

From 4th to 3rd dimension degree - problematic issues

Additional discussion about certain points to earlier presented files on site
www.u5d.net.

Here some comparisons and references (in general terms) are made to later readings.

Aspects:	<i>Page</i>
I. Introduction	1
II. Rotation	4
III. Geometrical aspects	8
IV. Manyfoldness and distribution of Mass	11
V. Mass as property - once again	16
VI. Step 4→3 in terms of Forces	20

Introduction:

The start of Physics:

Physics starts at the border to metaphysics, or rather at the *triple-point* between metaphysics - mathematics/geometry - and human concepts expressed in words.

The start of Universe:

Universe is proposed to be a “*blown up singularity*” as in this model and there it starts. (But it doesn’t seem to be any consensus about the size of this “singularity.”)

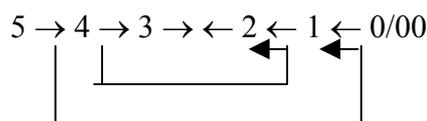
Inflationary or not, the Big Bang could perhaps be described in terms of “osmosis” (!), a scalar field of density, the derivation of which is vector fields.

Compared with the model here, sketched in Presentation, scientists seem to **look at the creation of Universe backwards**, from the end of the 5-dimensional chain: the first stage after Big Bang is described as a Universe of “radiation” only. Probably electromagnetic (EM) waves (?), referring to the observed nearly homogeneous background microwave radiation. This radiation should then in some way partly transform to electrons, protons and atoms.

At the same time they imagine all forces united at start and gravitation as the first one being “precipitated” from the other ones. And, according to other books, the only way one have observed “matter” created by EM-radiation is when energy rich photons create pairs of electrons/positrons (e^-/e^+), in the neighbourhood of heavier masses or atoms (as a condition).

It’s not easy to unite these different aspects in terms of established scientific data.

According to the 5-dimensional chain of concepts in the model here, reading it outwards towards lower dimension degrees: $5 \rightarrow 4 \rightarrow 3 \rightarrow 2 \rightarrow 1 \rightarrow 0/00$, forces or vector fields as Acceleration/Gravitation, F_A/F_G come first, in next step the EM-force, and the polarisation Mass--Space before Matter with polarisation of Charge, and waves in steps $\rightarrow 2 \rightarrow 1 \rightarrow 0/00$. However, reading the chain as from a perpendicular viewpoint, with debranched degrees in first steps meeting the other way around, illustrated in the figure below, the different proposals of the scientists seem more easily understandable.



What they imagine as purely radiation becomes in this interpretation only the debranched degrees from first steps, but should be completed with the *structures* from vector fields in steps $4 \rightarrow 3 \rightarrow (2)$.

It’s very much that physicists don’t know:

They don’t know what Gravitation is and how it can act over distances, just imagine a lot of small quanta as gravitons gathering to a discontinuous “field” or the inverse, a field quantified in those imagined quanta. Some believe they can skip gravitation and replace it with the curvature of space - but only half of the curved way of light around the sun could be explained by the curved space, the other half through “gravitation”. And they don’t seem to know *why* big masses are curving the space around them. They don’t know what Mass is, what is giving matter the property of Mass, but particle-hunting physicists now are looking for the “Higgs’ particle” that should give this mass property.

They didn't know, at least forty years ago, what Charge is and probably not yet.

They don't know what "Spin" is, an invented property, it's neither this, nor that - but still useful.

Not to mention quantum mechanics, which they readily admit they don't understand but still have rules and some words and mathematics to manage.

Yet, these concepts, forces, mass, charge and spin are the main properties which they use in the "standard model" to describe the realities, besides time and distances.

Such questions, what something "is", are by definition, hard to answer: The answers have to be given in any of the three areas meeting at the triple-point. Words and mathematics for the physicists' part. And there are a lot of concepts and different mathematics to travel around in. Concepts have to be defined through other concepts and these through others again.

A force, for instance, was earlier defined through its effect, as *something* that changes a motion, its direction or speed. Now, in the "standard model", forces are described similar to human talk: two persons as "particles" throwing words as small field quanta, photons or other things, on each other. Something like bacteria, joining to exchange parts of their genetic code, just to describe it on the superposed level of living societies.

