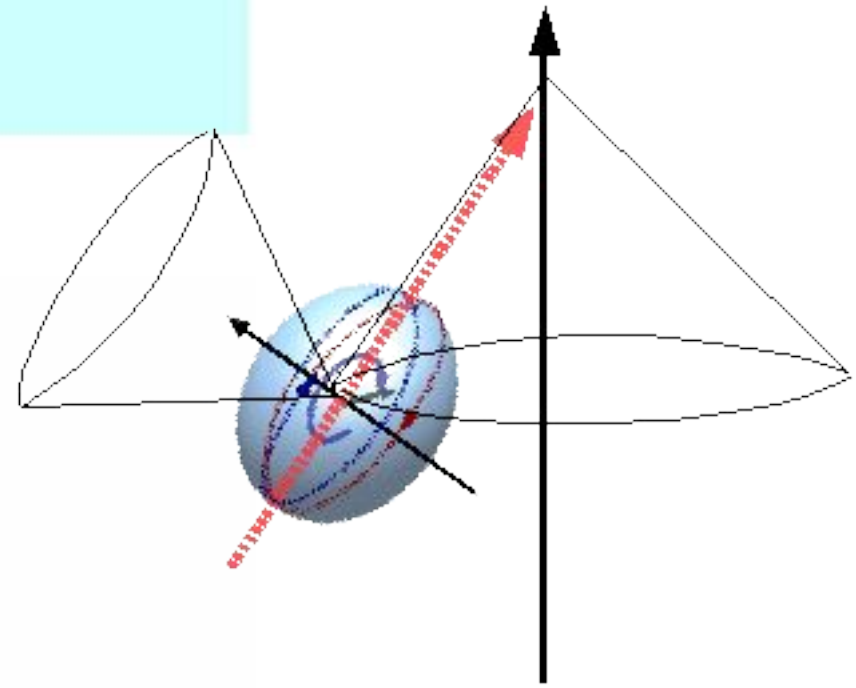


If the causal future of a system is pointing away from us, we couldn't see anything coming from there.

This angle goes together with 'length-contraction' and blueshift of CMBR, we perceive this situation as a black-hole. From there we can't see influences returning to our space of sight. That's why it is black. But this kind of 'blackness' is the habit of time in general.

The 'edge' of that light cone could be seen as a structure we call jets. Since black holes rotate, we have to think about the rotation of the light cone twisting it away from ours with distance.

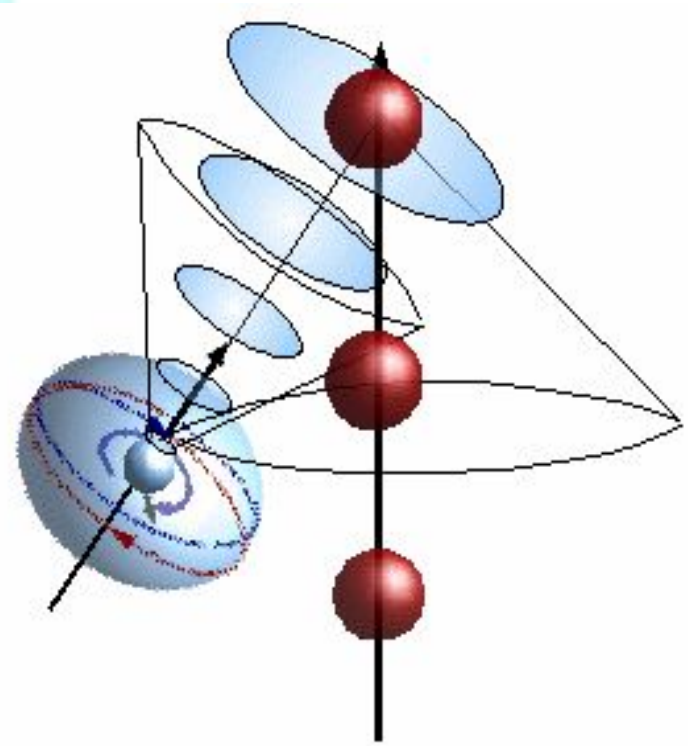
Gamma rays



The rotation along the equator could be observed itself and what we observe in this case is radiation of space.

If we see a distant object receding, it could reach the speed of light and its emissions get redshifted. But in a curved space we see these structures like from the side and envision, what SRT calls lenght contraction and a blueshifted version of the cosmic microwave background.

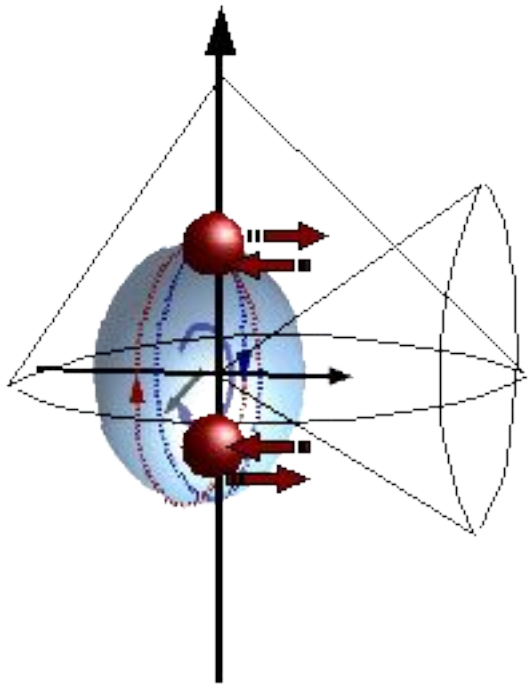
White holes



The interpretation of this situation could be called a 'white hole'.

A white hole is a region with a timeline pointing towards us. A white hole is actually black, because the rotation around the timeline is invisible. But perpendicular we would expect something radiating. So we had to look for the white hole corresponding to our galaxy perpendicular to its ecliptic.

Heat



If a state influences perpendicular to the timeline, objects would wiggle, what we call heat.

An interaction with the direct neighborhood is spacelike, since distance isn't important. That means spacelike influences acting perpendicular to the timeline and would heat up the neighboring structures.

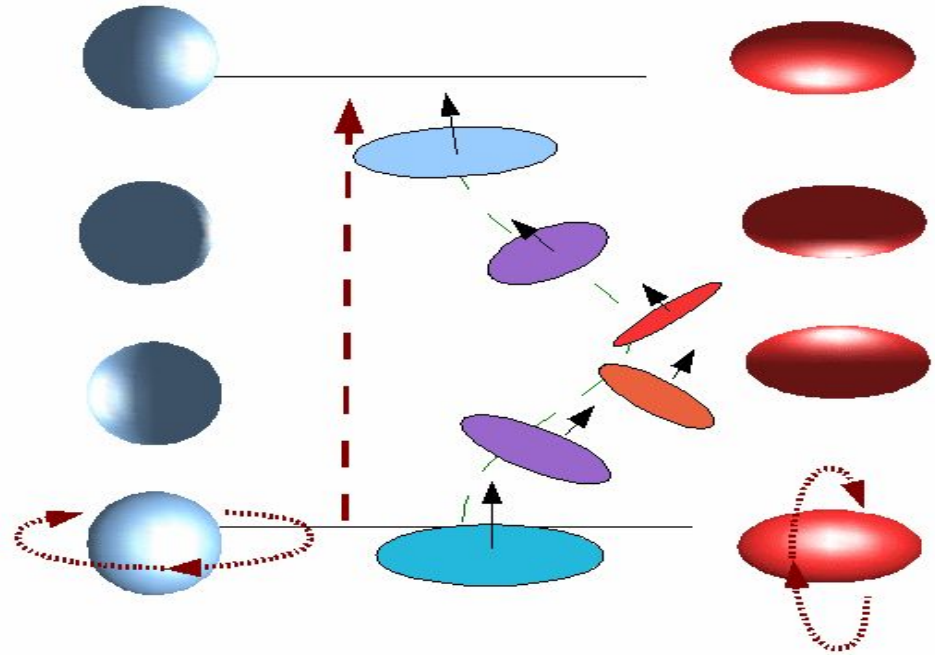
SRT

This model is based on GR as a general backdrop (but done with quaternions instead of tensors), hence SRT is a very special case.

SRT describes observations of an inertial frame, moving away from the observer along an axis of space with some velocity. That is a system with some angle in spacetime.
The Lorentz transforms describe, how the observations of space and time alter upon this angle. As c refers to the light cone and the angle of 45°, the speed of an object could not exceed c in the restframe of the observer. But in the objects restframe the picture is different, because there it doesn't move at all (hence the name). That means, a system could leave the observers lightcone and gets invisible to him, if the angle exceeds 45°. Of course it is not possible to accelerate an object to more than c, because that would require to leave the causal future of the machine, that would do that.

G. Sobczyk: Special relativity in complex vector algebra

SRT



Because relative velocity is the important point, the mass of an object -measured by a distant observer- is altered, if that is accelerated. It is lost, though, through deceleration in the reverted process.
The illustration depicts the so called 'twin paradox'. If we would send out a spaceship, receding from us, it would enter a different 'time-domain', to reach the distant planet. So the traveling twin is (heavily) accelerated on his trip three times: at the start, for the return and for the stop (or four - depending on the counting - because the return is like stop plus start), what cancels out the effect.

Quaternions

Quaternions are a good way to describe intervals.

The relation of a quaternion to vectors is, that a quaternion could be interpreted as the quotient of two vectors. It 'connects' the two vectors and describes their relation as a multiplicative connection. Like the imaginary unit i of the imaginary numbers, this is a rotation of a specific kind.
Real vectors are the tool to use for physics of observations in a real space.

Quaternions and General Relativity

Geometric algebra

A system of mathematical description for spacetime physics is called 'geometric algebra' developed by David Heestenes.

Actually many ways are possible to model this kind of relations. The most often used system of linear algebra, matrices and tensors in GR and QM is neither intuitive nor performant. Pauli matrices, Spinors, Quaternions, Twistors or geometric algebra all address the same kind of spacetime relations.

Some systems have advantages in usuability or performance, but none would behave exactly like nature does, since we have a continuum and the calculations could not be done with infinite precision, because that would require infinitely many calculations. Geometric algebra is based on 'spacetime algebra' and Dirac's notation.

Non-commutative algebras

There are more members of the family of non-commutative numbers, that have the same anti-symmetry as quaternions, but more dimensions: the eight-dimensional octonions.

There are two types of octonions: one having eight entries, like quaternions have four and bi-quaternions. They are build as extension of complex numbers over quaternions to octonions. They could be used to describe positions of spacetime events and the behavior of a matter in two different terms.

An other very interesting algebra is called '**Polysigned numbers**', developed by Timothy Golden .

John Baez about Octonions

Pauli matrices

Triad: 1>σ_x, σ_y, σ_z

$$\mathbf{i} = -\sigma_2\sigma_3 = -i\sigma_1$$
$$\mathbf{j} = -\sigma_3\sigma_1 = -i\sigma_2$$
$$\mathbf{k} = -\sigma_1\sigma_2 = -i\sigma_3$$

There is a interesting triad, as what you could regard the Pauli matrices.

Those matrices have a relation to quaternions. The bivectors σ2σ3, σ3σ1 and σ1σ2 are in fact Hamilton's quaternions i, j and k.

We could imagine that these spinors define three perpendicular complex planes and each of them having a perpendicular pointer, surrounded by an imaginary circle. This would be observed as sine waves, if the circle tilts. In case of a field we have two perpendicular fields. In case of three sinuses, we get a three dimensional patterns. (Quotes from wikipedia)

Spinors Pauli matrices.

Complex Four Vectors

Complex four-vectors have almost the same structure as quaternions, but can have complex valued components.

There are Hamilton's, Riemann's, Pauli, Dirac and complex Quaternions. All are associative and could gain negative scalars. Since time should be a positive scalar Complex Four Vectors (or bi-quaternions) are a better way to describe these relations, rather than quaternions, since there are hints, that nature follows non-associative rules. (That means, a sequence of rotations would gain different results, if they are performed in different combination). So this slight modification of quaternion algebra called Pauli algebra would be the best known method to represent systems within structured spacetime. This system is also a Clifford algebra called CL3.

G. Sobczik: Complex Gibbs-Heaviside Algebra for Spacetime

Quantum mechanics

Quantum-physics is the physics of particles and fields.

Quantum physics is using definitions and techniques, that are based on observations. Observation is by their definition the basis of physics. But that is only true for our observations. Gr is a theory that you may call observer-independent (or imaginary). It's shown, that GR is in fact background independent and QM is not. This is so with good reasons and does not make one idea better or worse. It just different views on the world.

The relation is, that QM is describing things, that have a volume in space, that has certain features. This is a three dimensional relation with one dimensional time. QM could be understood as the inverse to GR and spacetime providing the background, while QM regards the structure as real alone.

Quantum mechanics

Quantum mechanics is about objects and about fields, distributing over observed (or 'real') space.

In general QM is depending on an observer. It is using a background and needs an anchor point to start a vector. A quaternion is a method to stretch, move and turn a vector. It's useful to describe positions with vectors, but to model rotations quaternions are better.

So we could do quantum-physics with quaternions, but we don't need to. The connection to QM is modeled with linear combinations. It is spacelike rotation and summing over timelike sheets. Those sheets are depending on the direction of time, hence on the observer.

Space and time

What are the 'building blocks' of the universe and how do they interact?

The first question is left open and about the second one we assume, that they are connected like a quaternion-field and that you multiply them with each other. That means an 'element' is connected with its direct neighbors through rotation and dilation.The multiplication could rotate only spacelike neighbors. In timelike direction the rotation has no diameter. That's why the interval-like relation is an (imaginary) rotation in spacelike direction and a duration in timelike direction. These rotations have frequencies, that depend on the point of view (the observer).

So 'what is space' and 'what is time' is a question of the point of view. That point of view is introduced by the observer, mainly by being somewhere and treating himself as at rest.

The Nature Of The Universe

Space and time

Light-cones represent causality.

This model is based on the idea, that the consequences of an event influences events in the future with a certain strength, falling off with length of the interval and with the angle to its timeline.
The future is influenced by an event. The past is the reason for present events. This allows advantage only in one direction. We call that time.

Events are a mixture of all their past. And past is influencing a lot of future. A certain state is than composed out of all the events, that could have an influence. The strength of the influence and the type of its impact should follow an inverse square law for the distance and some factors for the direction of the causes. (To actually figure out the future would be hindered by the problem, that we would never have all needed data and infinite time to do the calculations.)

Space and time

In space we can move in all directions but in time we can't.

So it would be in a way difficult to move at all in spacetime. We could imagine this as getting moved and always stay in our own frame of reference. In space we can move, stay an object and need energy to accelerate.

This is like 'cutting' spacetime into space and time. What is stable in time is treated as space (the euclidean view means: space without delay). That is on the null geodesics of our own light cone, where we have two directions: left and right, backwards and ahead, above and below. In the movement along a horizontal plane we have no anti-symmetry, because that is already encoded into gravity and timeflow. But space seems to be not symmetric upon rotations and we would expect a slight difference between turning clockwise and counter-clockwise.