One conclusion: If we want an understandable description in words, it seems as we have rather much of a free choice when it comes to which concepts to use.

The concept "Dimension":

A special problem is the different ways to define the concept "Dimension".

In this model we have defined an outward or inward directed vector field as 4-dimensional. In which sense isn't it 3-dimensional - or representing an infinity of dimensions as extensions in an infinity of directions?

- Physicists want one dimension for each independent variable. Independent? Shall we believe that? According to the model here nothing is really independent, at bottom. This "independence" seems only to refer to elementary geometry and the usual co-ordinate system and relations where the scalar product of vectors are zero.

- Mathematicians as Hilbert creates an infinity-dimensional room for possible "states"...

- In ordinary speech of today there is often talk about this and that as another dimension, usually referring to another aspect, characterised through some kind of contrast or opposition.

- In elementary geometry we have the usual co-ordinate system of 3 axes and they are indeed also characterised by opposite directions from the origin, with signs plus and minus. One says that the 3 axes are needed to completely define the position of a point in space. However, this view disregards identification of the origin, where the axes cross each other, and the "directions", the "signs" (+/-).

One definition concerns extension, actually built on the basic concept Distance. A point has no extension, represents dimension 0. The extensions are created first with distances and space.

To this comes the little problem with a curved line or surface: a curved line is 1-dimensional in itself but needs 2 dimensions, a curved surface 3 dimensions for its existence. What about a curved space - ? - or a "curved" mass? * And in the String theory a linear string needs 10 more dimensions plus Time for its vibrations to express such things as mass and charge and what else: still another definition of "Dimension" as it seems.

*A point has in these days been defined as something with an infinite

radius of curvature - a really self-absorbed definition!

So, in which sense do we use the fundamental concept Dimension in this model, when describing vector fields as 4-dimensional in relation to Masses and Vacant Space as 3-dimensional? The *infinity* of directions outwards from a point or inwards towards the point is obviously not seen as different dimensions, just as a property in this dimension degree (d-degree).

When talking about 4 dimensions we use the kind of definition which concerns how many data that are needed to identify a certain unit (3 for position in space, + 1 for directions outwards/inwards. When talking about Mass and Space as 3-dimensional in relation to vector fields, we still keep to the polarisation concept of two complementary “structures” but suddenly also enter into the definition of dimensions as extensions, viewing Masses and Space very elementary, without complex curvatures, only in their external form.

Do we use the same definition of dimensions in these descriptions? What happens - in the *degradation* of our viewpoint - or physically in the formation of enclosed volumes as masses - when stepping from 4 to 3 dimensions?

How does an infinity of directions (v_{div} / v_{con}) transform to an ordinary 3-dimensional form in the step $4 \rightarrow 3$ according to the model here? In which sense could Mass be interpreted as 3-dimensional in relation to vector fields as 4-dimensional?

There are many questions connected with this one:

- Why do all masses of universe rotate?
- Why this manifoldness of masses and unity of Space in cosmos?
- And again: What is Mass, how should Mass be interpreted as created through this step $4 \rightarrow 3 \rightarrow (2)$?

Rotation:

Why do all celestial masses rotate, cosmic clouds and elementary particles, even *haploid* eggs in the oviduct?

It's an obvious reality for celestial bodies in macrocosm and in microcosm, but what is the best way to explain it?

In which sense do principally anti-parallel vectors (outwards-inwards) towards a centre, in step $4 \rightarrow 3$, change to perpendicular ones, an angular step proposed in the model here? And what makes expansion-contraction transform to rotational phenomena? It's difficult to find any convincing explanation in the used literature behind this discussion. The question is connected too with the problematic *turbulence*.

1. Rotation as a 2-dimensional motion:

1a) In terms of the elementary 5-dimensional conceptual structure of our model:

We may ask: *What is lost in the dimension step $4 \rightarrow 3$?* D-degree 4 is defined as vector fields, and a vector, according to the established definition, is a physical quantity that besides numerical values must be given a direction. So it has to be the character of Direction that is lost *in the structure* in this step - and translated to motion. A circular form has no direction in the sense of inwards - outwards.