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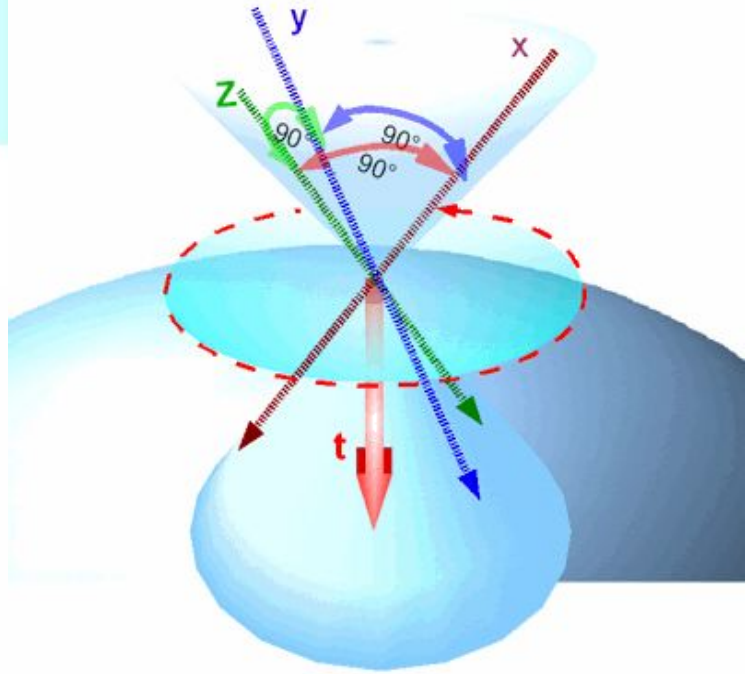
Space and time



The lightcone is put vertical and the x,y and z axis diagonal.
That is an unusual, but -of course- legal arrangement of the axes. This is used, because in this case the axes are equivalent to each other and it is easier to see the direction of the timelike path of a free falling object. Usually we think about vertical and horizontal axes, but then the vertical axis is different from the horizontal ones.
On earth the timelike axis is pointing downwards and timelike movement would make things drop. This is like the aspect of contraction, that tend to pull a state together. The surface of the earth serves as a time-domain, allowing to use the same clocks around the globe.

Space and time

All we could see, that comes to us through light.

So what we call space is defined by our own light cone. To see the future would be clearly a miracle, but we can't see our past neither. The outside of the lightcone we can't see now, because light needs time to travel.

We couldn't look into this direction, but we could imagine a now would exist, connected through something with infinite velocity. Light can't do that, but a static field could. Or: a field is static, because it connects over an imaginary distance. Electrostatics always did it like that and uses imaginary numbers. Than we could think about light as the em-field, that moves away with maximal velocity. Since space is defined over the features of light, we actually talk about the past light cone and that is different to our future light cone and the space we see through isn't the same as through that we are seen.

Rotation and dilation

We have two distinct types of influences in this model: rotation and dilation.

In fact both are closely related:
Timelike steps distribute a structure along a line and that is performed by a multiplication **v'=q*v**
A rotation with quaternions is performed by a multiplication with a unit quaternion and its inverse. **v'= q*v*q^-1**
The term **q^-1** could be interpreted as spacelike and the **q** as timelike. Than the role of v and q could be inverted, because v denotes a position and q the rotation. If we flip that over, we generate a space, where our timeline is a spacelike axis (Quotes: D. Sweetser).

Objects

We would like to have some content in our world, what we call 'objects'.

These objects have their own ideas about directions. So we do the same with an object, but now we give different names, because we want to research such an object and describe it as observers.

The scalar behavior is called the 'mass term'. A pointer sweeping over the spacelike (hyper-)plane is called the 'radiation term', because timelike stable is a mass and radiation distributes in space.

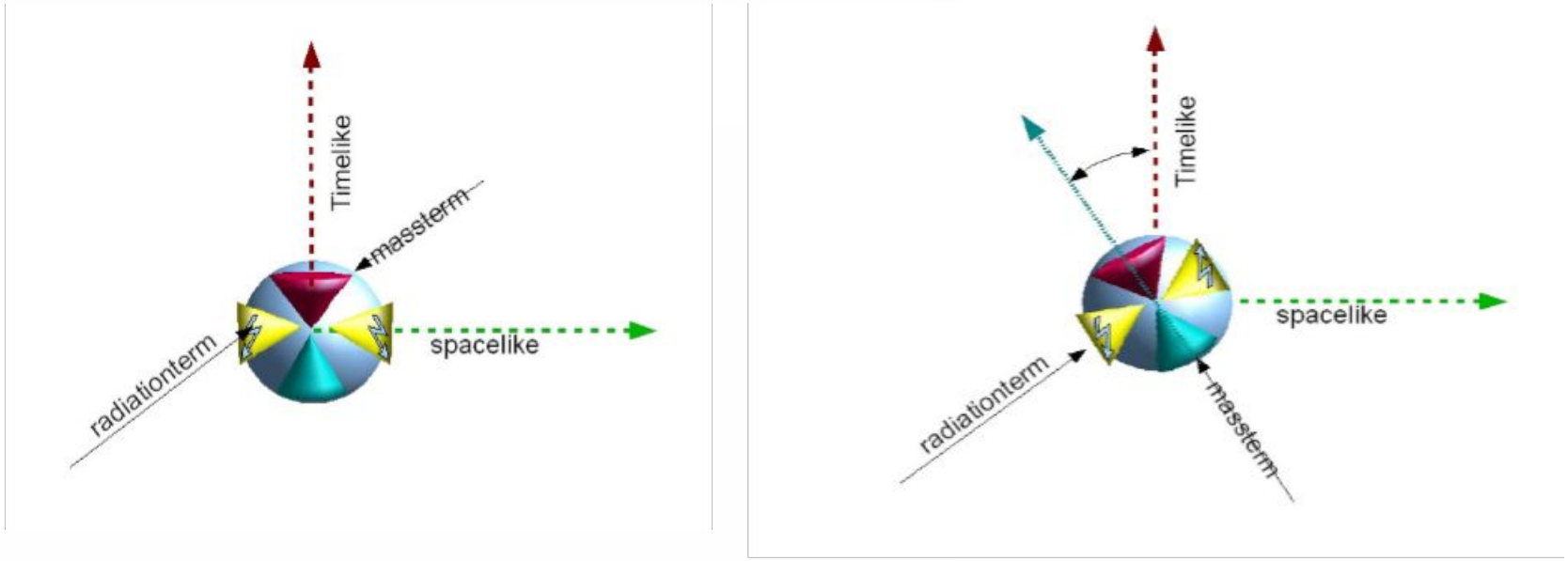
Objects are assumed to be three-dimensional structures, that behave like vortices. The temporal movement is subtracted, to make the object 'self-centered'. The size of a structure determines the frequency, associated with the object. Very large objects behave with very low frequency and small structures with higher frequencies.

Objects

If we put some energy into those elements, this would produce many different patterns and interactions.

The amplitudes are assumed to interact and add up to patterns, that influence their neighbors from there again.
So the same laws of interactions as used in general relativity and electrodynamics are applied on all scales.

Objects



Special relativity describes observations compared by different observers.

From this theory we need a certain angle θ. This is the angle between the worldline of an observer and the worldline of an object. This is a representative for velocity in respect to the observer. β=v/c is between zero for at rest and 1 for speed of light. But somehow, any angle should be possible. Exceeding β=1 would turn matter into radiation and the massterm is the radiation term then.

Foliation

It is useful to think about thin 'foils', that are 'moving'.

To encode the timelike behavior into this model, we could use 'foils'. These are moving planes, that have special meaning in the circumstances to research.

Since time would be a parameter in many problems, a co-moving foil would represent the aspect of stability. A plane perpendicular to that would represent radiation or energetic aspects in general. So a 2x2 dimensional description with two perpendicular foils is useful, if we want to research the energetic behavior of an object.
That is done with quaternions, that could provide positions and rotations.

Foliation

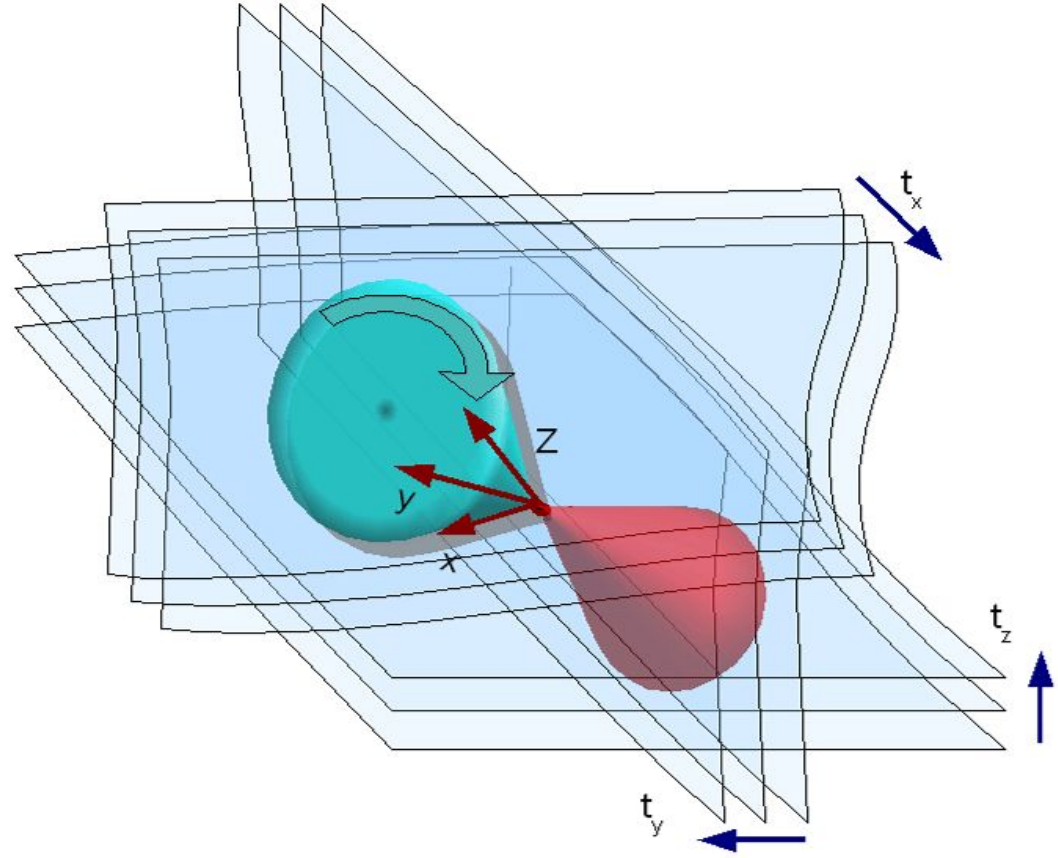
A 'foil' can be regarded as the plane of a complex number c= (a+ i*b).

To describe space, we can use three perpendicular planes, that have each their own direction of movement. The movement has to be imagined connected. Antisymmetry make the change of a direction act like a mirror. That changes the signs of the influences passing through.

The worldline belongs to such a plane, that would make an inverse out of a quaternion. That can be described by two vertical perpendicular planes. The horizontal co-moving plane is the third plane to describe this behavior. That plane separates past from future.
A more general case would need three perpendicular planes.

Foliation

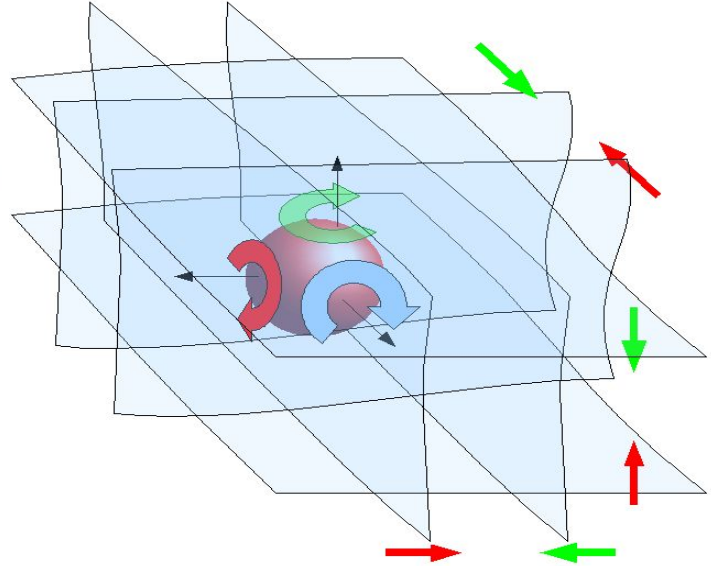
Triad: t_x, t_y, t_z



This picture shall illustrate how an evolution in all directions at the same time would look like.

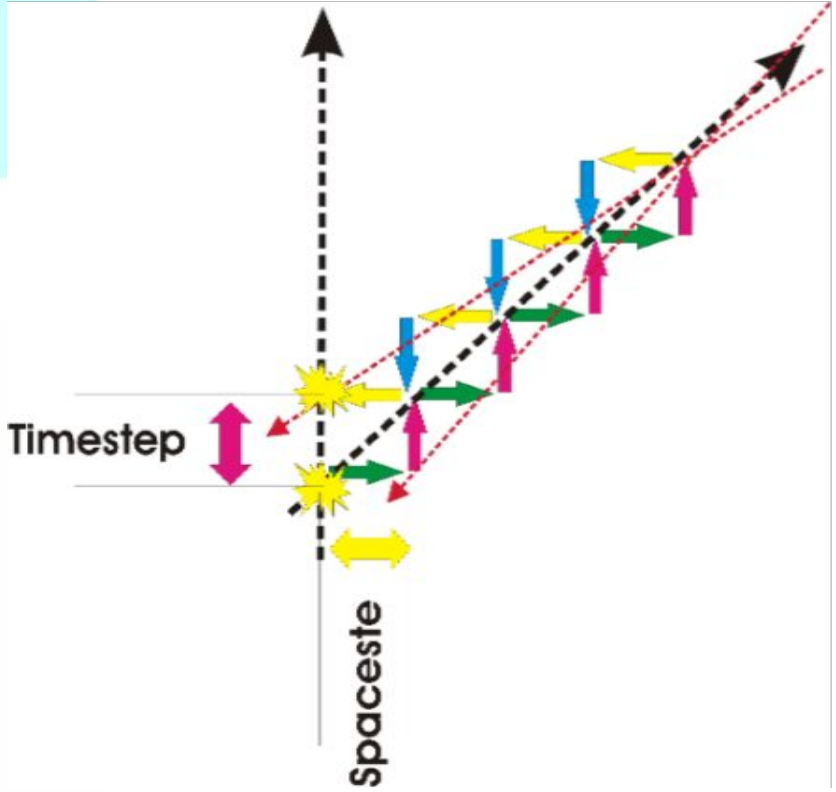
This picture illustrates the independent advance of spacelike 'foils' and as a result a rotating light cone. We could see that three components of movement cause a rotation.

In- and Out-going



This illustration shows also the two distinct aspects of this model: one is outgoing and the other is incoming.
Both aspects are combined and depend on each other. What goes out from somewhere, that goes into the neighborhood and vice versa. The outgoing aspect is spacelike and the incoming timelike. That is like expanding and contracting. That effect generates harmonic waves of a certain frequency, that is characteristic for the system in question.
So timelike and spacelike have the relation of inverses or as axis and rotation.
(The ancient meaning of 'yang' is incoming and of 'yin' is outgoing and we could interpret the yin/yang sign as the combination of two quaternions, where the scalar part expanding in one and contracting in the other.).

Speed of light



It is not that obvious, but the speed of light is depending on our definition of space, time, light and matter.

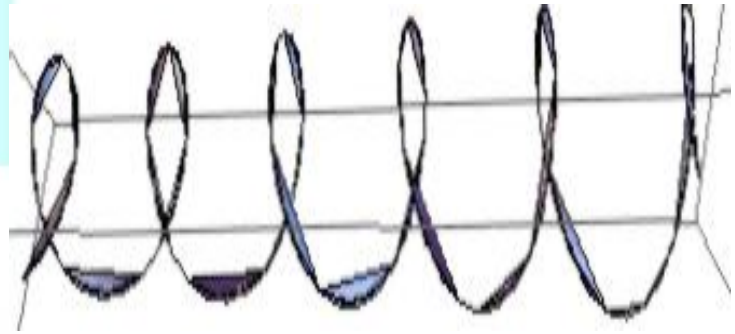
We see how those 'influences' distribute over spacetime. They attempt to turn 'left' at any spot and in any direction. This causes a timelike step in timelike direction and a spacestep in spacelike direction. In vacuum this is the same by definition, so lightspeed is the same for any observer, but that has the relation of unity, while c means a velocity of dimensions length per time.

Speed of light

It isn't a very good idea to say **c=1**, because 'speed' means length traveled, divided by time needed for that distance. So what do we mean by 1? That hasn't even a unit. This indicates, that **c** would be just an arbitrary constant. But 'speed' means length per time and not an interval, hence refers to what is in this paper called 'real space' and time measured by an observer. Mixing spacetime units and observed units isn't recommended, since that obscures the meaning of the term speed unnecessarily.

The '1' refers to the equality of timelike to spacelike intervals for light and to an angle of 45° degrees in the spacetime picture. This speed seems to be a limit for transferring signals, since a static field can't transfer a change and the time axis is linked to a point. So changes tend to move along the light cone, what is that zig-zag line along the diagonal. That line is meant symbolic and it will be later shown to have the form of a helix.

Helical screws



The expected form of distribution of influences is a left-handed helical screw.

Screws have interesting features. They are continuous in one direction (this is the direction of their evolution) and -if you scratch over the bolt- are discontinuous (that is the direction perpendicular). This is exactly how quanta work: it's a discontinuous approach in a continuous space. Those screws are the spacetime representation of a spherical wave. . They reach us in 'packets' because the interaction requires an exact match of state and receiver. It's a particle because we can define an operator with such a property. These spheres are assumed to rotate and their influences spiral in and out of what is possible to observe, what makes them alternating visible and imaginary.
The screw-like behavior stems from exponential functions with imaginary exponents.

Helical screws

The helices are assumed to be wound up themselves and build fractal patterns.

After a screw is build, it could be wound up itself and build a new screw. At all these steps we expect a different behavior and the relations to depend on the scale of observation.
This would lead to a difference, if we look at a small pattern or a big structure. The dimensionality should depend on the direction of the screws and their relation to the observer and how they overlap.

The relation to our observation should be like a pattern of vortices, where these screws are concentrate in the center and spread out.

fractals and helical screws

Pre- and Postfactor

Since quaternions describe a position, the 'points' don't spin.

Quaternions describe a 'frozen' rotation. That isn't enough. So we need another factor A, to generate a spin.

Trialities have a specific symmetry, that allow a rotation around three axis, we need a rotation around an axis and a dilation along that axis.
So a rotation is this: **v'=A*v*A^-1**
and a dilation is this: **v'=A*v**.
The rotation spreads over a plane and **A^-1** is called the radiation term and **A** is called the mass term.
These names are chose for the reason, that they describe the behaviour of matter: A is spherical symmetric ('points' in all directions) while A^-1 does not.

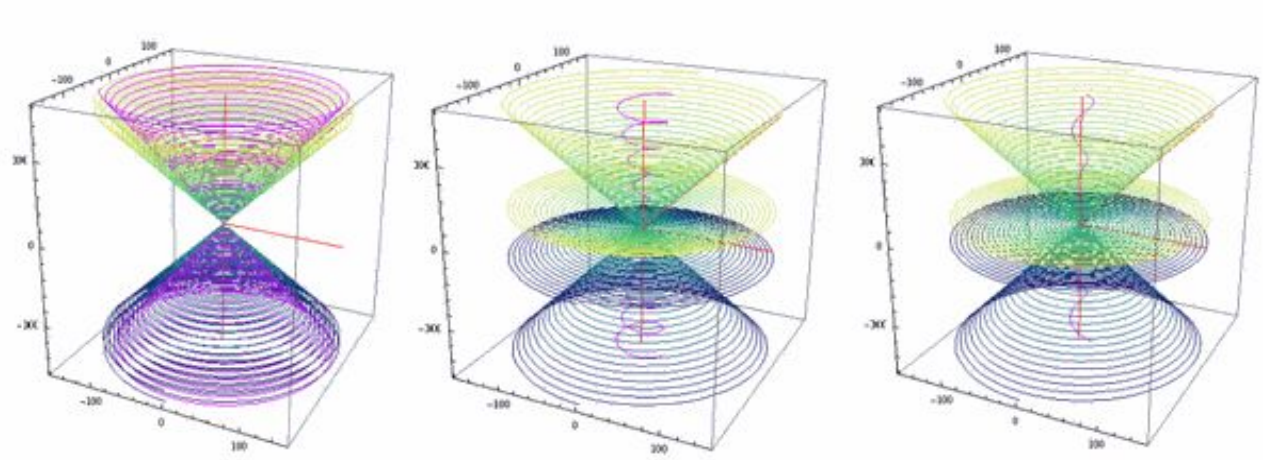
Pre- and Postfactor

These factors could be separated from the position and spread over the neighborhood. That is how a spherical mass behaves and than A^-1 is than its field.

The axis could point in various directions and generate structures, that are known under different names. If the mean axis of a system points into the timelike direction, we get timelike stable patterns, along the light-cone we get light and in the spacelike direction, it generates fields.

The mechanism is assumed as rotation of these elements, that twist their direct neighbour and distribute this rotation in all directions.

Euler cones



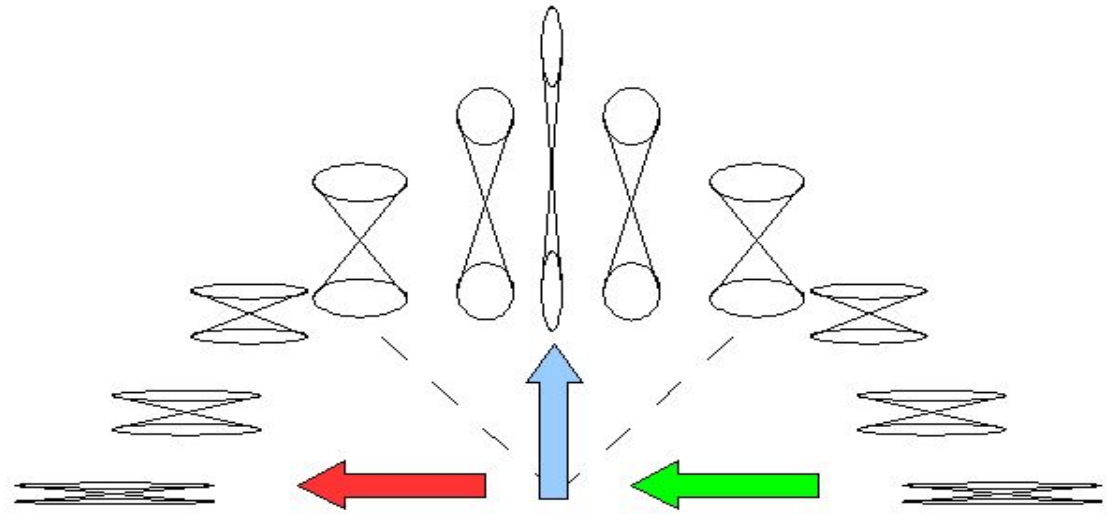
This is a small Mathematica(TM) program to illustrate the cones generated, if the Euler equation e^i*pi=-1 is multiplied by a time and mass factor:

```
scale = 8; s = scale; m = 30; f = 1/(1 + m);
Show[

ParametricPlot3D[{ t Sin[t], t Cos[t], t}, {t, -s Pi, s Pi}],
ParametricPlot3D[{ t Sin[t], t Cos[t], f^-1 t}, {t, -s Pi, s Pi}],
ParametricPlot3D[{ t Sin[t], t Cos[t], f t}, {t, -s Pi, s Pi}],
ParametricPlot3D[{ 0, 0, t}, {t, -s Pi, s Pi}, PlotStyle -> Hue[1]],
ParametricPlot3D[{t, 0, t}, {t, 0, s Pi}, PlotStyle -> Hue[1]],
ParametricPlot3D[{t, 0, 0}, {t, 0, s Pi}, PlotStyle -> Hue[1]]

].
```

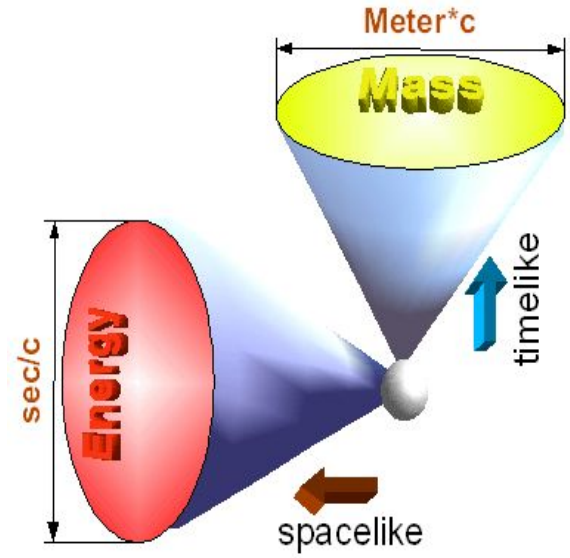
The Arc



This picture shall illustrate the relations of the angle theta to the expected form of a cone.

That is related to mass, charge and energy. The cone it is narrow and elongated for a massive object. To the side it is short and wide (our spreading over space). So more mass means more loops around, too, what means more electrons and protons. So more rotation (or mass) would stabilize the path of an object and cause inertia. Since this is a continuum, all angles should be possible. On the 45° line we have the behavior of light in vacuum. For light the two cones fall together and we have no mass or charge, but momentum.

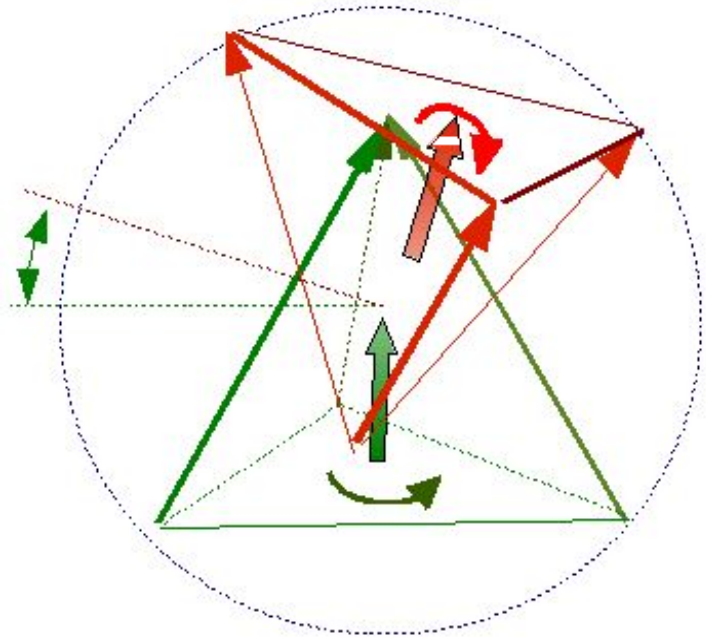
Energy



Energy is composed out of two different terms:

we have radiant energy **E=i*pc** and mass-energy **E=m_0 *c^2** .
The mass-energy is defined over the borders and the amount of rotations within. The system has a (positive) volume.
Since we would like to relate radiant energy to a change, but mass-energy to stability, we need to rotate the light cone to the side, to compare mass-energy and radiant-energy. Then mass is the timelike aspect and radiation the spacelike of a system. Both forms behave as inverses and could be transformed into each other.
(See A.F. Mayer: 'Geometry of time').

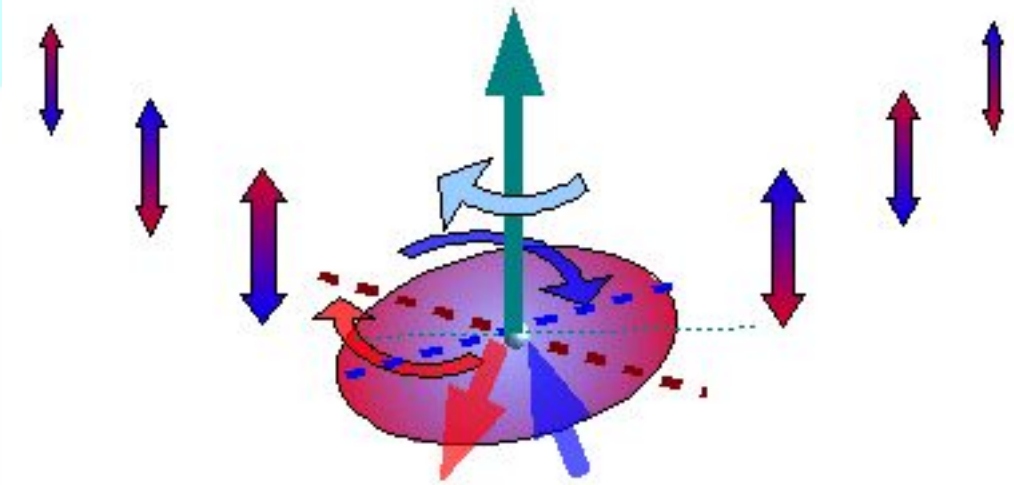
Waves



If a state is modeled as a standing wave, how would it look like, if it is not standing?

Imagine the ingoing and outgoing aspekt would be not in line, than we would have 'internal curvature'. That could be imagined as both aspekts put into an angle or otherwise deformed. This would make things move or radiate.

Waves



If all the axes of rotation are parallel to the world-line of the observer, we can't see this.

But if there is an angle between the two axes, the wobble (due to 'stress') would influence the neighborhood and we perceive this as radiation.
If we increase the angle, the rotation is more spacelike and less timelike, what would have an impact on the frequency. The more we raise the angle, the more the spacelike aspect gets visible, starting with low frequencies. It's like turning the object to the side, due to em-forces, gravity or because we make the system or the observer move.