1b) In d-degree 3 *two degrees should be viewed as debranched* and transformed to external motions. A 2-dimensional motion is rotation. (See files [Presentation](#) and [Motion](#).)* Hence, rotation is viewed as one expression for the *polarization* of Direction in “poles 4a ---4b

There is also the general view on a dimension chain as steps towards a more and more specified (crystallised) direction towards “one-way” character. (From a chapter

on “chance”, not yet on this site.)

The one-way direction in rotation could be a Testimony of the rightness in the view of masses as one “pole” or partial structure in relation to a complementary one, the Vacant Space. (It may demand an excuse pointing out the natural fact that Space “rotate” in the complementary direction around celestial bodies.)

* Now it seems wrong to state that a celestial body has only motions in 2 dimensions. A planet like the Earth has its translation too, its pathway motion (and a slow rotation of its rotational axis!). How then justify the proposal? We could perhaps presume that it is the orbital as a 2-dimensional plane of each planet that moves around the sun, not the 3-dimensional planet (but not the same as the very slow rotation of the orbit of Mercury for instance that Einstein explained). We could alternatively see the linear motion in “geodesists” as expression for the motion on an underlying 4-dimensional *level*, not belonging to a step in the *same* dimension chain?

2. Starting and end points of vectors as “stretched out”:

The starting points of vectors inwards - - and target points of vectors outwards - have positions “stretched out”, with a formulation from quantum mechanics, not defined - or all possible...

The infinity of starting points of Direction inwards as a virtual, circular structure may be interpreted as transformed to Rotation with a factor of Time, that’s Motion.

Compare the indeterminable principle: If a particle has a certain moment, implying direction, (as inwards from the 00-pole towards a centre in our model), this implies that it has all possible positions. If it has a certain position (as the 0-pole in our model), it has all possible directions. And here the 00-pole is just defined as “anti-centre”.

Compare that the 00-pole also represents multiplicity in our model.

In a surface, the 3rd d-degree is indefinable, and in 3rd d-degree the 4th d-degree should be likewise indefinable. The higher d-degrees have the character of “superpositions” (sooner “sub”-positions).

Rotation, illustrating the “meeting points” between targets of outward direction and starting points of inward directions, may be regarded as expression for the binding force between mass and empty space ($E = +mc^2/E = -mc^2$) - ultimately an expression for d-degree 5 as the binding force between centre and anti-centre. This in accordance with our description of d-degree 5 as step by step translated into motion through the dimension chain.

Hence, rotation in d-degree 3 should be interpreted as resulting from the combination of a radial and circular geometry.

As to a higher d-degree as indefinable in rotation, a similar description is given for quantum numbers of electron shells in the atom: two of the quantum numbers (s l, x) are fixed, defined, but the 3rd not: it is illustrated as a vector with fix starting point but the arrow of which rotates around the y-axis.

(The slow rotation of the “y-axis” of the Earth seems to illustrate the same?)

3. How do physicists and astronomers explain Rotation?

The fact is that they don’t seem to have any common explanation. One vague suggestion is that rotation should result from some irregularities in the surrounding gravitational field. If so, we could compare with the general assumption in our model that the 00-pole as anti-centre, ~ surroundings, represent the polarizing force. Here in the step 4 → 3.

Other sources refer more accurately to the law of energy preservation: When a celestial cloud contracts through gravitation, the potential energy of the outer areas in the cloud decreases and the energy has to transform into something else: rotation. To a certain degree it may transform to temperature radiation outwards until the density

becomes too high. There is a change in the “quality” of energy (a term from *Sarfatti*).

If this view is an explanation or just a description may be discussed. In any case it is in accordance with the general proposal in our model that a) there is a geometrical transformation from outwards-inwards to a radial - circular one, b) it is in a certain sense the inward direction from the anti-centre that transforms into a circular geometry.

One author talks about “random motions which probably show a little surplus in one direction” and with decreasing radius develop to rotation in that direction. A rotation of a star 17 times per second (!) is attributed to its collapse to about 20 km radius, and to the law about preservation of angular momentum.

Another formulation: the temperature ought to increase when a celestial cloud is compressed, but the clouds of gas have an effective way to get rid of the created warmth: the energy is stored as rotation of the hydrogen atom. (Hence, not only rotation of the big clouds, even the one of individual atoms?!)