Waves

The are three types of waves: longitudinal, transversal and torque waves.

Longitudinal waves are of the type 'push and pull', what is typical for sound waves. Transversal waves extend to 'left and right', perpendicular to the path, what is the behavior of light. The third part is related to torque. That is something like the waves along a helical spring, if small elements of the wire it is composed of, are observed.

Since spacetime is assumed to behave in such a form of helical screws, there should also be torque waves possible. Those have low frequency, since they behave like the observer itself, hence travel with him.

Wavelength

For greater angle theta the frequency is increased.

If we interpret the unit-sphere as a geometrical representation of the unit h, the relations between mass, frequency, angular momentum and wavelength could be directly derived.

Imagine a projection of the amplitude on the plane of observation. The frequency should be **f=sin(theta)/cos (theta)** . The wavelength is the frequency divided by c: **f=λ/c**

Particles

Particles are observed structures of small size.

Those structures are assumed to be generated through the anti-symmetric behavior of multiplicative connections of neighboring elements. Particles could be interpreted as specific geometric relations, that could be encapsulated into operators.

This means: we observe particles, but we do this, because we model geometric relations through operators, that act as if the relation would be created with an operator and treat them as things.

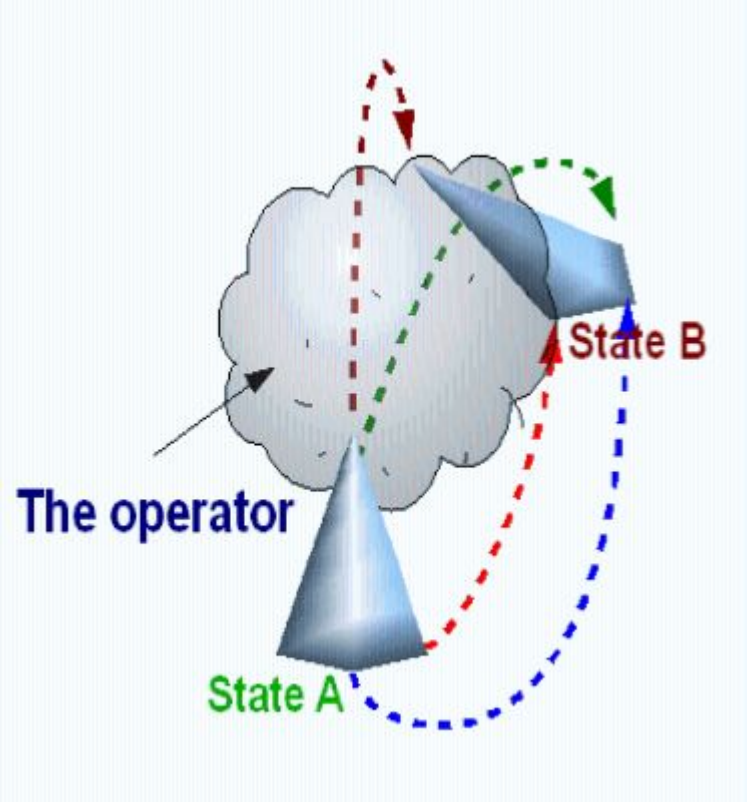
But these 'things' are only structures within a continuum, hence particles ARE operators. What is somehow the inverse of the current particle concept. This picture seems unlikely, but it would fit to the general concept here and some real observations require to accept such an idea: mainly the behavior of comets and the 'growing earth hypothesis'.
Particles are not assumed to be fundamental entities, that last over a long time. They are related to the behavior of spin, hence could be created, but disturbance never vanishes, so they stay in time.

Operators

In this model we interpret particles as operators, that would generate certain three-dimensional structures.

Operators are assumed to do something: they 'operate'. Those Operators are abstract constructs with the ability to do what they are designed for. That is more like 'objects' are used in object oriented programming. Such objects may have parameters and return values.

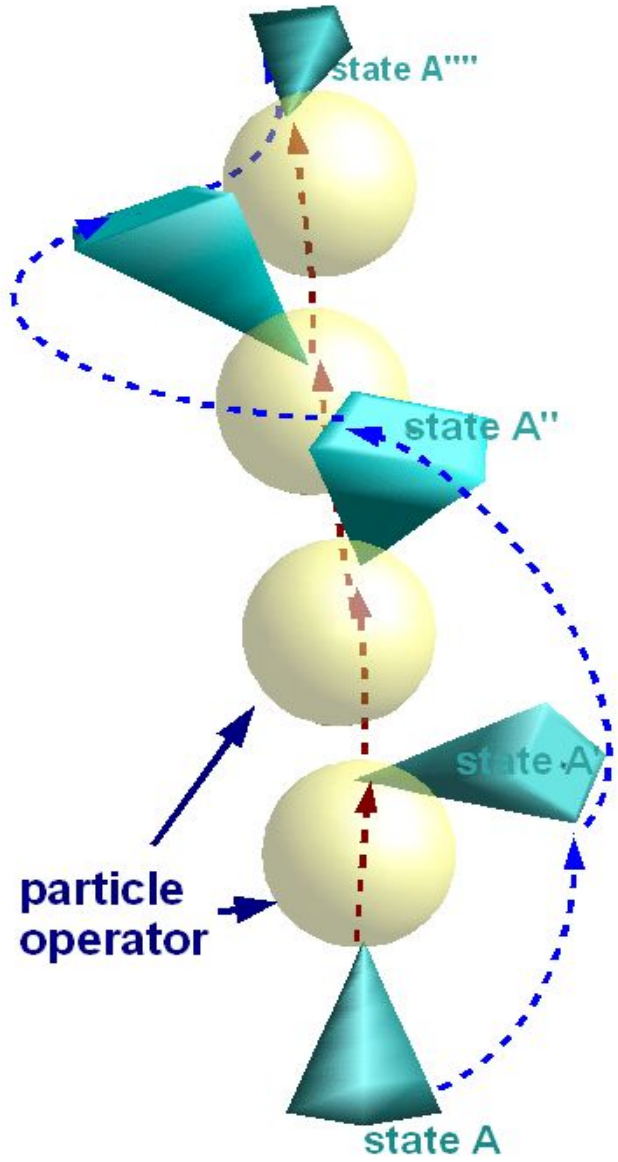
As this model is build mainly with geometric relations, those operators can encapsulate and perform geometric connections. An operator is a mapping 'device', that takes a pattern and sets up an other pattern somewhere else, according to its design.



Particles as operators

We can identify certain structures and to these structures we give names.

To research such a structure, we define operators, that would create such a structure.
So the first operator is called 'electron'. That generates a circle. It's assumed to create such a structure and move in timelike manner together with it. With this model we can address the structure and separate it from its kinematic.



Generations

A 'particle operator' acts on a background as kind of mapping 'device'.

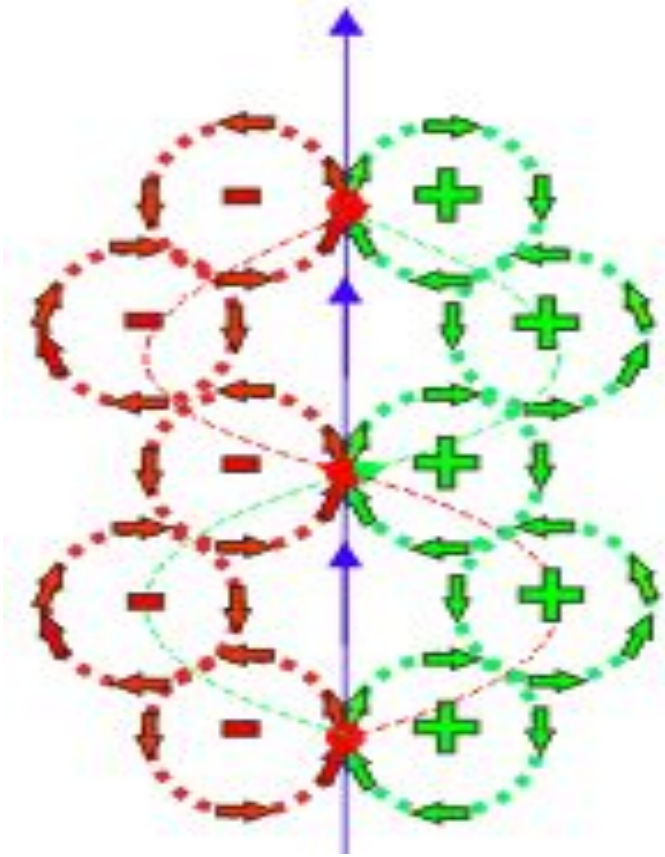
What do they map to where? A state is a certain situation. If that is stable in time, you can find it again and again. The operator connects this first again with the second one. This is how we come to the idea of a particle.
But it can not only map along a line (from a to b). There is the possibility to spread over an area (from a to (b,c)) or over a volume (from a to (b,c,d)).
This are exactly three generations (no more are possible).
The energy needed to map would be linear proportional, squared and cubique to some constant (plus some unknown 'formfactors').

Generations

Atoms

Atoms are structures that are stable in time and that we find repeatedly.

Atoms look like these structures or patterns, if you subtract the time component (to make them timelike stable). The mechanism is entirely different to current theories.
This picture shows in fact an atom. Remember handedness, that would make everything on the right negative, too. So we get two negative 'electrons' and a small core. Then multiply the picture by three and interpret this as ball-like structures.



[Rydberg Atom]

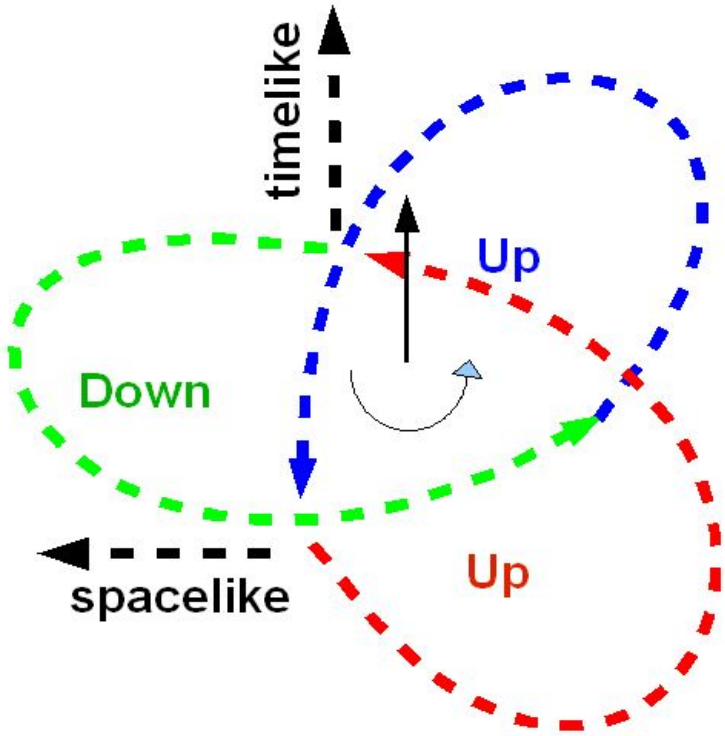
Quarks

What geometric relation would look like a quark?

Lets look at the rotation. To twist a sphere by two full turns, we have to twist twice around three spatial axes. So a quark is a operator that twists around a spatial axis.But why do they come in pairs? It's only one, but they look like two, since spacetime is antisymmetric. This is the same with other particles. We have pairs, because of antisymmetry, what would change the signs on both sides of an arbitrary direction.

Quarks relate to the triality and have a 2/3 behavior. They can't be separated, because imaginary rotation around a real axis is not possible and they are a part of a single structure.
Recognize the names given to quarks: up/down (orientation of a line), bottom/top (about an area). The third family should be called in and out (of a volume).

Protons



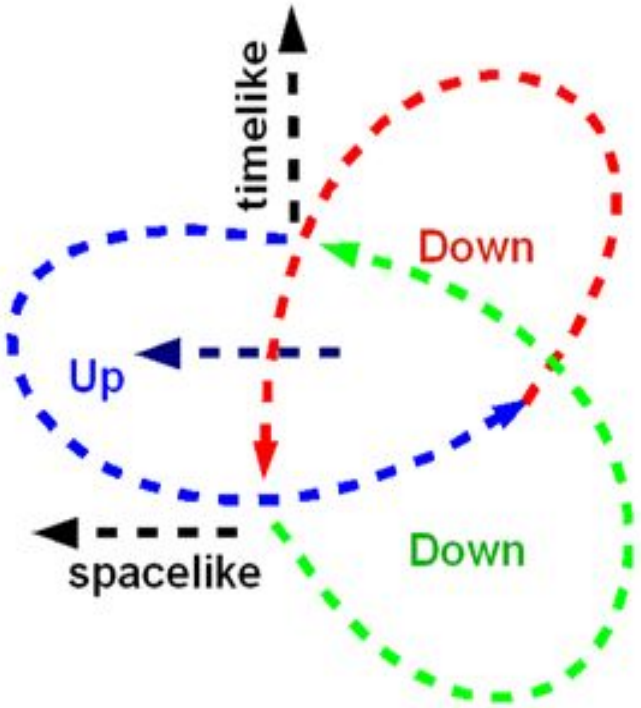
Antisymmetric spheres have two types rotation: positive and negative.

A proton is positively charged. We treat it as at rest, so it's spinning around a timelike axis. It's mass term is in line with the timelike direction and is depicted as 'tri-foil knot'.

The 'proton-operator' maps that kind of pattern into the future. It would rotate the hyper-meridian back to origin. That needs two rounds and has 'spin' of half.

Proton spin

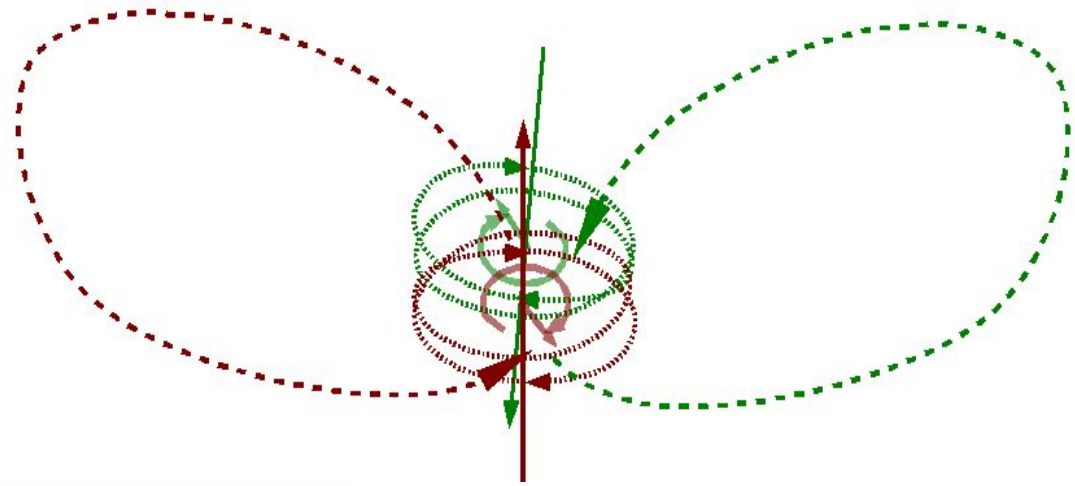
Neutrons



A neutron is neutral. It's build out of one up and two downs. It's like the electrons circle through future and past, so it's not charged. That means the neutron is rolling like a barrel and twisting around a spacelike axis. The 'neutron' operator maps the hyper-equator back to origin after two rounds. It's like a proton shifted to the side.

Neutron

Electrons



An electron and a proton in an atom are 'one thing' .

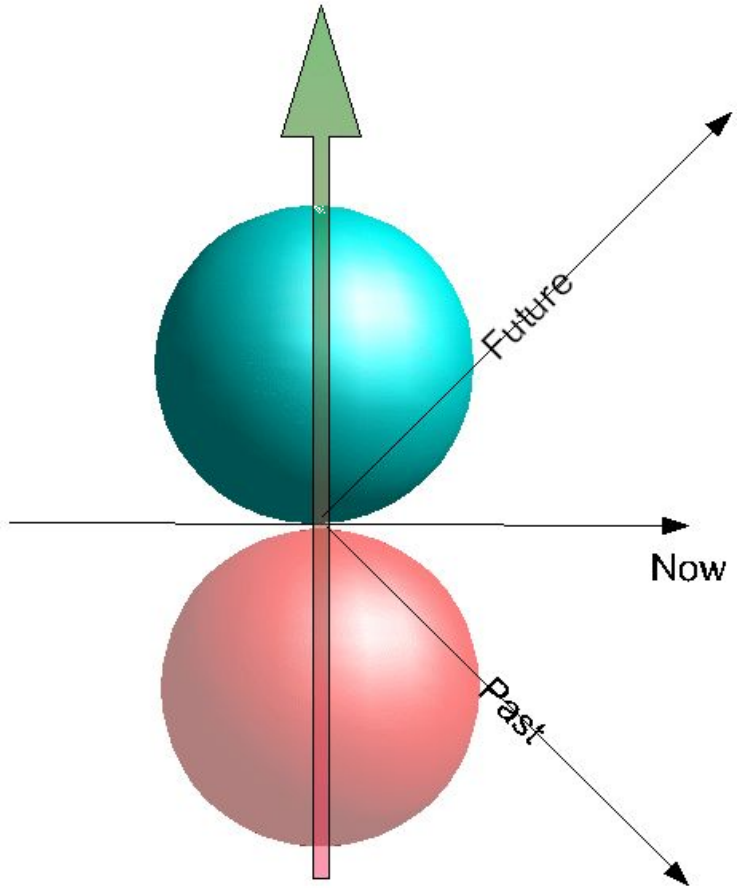
The electron is a full circle over a spacelike plane. The left and the right turn have the same sign, but different 'spin', so we get two kinds of electrons. Antisymmetry would make the left part negative and the right turn negative, too.
The electron represents than the aspect of a potential, what is the outermost point of a standing wave, composed of rotations, the point of highest angular momentum and lowest momentum.

Photons

Light is a structure of disturbances moving through space.

It moves away in spirals away from an event, because once in movement it 'forgets' that it's spacelike and acts timelike then. It twist its spacelike neighbors, but what those are is altered upon movement. This is like the screw a plane would perform, if you would set two rudders to maximum and let it spiral through the sky.
The diagonals build the lightcone. You can see these circular structures on a lightcone, with opposite spin on both sides of the observer, what you might interpret as photons. A photon is a 'packet', because of its origin from a state, hence it inherits its properties. Since a circle may or may not be closed, a state denoting a full circle could be called a distinct entity, that pops in and out of existence. Since those states are only stable if they fulfill the standing wave conditions, they tend to 'snap' between those states. The photon is than emitted as remainder of the angular momentum.
Spacetime itself is not 'quantized', but smooth.

Uncertainty



If 'space' labels actually the past light cone and a state has more or less a spherical shape, then the concept of space breaks down at the point called 'here and now'.

That is like pushing a ball into a corner. The smaller the ball, the closer you can get it into that corner and smaller balls refer to higher frequency.

Uncertainty

There is something 'uncertain' within this model: the observations.

There is no inherent uncertainty in this model, but what we observe is somehow 'blurred'.
We assume a unit sphere a representation for the Planck constant h. It is the proportional factor between size and frequency.
A sphere in this model is described by a circle on a hyper-sheet. That has a volume, since a shadow of a hyper-sphere is a sphere. That should contain energy and multiplied with time, we get an action. That is somehow the restriction to observations, since such spheres could be described over its center, but this center is not part of the sphere (spheres are hollow, opposite to balls).

Uncertainty principle
Bohm interpretation

Uncertainty

We have three timelike relations in what we call 'space'.

There is the observed space or the universe, seen through the past light cone. Second is the future cone, that is the future of an event and where it could be seen.
The now of an event is in the spacelike direction. This is the direction a material object is influencing an other.
These directions are usually treated as one and the same, but they are evidently not, since time makes a difference between past and future. So our 'world' does perform a hyperbolic curve of observational relations, between spacelike direction and the past light-cone. Its parameters depend on the scale of the system we observe. The 'real' connections are spacelike, instantaneous and imaginary, but we perceive this only in the direct vicinity, because distant entities we could only see and not touch. The curvature of this hyperbola is a measure of its frequency: a flat curve has no time component, while a pointing one has a high frequency.

Particle mass

Where does the particle mass come from?

Mass is the timelike energetic content of a structure.
It is determined by the sum of the angular momentum within a structure, what are squares of amplitudes. This is introduced over the cross product in the multiplication of four-vectors.

For particles we have to look, where this amplitude is pointing to. Than we can split off the part, that is radiating away and get the rest mass of the particle. The mass is then related to the cross product and to angular momentum like in a gyroscope, because velocity in this picture of spacetime is an angle and more angular momentum is known to stabilize the path, an effect we usually call inertia.

Sizes of shadows

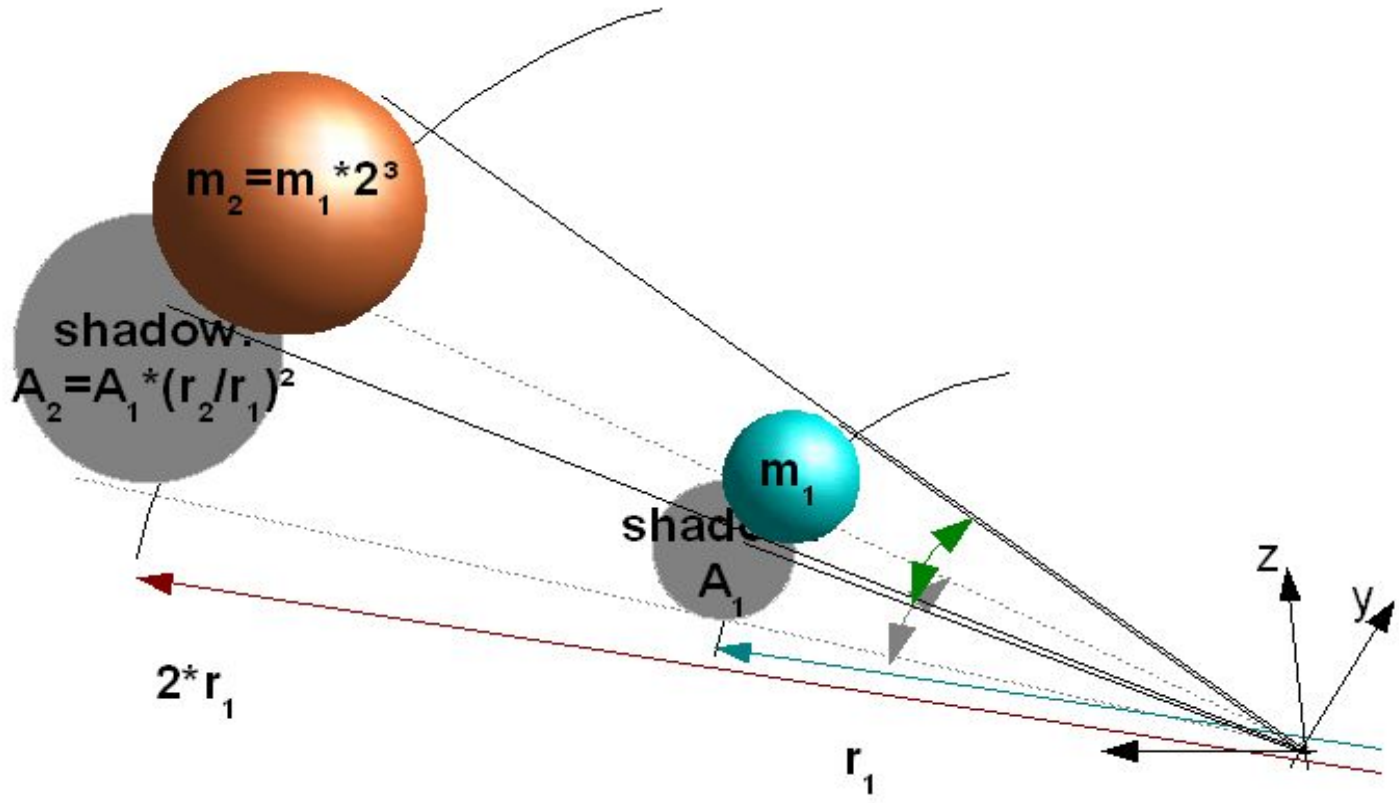
A projection of a pattern on a hyperplane is applied by the Cauchy theorem.

How a pattern acts on an other one depends on the 'shadow' area or the inverse square law. The form to shadow is depending on the orientation, since we could see a Kink surface as a sin or as a circle.

It's interesting, that within this theorem we find the first mentioning of probability, that we find in many equations of QM.
There seems to be a connection to quantum-mechanics, what makes extensive use of probabilities.

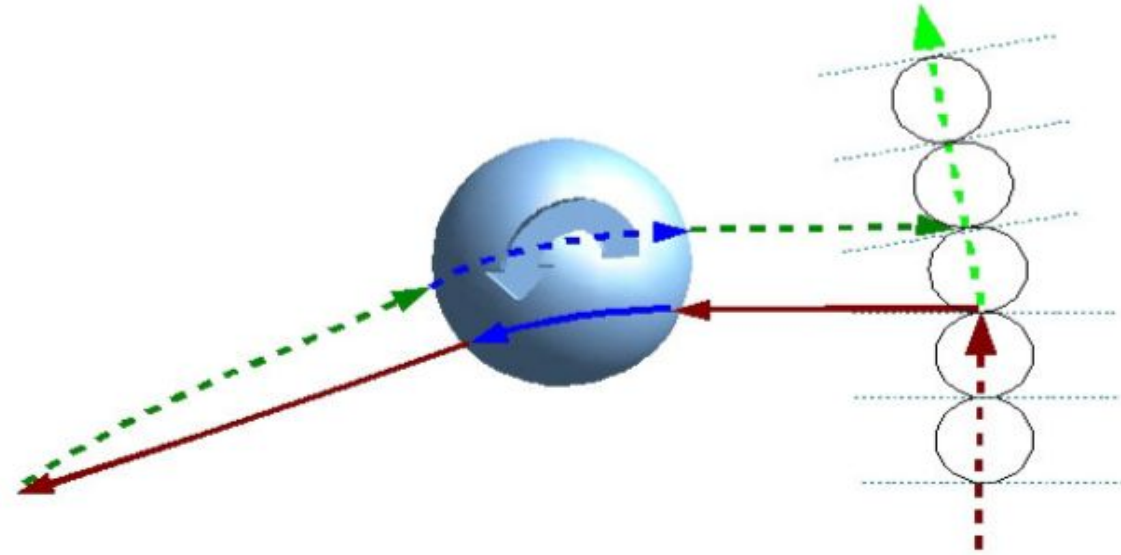
Cauchy theorem

Inverse square law



This diagram shall illustrate the inverse square law.
It's ubiquitous and describes the dependency of a relation as a force from the percentage covered by an object of the whole sphere of sight. The volume increases cubic with the distance and the forces decrease quadratic with distance and the shadow area of an object would follow such a law.

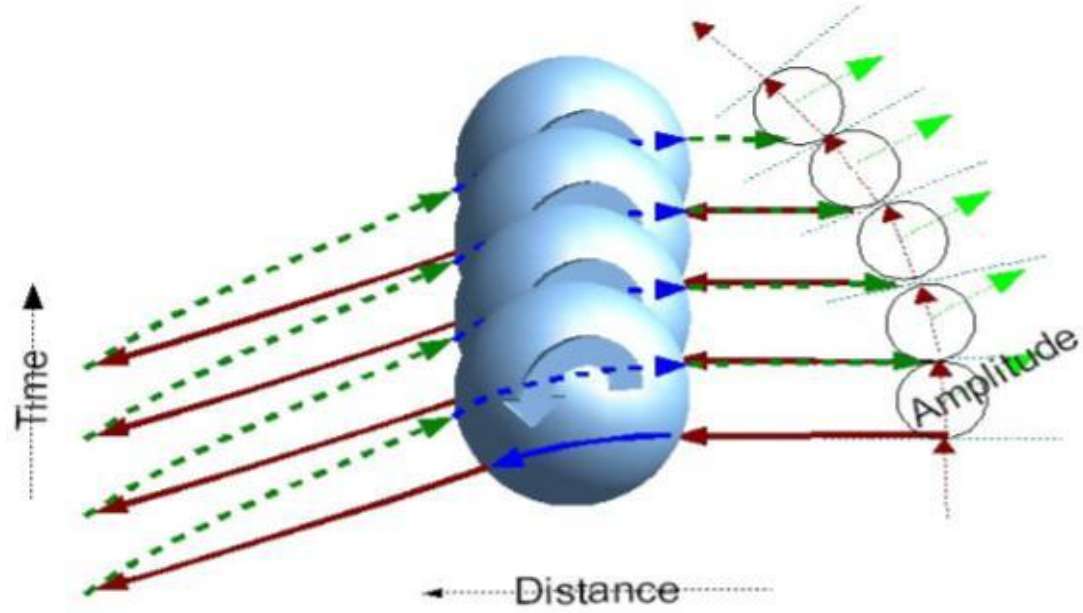
Fields



This picture shall illustrate how objects react on other objects.

Imagine an object, with internal rotation, than this would deflect these 'influences', that would need longer on their way and recreate the object somewhere else. The rotation acts in opposite direction on its way back due to antisymmetry. Since the objects are influences overlapping in superposition, the worldlines gets curved.

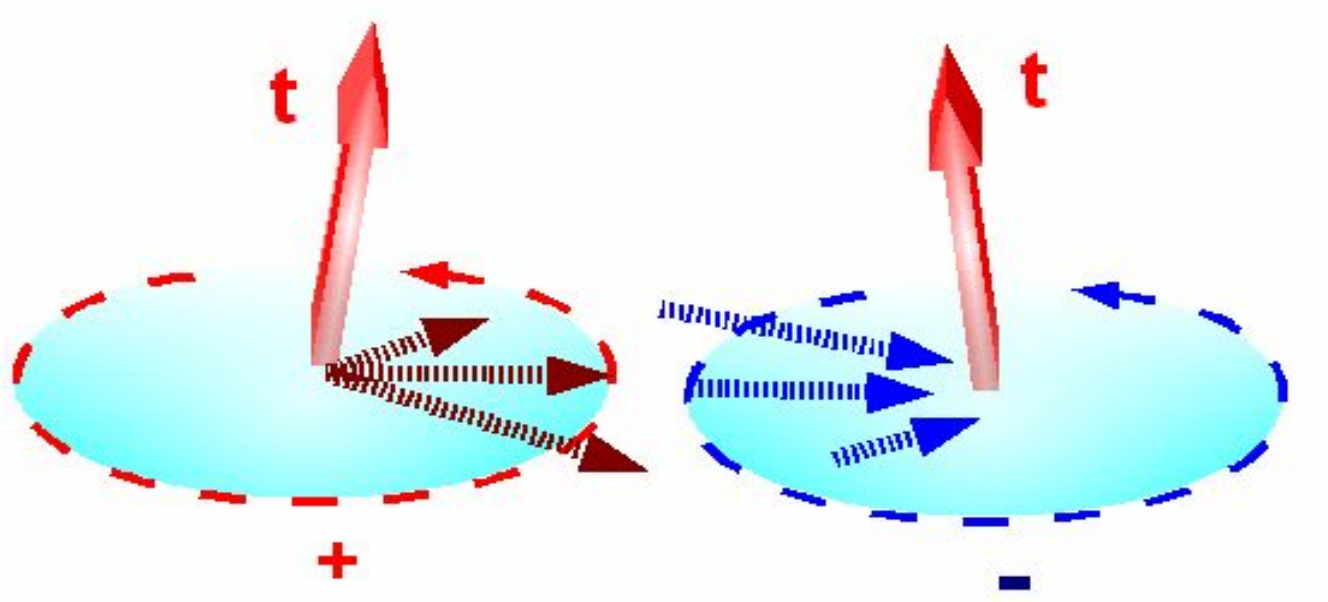
Fields



This (symbolic) picture shall illustrate how the effect adds up in time.

We get a parabolic curve of a free falling body. The curve does not seem to depend on the mass of the test body. The amplitude of the test body stays aligned to the observer.

E-field



The e-field acts between bodies through interactions in spacelike direktion over the 'rim'.

That is the connection through rotations around the timelike axis, what is the anti-symmetric realm. The magnetic field acts over a relative movement, what is an angle in this model .

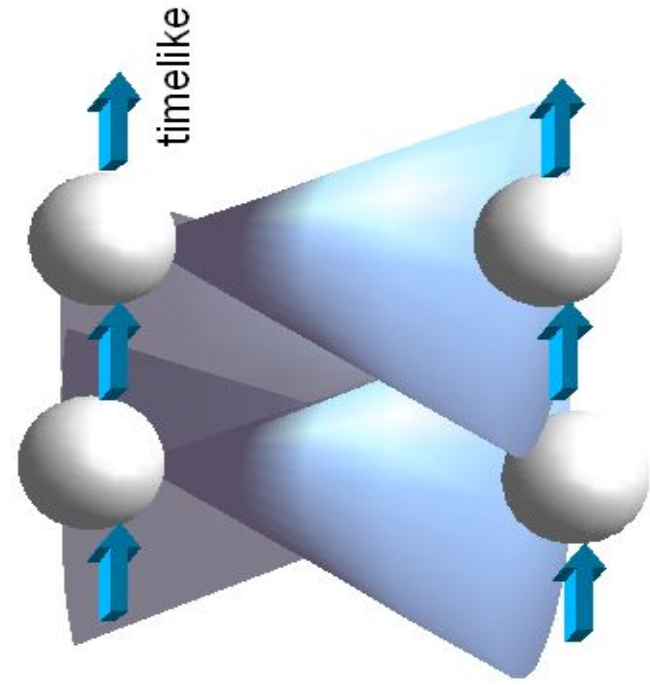
em-field

The em-field consists of two components, that could be imagined as properties of rotation in an imaginary field.

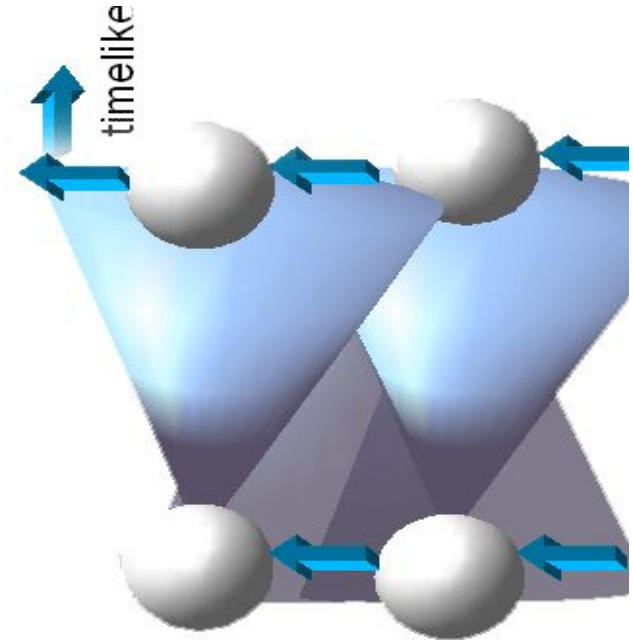
If we call the stable asymmetry 'charge', than the aspect of rotation would be the curl and could be interpreted as magnetism. To a cone, a plane perpendicular is timelike stable. A static field would spread over this plane (we multiply that by three) and the rotation is invisible. If the orientation of the plane is shifted, than the aspect of rotation is not invisible.
The e-part is the potential part, while magnetism is related to movement in a standing wave. For light we have no mass and both parts circle around each other in a helical form. Since light is limited to a certain direction in respect to the source (its future light cone), the outcome of a shift of the timeline would be the altering of the properties of light. Than other influences would fulfill the requirements of light. As we define space with light, the observed space is altered, too. What stays constant is the speed of light, but for an other subset of influences.

Gravity and em-force

This picture shows two gravitating spheres.



They gravitate by timelike interaction. If we connect the positions of an object in free fall, we get their timelike path.



To compare it to Coulomb force, we could shift the picture by 90 degree and see two parallel light cones. This is an inverse and turns weak gravity into strong em-forces. Since we had to invert the antisymmetric arrows, we get two even charged particles, repelling by a force, supposed to be as strong as gravity is weak.

Gravity 'mechanics'

Gravitation acts between bodies through influences upon the timeline.

Imagine a standing wave, composed of two antagonistic relations. That stands still under certain conditions. That is homogeneity of the environment.

Since timelike stable is what we call mass-like, these structures depend on the timeline of their domain. If these spread apart, as the normals to the Earth surface do, the lower points of these waves reunite earlier than the upper points, what makes these structures move downwards. Since the structure (a testbody) itself acts this way, it would bend the normals of the Earth, but only very weakly.

This behavior could be compared to an elastic ring and the normals to elastic rods. High gravity means stiffer rods and higher curvature. Higher test mass means stiffer and smaller rings - or higher frequency and greater energetic content.

So for smaller structures we would expect gravity to be stronger because of higher curvature, only we usually don't call it gravity then.

Gravity and Heat

The meaning of heat is the average alignment of worldlines of the elements of a system with the worldline of the observer.

That could be related to internal degrees of freedom, due to rotations of a certain state around and in respect to the timeline.
A twist of worldlines is equivalent to a velocity within the space of an observer. So the velocity of a particle is a certain angle in spacetime.
This angle between the particles axis and that of neighboring elements is assumed to have an average distribution depending on the temperature.
The average of those angles is called heat. For zero temperature the axes are all aligned.

Heat is an 'over all' relation. It characterizes a system in a statistical way.
Gravity is also acting as an all-over sum, but on the timelike direction, while heat is acting over the spacelike connection.

'Dark energy'

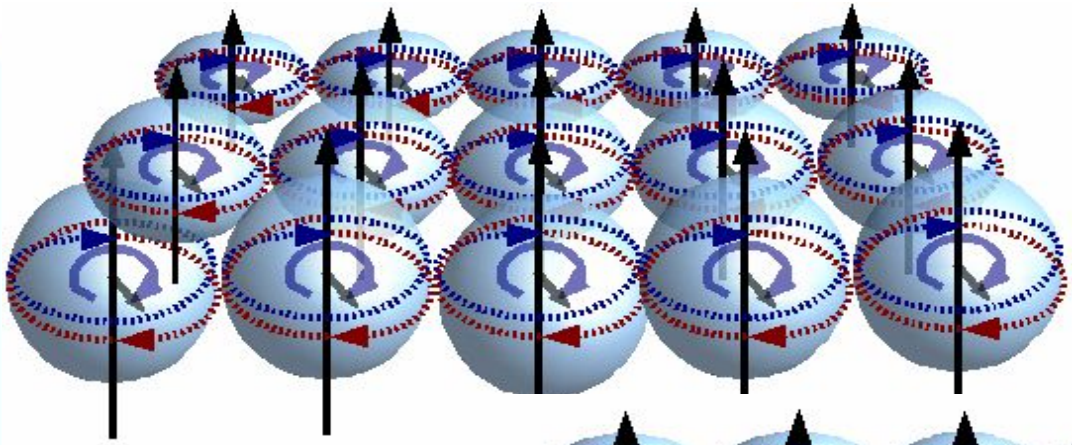
Dark energy is rotation around the timeline without heat.

Imagine rotating elements and their scalar part doesn't change axes or amount over distance and time.
That can't be seen, since the rotation is acting like a static field, but that is not visible by itself.

This is dark only the case of parallel axes for observer and observed system. That is the opposite to starlight, where the axes are parallel, but we see stars, that represent heat and gravity. That light comes to us through the light cone.

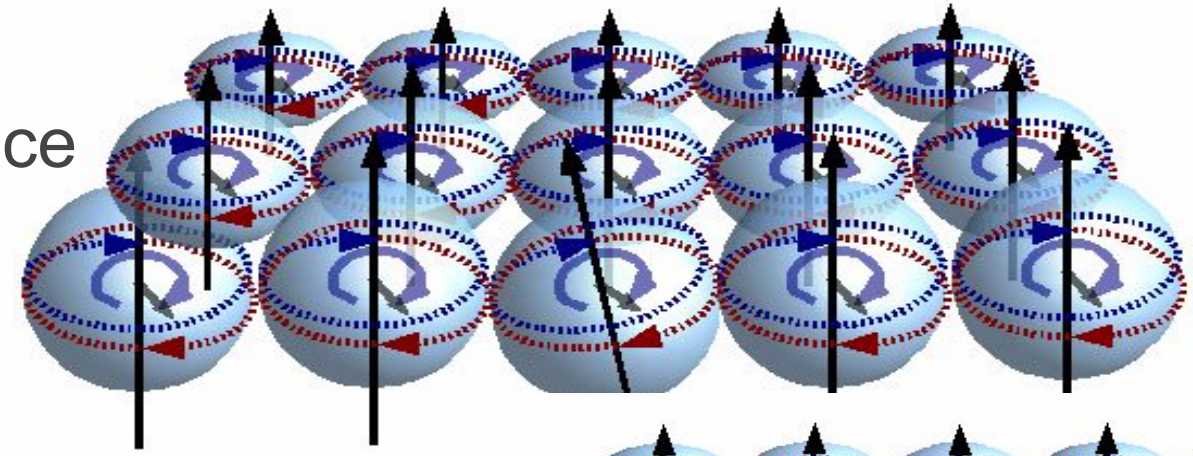
The rotational aspect is static, because it represents an inverse to the timeline, hence is timeless. In the imaginary direction we can't see neither.

'Dark energy'

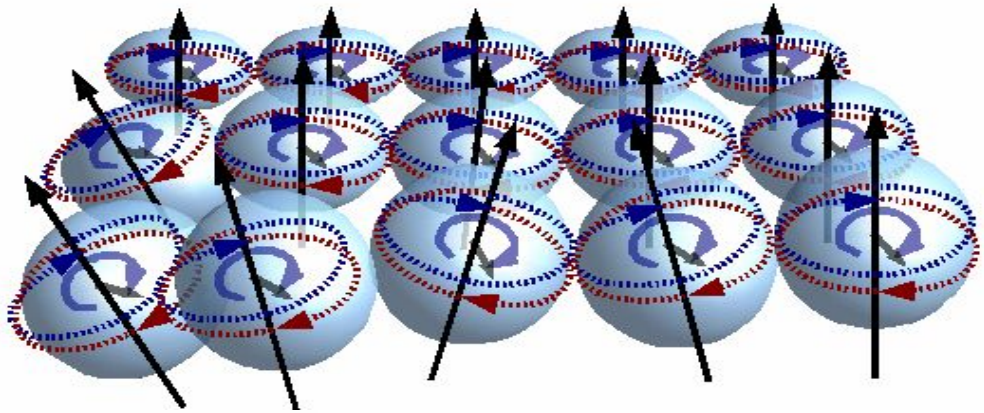


'dark'

disturbance



'not-so-dark'



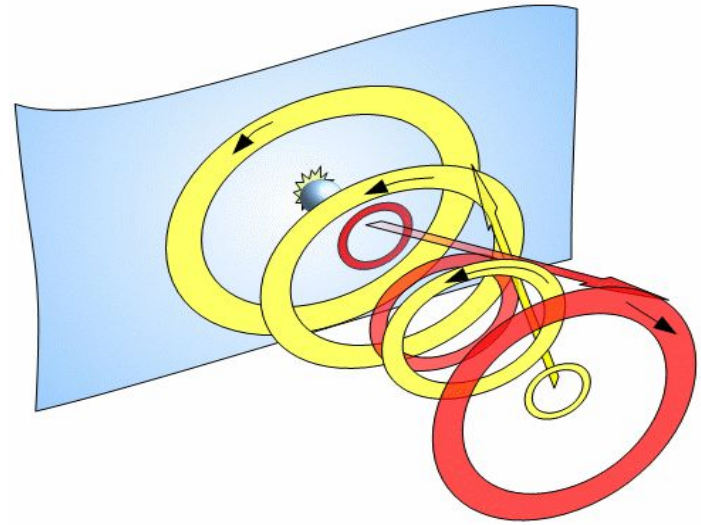
Radiation and Matter

There is a relation between particles and radiation, that is quite unexpected: matter and radiation seem closer related than we think.

Radiation is here meant as the radiation term and matter as a structure with inertia. We could create such patterns out of vacuum states by disturbing the orientation of worldlines. Gravity has this feature of bending worldlines. The em-field could bend worldlines, too. Those situations create disturbances or structures in spacetime, that we can observe.
We can see more phenomena of this type: the earth is growing somehow. Suns don't seem to run out of fuel. Galaxy curves do not fit to any kind of Newtonian gravity. Black holes have jets. There is particle pair creation and massive particle showers in accelerators, what violates conservation of particles. So we would need an other model for matter itself, that would fit to those observations

particle showers

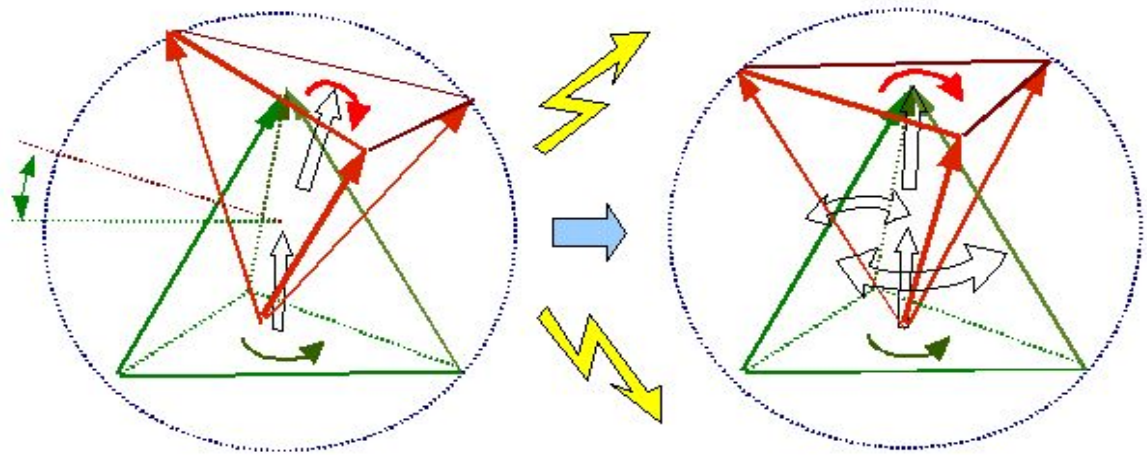
'Trapped' disturbance



Matter is modeled as 'trapped radiation' .

The systems would perform rhythmic interactions, because what is leaving one system must enter an other. If the neighbors are twisted and a state would perform circular motion, their influences could return and get 'trapped' at the center of this rotation and those states could carry angular momentum. The direction would be kept, since only at those spots the patterns are recreated, where the length of the return path 'fit together' at that spot. A deflection through other objects nearby would make the pattern move away from its timelike path. The temporal movement is subtracted in a stable situation and such a pattern could be self-centred (or 'trapped').

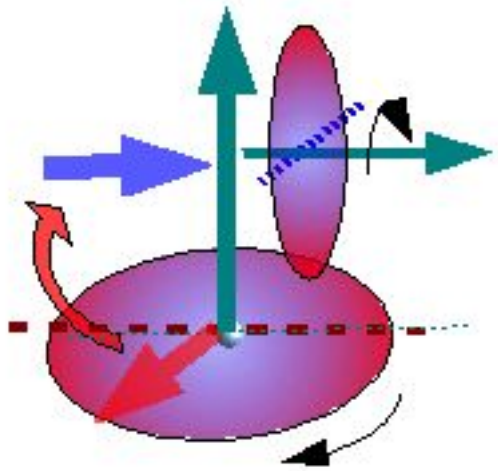
'Trapped' disturbance



Nature tries to minimize the the disturbance in space.

It is energetic expensive to have a singular particle. Energy can be kept only in timelike direction within an object, because of the dependency of the distance to the core of rotation. Greater radius means higher angular momentum, hence higher energetic content. So rotation tends to stay about certain cores.
Rotation will target any object, even its own source. In this case the energy is disturbing more space. In a crystal lattice we have less energy in space, than in the case of a single particle.

Monopoles

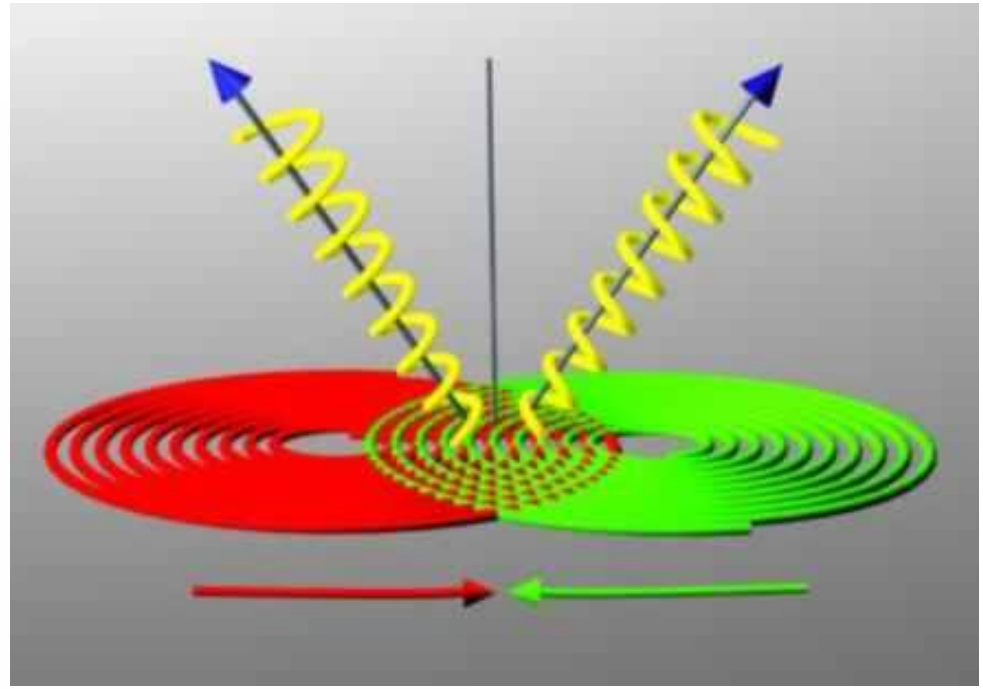


If we flip a state to the side, by a high acceleration, it would become a metastable 'monopole'.

Such a state is like 'rolling' along the timeline, what is metastable. Since the red arrow refers to a potential, a very high voltage could possibly create such a state.

Light Leptonic Magnetic Monopole

'Un-trapped' disturbance



The opposite could happen and states disintegrate as waves.

This a reaction of two spacelike separated systems with one mirror-symmetric to the other, generating beams of radiation. This could be treated like a Feynman diagram, with two anti-symmetric particles interacting horizontal and two waves-packets leaving along the diagonals .

Aging matter

The idea of aging atoms is violating the idea of real, lasting particles, but fits to the behavior of observed systems.

There are obviously planets and their creation is still debated.
For these reasons, the 'growing earth hypothesis' could be correct:

- The spindown of earth (the year gets slightly longer)
- There are heavy elements and sediments near the surface or on mountain tops, while light elements seem to come out of the earth in volcanoes like methane, carbon-dioxide or water-vapor.
- Animals and plants were much bigger a some hundred million years ago. (A simple reason could be lower gravity due to smaller mass, what enables those animals to carry more weight on relative weak legs.)
- The continental drift could be nicely explained over a growth and no subduction would be needed (together with formation of mountains, rifts and location of fossils).
- The findings of minerals or metals, the properties of volcanoes, lava and the evaporation of gases from inner earth.

Quantum gravity

Temperature of space is related to gravity.

'Quantum gravity' attempts to build spacetime out of quanta. That seems to be impossible, because spacetime is meant smooth and continuous and the nearest quantized behavior, related to gravity, is heat. That is the related topic wick-rotated from gravity.
Matter is, what is stable in time, hence is timelike.

The quantization requires a feature, that gets lost in timelike direction. A rotation in that direction is degenerated to a circle of zero diameter. The property of a sphere is not visible in that way. Time could be measured in any fraction, hence could not get quantized.

Black holes

A black hole is just an area of spacetime without specific features.

The light from there can't reach us because the curvature is exceeding a certain angle.
Since those elements behave like tiny gyroscopes, they display their mass term at curved worldlines. We look at them like from the side, hence see them radiating.

But being there at the black hole in free fall would be a completely different picture: To a free falling observer space time is flat!
So black holes are just a way we experience curved spacetime.To get the right picture, we had to uncurve and unroll spacetime, and then we would find nothing specific in such an area. But we could find such a patten somewhere else and seen from there, a black hole would be here!

Black holes

The phenomenon of a black hole could be easier and more satisfying explained, if light travels along the light cone and a black hole is a vortex, that shifts the lightcone in an other direction, from where we are not able to receive the light.

It is pointing away from us and light gets 'black' (for us!), because it's causal future is pointing away from us. That is the usual behavior of the future, that we could not see it, but only the past.
Because the bending of the light-cone makes space look contracted and than distance combined with curvature would gain vortices, that we call black holes.
To figure out the situation 'there', we had to expand the vortex first, to estimate the 'real' distance (=uncurve spacetime and re-expand the compressed length), because otherwise we would calculate with wrong numbers. Than we find out, that these objects are nothing more than an optical illusion, stemming from curvature of spacetime.

Quasars and Pulsars

What we call a quasar is a whole galaxy, rotating in a distant region, where the timelike axis is pointing away from us.

If we would think about gravity as acting on a body in free fall, than spacetime is always flat in respect to that object. This is important, because gravity is acting on that body and not on distant observers. So we have to treat all celestial bodies in their own frame of reference (and not in ours) and we had to treat gravity relativistic, too, no matter if the object is fast or not. That would include the earth.

How would a star look like, spiraling near a black hole?
It would look like a pulsar. What is 'blinking' are binary stars, spiraling around each other. Now we use SRT to calculate time-dilation and we could figure out the local time at the quasar compared to ours and would find, those are just usual stars.

Jets

If space gets curved, those light cones and their main axis bent away from us.

When it bents away, the 'edge' of the light-cone could still be visible, what would look like a jet.
Imagine light being radiated away in the form of such cones from an object. The objects have a direction in their frame of reference. If that cone bents away, we would see matter radiating. If it's bend away more, then only a small bit could reach us, perpendicular to that curvature. But than we experience that as matter again.
How does that look like near the black hole? It would look like a jet.

Jets

Big bang

The big bang violates features of spacetime: having no 'form' and its idea of uniform time.

It is possible to treat time like a vector, but we shouldn't forget, that time isn't. We experience a direction of time in a way, that points from past to the future. That is a feature of spacetime in general, not only of time.

A vector is a property of space to describe a spatial relation. But time may be oriented, but it's 'length' is an interval and not a meter. We observe only a part of spacetime, hence cannot derive the age of the universe from our own state of being, but on all possible observers. That is not possible, because we can construct worldlines, that do not intercept.

The interesting question would be, what is happening in the part, we couldn't see. It could be possible, that there are regions, that have directions of time as we have axes of space.

Redshift

For redshift, there could be an other and entirely different explanation:

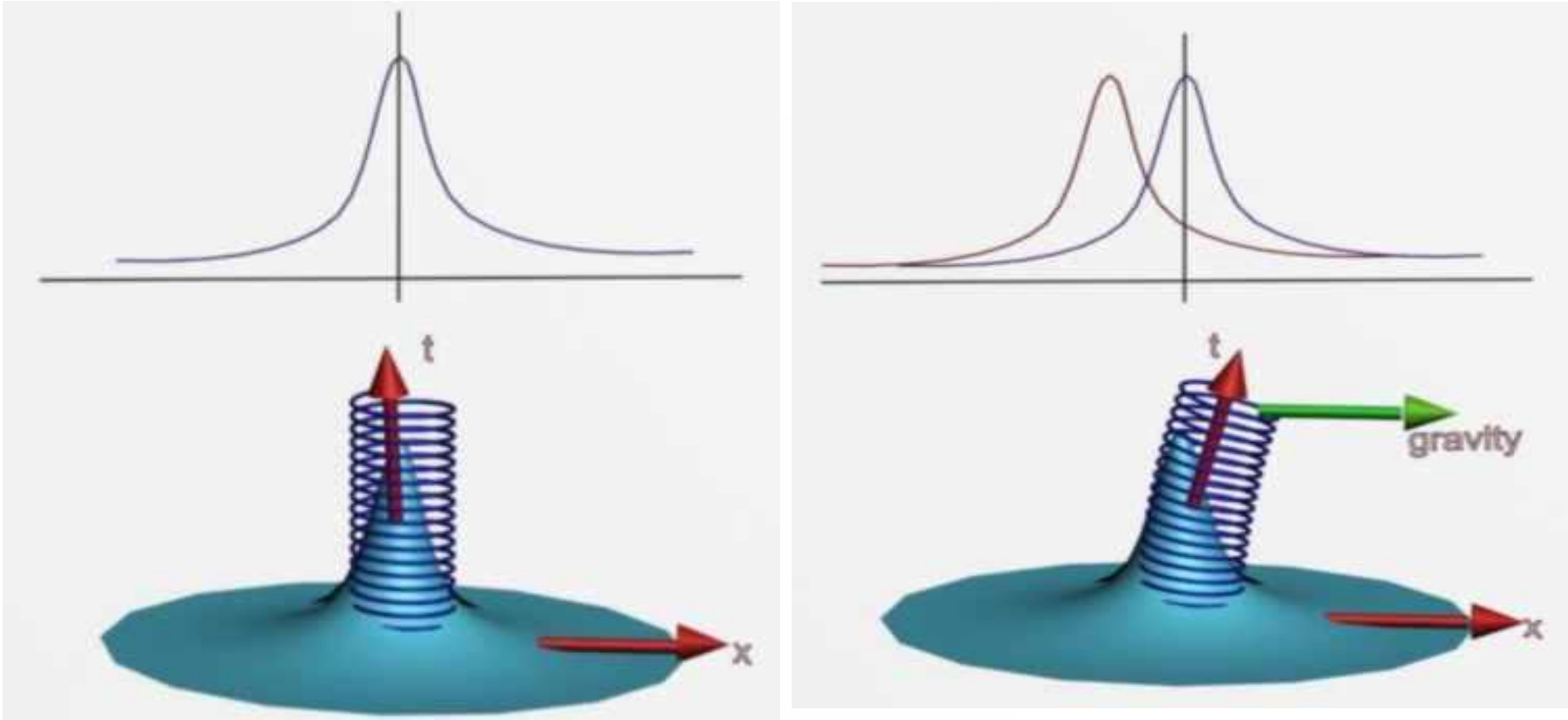
Think about the universe would do in the whole, what atoms do on small scale. That is a constant shift of two distinct states depicted by the two tetrahedrons. That would mean, that the universe in total undergoes a shift, like that from imaginary to real and vice versa.

Than it would look like a big bang, that crates space and objects were forming in it like drops in overwetted air. That is a process of a 'condensing universe', where celestial objects form like drops in air. Since depth of space means age of objects, too, we would perceive this picture as if the remote objects were colder than expected.

CMBR

CMBR is radiation coming in microwaves to us in all directions (almost) evenly.
It has a perfect spectrum of black body radiation. It is assumed, that the strength of influences in respect to their timelike axis follows a thermal law like a Gauss curve - depending on the properties of that particular state.
The temperature of space is low (2.7 K) in the vicinity of Earth.
If we have an aspect of rotation in free space, than gravity would bent worldlines and the rotations in free space starts getting visible, because they are then more light-like, rather than time-like and light is what we see. Frequency is related to this angle. Since the angle is small, the frequency is low.
That is the relation between a straight helix and a curved line. For the straight line, the helix is static (circles around the observer). Gravity would bend the observers worldline and than the helix is pointing more into (real) space and starts to get visible.

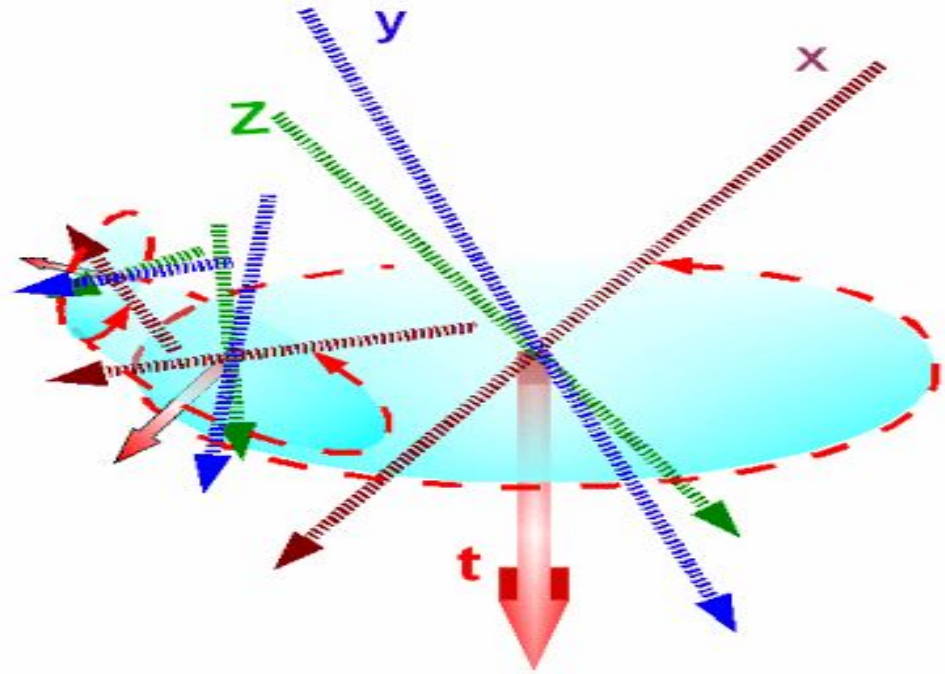
CMBR



If there is a spin around the timelike axis, that would appear as radiation under this considerations:

Gravity acts upon a mass, but not on the fields. Than gravity is bending the worldlines and the radiation gets visible with a thermal spectrum, that stems from the strength of the influences over the angle to the timeline.

Fractal vortices

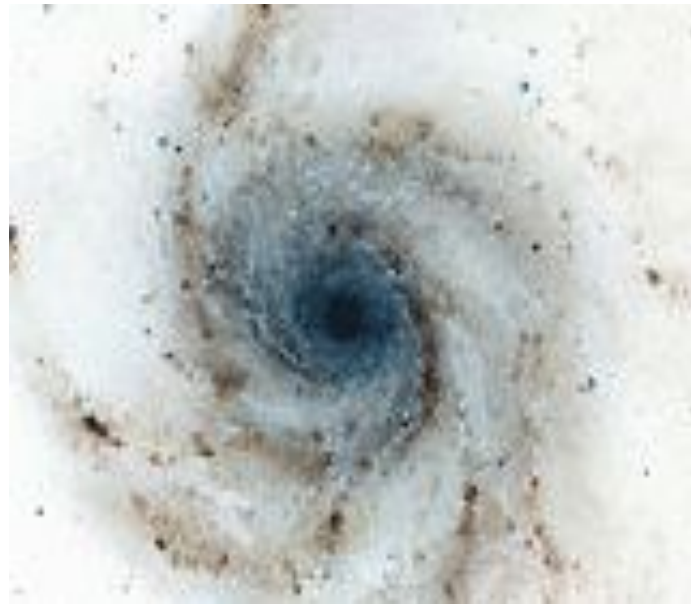


This model has a fractal behavior, since it doesn't provide a 'natural scale'.

The scale is provided by the observer and the system in question.
All things rotate, but not with the same velocity. A spinning skater stretching out the arms to the top and then to the side could illustrate this relation. The angular momentum is conserved, but the velocity changes and with it the relations between mass, time and space.

about bi-quaternions and fractal spacetime

Fractal vortices



How do fractal vortices look like?

Those spiraling forms look very similar:
spiral galaxies (the picture is a negative image of a galaxy), a whirlpool, hurricanes, water in a drain, maelstrom, electromagnetic vortices or tornadoes.

All of them are fractal three-dimensional structures. They are assumed to be the natural behavior, if we superimpose systems of different size. They all have a distinct axis of rotation and internal substructure with own axes. The direction of rotation is left-handed, if we are following the direction of time, pointing into the future.

The 5th Dimension

Galaxies

There are two kinds of galaxies: elliptical and spiral.

Stars are 'born' in the spiral arms of galaxies. In elliptical, there are no arms. But there are no galaxies in between. This means, there are spiral-arms, or there ain't. If there are arms, the stars are 'born' within the arms. But that can't be possibly true for the current model of star creation, depending on clouds of dust and gas, that gravitates to stars. There are arms, but that doesn't mean there are no stars outside the arms. Only the new stars form within the arms. We could think about a different system for star creation. In this, the new stars form out of former gas giants like Jupiter, due to growth. This 'growth' contrasts the standard models of cosmology. It also violates the so called 'particle-concept', because growing planets would need particles to get into the planet from somewhere outside.

Gases

Best for calculating fluids (and gases!) is, to forget the atoms and look only at the energy flow.

When we look at the law for ideal gases, then we will find no term for the mass of the molecules. Isn't that surprising?

If we think about gas atoms as tiny billiard balls, bumping against each other, than this is the wrong idea. The speed of sound is higher that the speed of the atoms. So, there is something wrong. Best would be, to forget the atoms in such calculations. This one of the main reasons to give up the particle idea and replace it with a continuum. This is replaced with a continuum, where objects are discontinuous structures within this continuum. Hence this continuum could provide the bonds between those structures.

ideal gas

Fluiddynamics

All matter is somehow a fluid, maybe spacetime itself, so fluids could be calculated with the same methods as spacetime.

Setup a sheet of cells, twist them in the appropriate direction, setup the amplitudes to every cell and number them.
Lets perform timelike steps, and pile up those sheets in a stack. Now we should look, where every 'cell' went and connect those points to its trajectory and we have our fluid modeled. This is assumed to behave with infinite accuracy, depending only on the amount of cpu-time and its power and on the accuracy of the setup. But we don't need to care for things like heat or friction. That is supposed to be modeled within the algorithm. And we could model all kinds of fluids under any kind of circumstances. This simple algorithm is something like a tube, but other forms are possible, but would be more difficult. To turn pattern into flow, pattern recognition like CDA could be used.

Solids

It is quite unexpected, but according to this model, it depends on the state of the observer, what is observed as matter and what as radiation.

Objects have both aspects. In case of solids the atoms are the real part of the pattern and the bonding forces the imaginary. Matter is assumed to be part of an ensemble, that consist of spacelike separated objects of the same kind, that are all arranged in roughly the same direction. Their similar timelike behavior would build an overlay pattern, that looks like a lattice in the space of observation. If we would exchange bonds with knots, the structure would be a gas. Both relations in equilibrium would build a liquid and we get the three states of matter. Since the change of the direction of the timelike axis could introduce such a transformation, the gas could be the inverse of a solid. In the extreme, the solid is turned into radiation. The opposite transformation would 'wrap up' radiation to a solid.

Molecules

Molecules are complex three-dimensional structures build out of atoms.

Chemistry is related to this topic (though not covered). Lattices or crystals are important, too. A lattice is a structures rebuild at specific points, where you would have the atoms of the lattice. So all atoms are - as all particles in general - a part of an ensemble.
You get an idea how 'stiff' spacetime is by the duration of substances. You could apply the idea to various kind of chemical reactions or some other behavior of solids.

Quaternions in modelling molecules

Currents

Current is how the influences path through a structure.

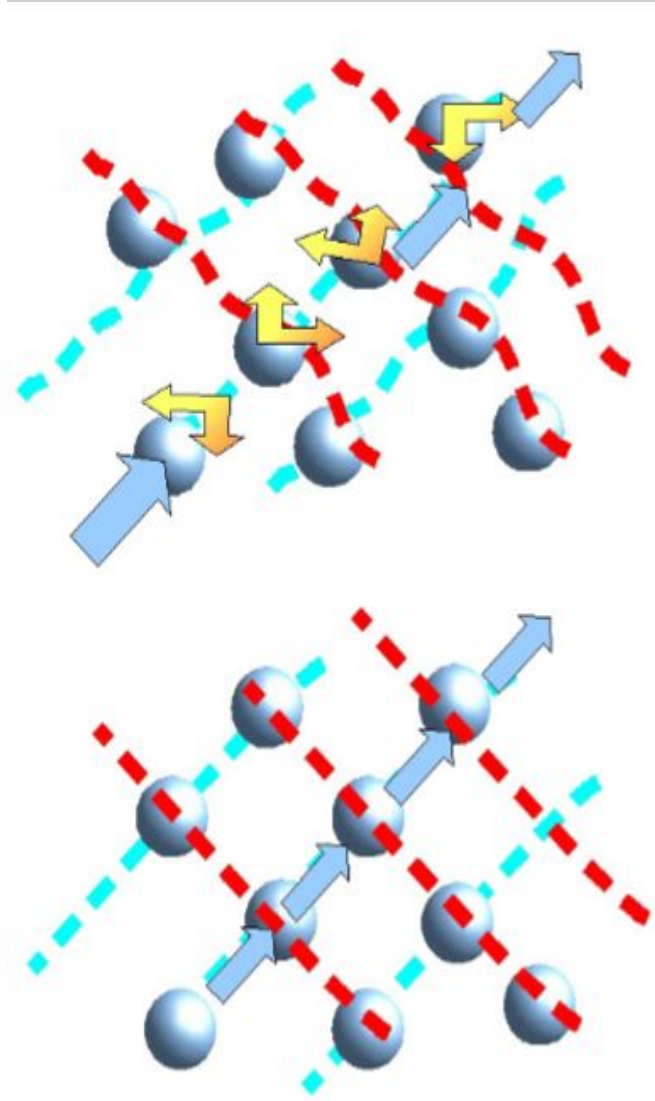
Imagine an influence passing through a lattice. It's getting from object to object and transferred through time and space. An object acts like a very tiny gyroscope. It has a timelike axis and spacelike axis. The antisymmetry makes it possible to store energy in timelike direction. In lightlike direction it is symmetric and will be send away. There the rotation cannot be kept.
It's important to notice, that this is a model in spacetime and the scheme on the next page is meant symbolic. It is assumed, that the lattice itself is related to the spacetime patterns caused by those influences. Those 'influences' we call phonons within solids. They are connectors between atoms in a lattice, because in this model atoms are the intersection points of such patterns.
Outside of a lattice (in free space) we could have currents, too. That would behave like 'magnetic currents'. That is like shifting the electric relation to the side (a pseudo-scalar).

Conductivity

If a lattice is hot, the axes of the spheres do not align and every single 'knot' would keep some energy and radiates some away. The more is radiated, the higher the temperature.

If now the object is very could, the axes get aligned and keep aligned. An influence could pass right through the lattice and is not radiated away. Those influences are usually called phonons.

If we interpret this picture from second to first, than it would illustrate, why wires get hot and emit light if a current flows through that wire.



Strong force

In this model we have something 'strong': That is the confinement of rotation to an object.

This is quite strong and the GR equivalent to the strong force. That is like dragging the 'fabric' of spacetime apart. Since it is timelike stable, a broken string will be 'fixed', because otherwise we would tear a hole into the fabric of spacetime.
Why does an element have timelike development, but in spacelike direction we have something acting instantaneous?
We can't easily disrupt spacetime. In a water analogy it is easier to see: rotation is possible together with the water, it's tougher against the current, but it gets very strong, if you try to create vacuum within. The reason is, that a proton is assumed as a three dimensional closed knot and only closed loops are stable.

Tuning the model

The model could be 'tuned' by known numbers.

We know c, what is the proportional factor of duration to length. And we know the Rydberg constant(s). And we know h. That is assumed to provide all that is needed to connect numbers of this model to units we observe in physics. All structures have specific frequencies and axes. Those are the characteristics of these structures and how they are distinguished. How those structures move and interact upon each other is related to the term 'field'. With this method we can tune the model and connect patterns to physical terms and units.

The 'unpleasant' aspect of this model is, that it is not quantized, because phenomena could be turned into each other and it is assumed to be a continuum. This sets strong limits upon the use for calculations. As a prerequisite, the entities or structures have to be defined properly.

Tuning the model

The dependence on scale and orientation of objects and observers could make various systems 'real', that are not the same as in other models with diffent assumptions. Our usual context with human measures here on Earth would provide an appropriate system. But we cannot extend this system and its behaviour to other scales and different time-domains.

Calculations could only be done on the basis of such a system, if the process of quantisation is introduced, because a smooth continuum could not be perfectly modelled. This is like the weather-forcast. We could predict the weather only with some degree of accuracy, if we define weather-phenomena like e.g. rain and some grid for the location of rain and intervals of time, when we expect that rain. But we can't predict every single drop, its precise path and the exact time.

Résumé

In this paper we tried to show the possibility to model various phenomena with only a few principles.
It seems to me, that it is possible to see all kind of relations in physics in this way. The aim was to check this assumption on as much problems as possible. It started with a very unspectacular question: in air, the speed of sound is higher than the velocity of the single atoms. What could be the reason? There is a model called 'ensemble interpretation' in quantum physics. The aim was, to find a way to model an ensemble (of things, that act 'dumb, simple and local') with something compatible to GR.

Résumé

"...it is more important to ask the right questions than to seek definite answers..." (Douglas Adams)

Linear, quadratic and cubic relations return under different names and in all kinds of combinations. There are: speed of light, the strong force, the weakness of gravity, that are related to only one geometric property in this kind of model, but return with different names. This paper is not more than a start, but maybe -I hope- someone having more knowledge than me, could develop it further.

Thomas Heger, Berlin 9.8.2009

Last editited: 23.3.2010

About me

My name is Thomas Heger and I live in Berlin.
I have a diploma in economies-engineering.
My mail address is: zehquadrat@googlemail.com
Until recently I owned a bar named 'Art Pub'.

I am a hobby physicist and wanted to have a challenging task. I would like to hear some critics about this idea, because that would help to develop it further. I would like to share my idea with people interested.
You could find this paper in its latest version here on google.docs, in case that this is a downloaded pdf-file).

Disclaimer: this text is highly speculative and based on my own ideas and no guarantee whatsoever is given for any kind of usefulness. All pictures were designed by the author. The text is written by the author, except where quotes are mentioned. The links are intended to provide additional material for further reading.

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Relational Quantum Gravity
Quaternions and General Relativity
Quaternion Physics
wikipedia/Quaternion
The Compton Radius Vortex model
Lanczos Equation
Pseudospheres
Hopf fibration
Dirac equation
E.Cartan: Theory of Spinors
Symmetrical structured Spacetime
Structured deformations
Polysigned Numbers