Compare the perpendicular relation between energy forms of Frequency and Amplitude in electron shells ([file EM-waves](#)): absorbed energy expressed in amplitude of electrons, outward transmitted energy as “radial” radiation, expressed in frequency.

4. Turbulence:

A corresponding transition from linear to 2-dimensional, rotational motion appears in the emergence of turbulence in gases and liquids. Why has turbulence been such a mystery for the scientists? (One of Heisenberg's questions to God: Why turbulence?)

How does a more or less rectilinear current suddenly change to whirls and big whirls breed smaller whirls etc.?

We could try the assumption that more substance (as one form of energy) is poured into a water current for instance than the outlet permits, in accordance with the description of celestial clouds above, which should imply that the surplus of energy had to be translated into rotation.

According to chaos research however, this cannot explain why currents, like the Golf stream as an example, here and there begin to wind and generate whirls or debranched circular currents. Or the behaviour of smoke from a cigarette. We could probably add: the Rossby waves from the jet stream of wind around the arctic pole, from which more or less circular high-pressure and low-pressure cells are debranched.

Could we assume that everything in the way of a laminar current, invisible perhaps, that can get the role of a centre, curves the linear motion as if activating one pole of d-degree 4 and step 4 → 3? Perhaps a reality in some water streams but not a satisfying assumption according to other examples.

Looking at our elementary dimension chain we have:

D-degree of Structure: 5 → 4 → 3 → ← 2 ← 1 ← 0/00
 D-degree of Motion: 0/00 1 2 3 4 5

Chemically, *solid*, *liquid* and *gas* phases have in another part of this booklet series been characterised as 3-, 2- and 1-dimensional phases respectively on that higher, chemical level. (Water for instance has molecules with a plane form.)

If our simple scheme above is possible to apply to that level, we should find a 3-dimensional motion in liquids and a 4-dimensional motion in gases: perhaps in the form of spiralling (= translation + rotation) - with addition of a motion inwards - outwards as expression for the 4th d-degree. (Inwards?! Do we eventually find such inward directed but perhaps disregarded motions in gases?)

There are interesting experiments in the literature showing how 3-dimensional motions are appearing in liquids (mentioned in a book about chaos):

A spot in a liquid was observed to twirl east - west, up - down, inward - outward. And Theodore Schwenk who studied currents in a watercourse found secondary streams moving as in spirals, as one surface rolling around another. Another example: studying liquid helium, there was observed first the formation of two rotating cylinders of the liquid, then, a bit later, also waves along these cylinders. Hence, a 3-dimensional motion.

Scientists also use the term “phase transitions” when talking about such examples of turbulence, which in our model should represent dimension steps.

The motion of a stream may represent a 4-dimensional “vector field” as it appears on that higher *level of Matter*. “Direction” as structure. A liquid as a watercourse - and a gas - has of course in its entirety also a mass and a surface to the surrounding, possibly developing to internal 2-dimensional “layers”, and extensions as principally 1-dimensional. (The step from laminar motion to rotational ($2 \leftarrow 1$), corresponds in our dimension chain to the step from the property Direction to volume, Mass, step $4 \rightarrow 3 \rightarrow$.)

Hence, a stepwise increasing complexity in the motional patterns could perhaps be reasonable from this point of view, as expressions for how these different properties of the stream manifest themselves?

Assuming such phase transitions, should we think of them as endogenous or not? What causes the transitions?

One answer, in terms of abstract, general postulates in our model, is that a unit whatever it is, here a stream, always has a surrounding, corresponding to the anti-centre pole 00, representing the polarizing force. Compare the talk about “external disturbances”.

More concrete, a liquid has its borders, a cloud its emptier surrounding. We could imagine that the difference at the border - as defining a border in itself - is enough to represent a polarization. Difference in velocities at the borders, through friction perhaps, should be enough to create polarities.

The different properties in structure as Direction and Mass ($4 \rightarrow 3$) seem to manifest themselves stepwise, and this could *depend on a change in velocity*. Velocity has in our model tentatively been identified with the dimension steps as such, representing the debranched d-degree, fundamentally expressed in the last step $1 \rightarrow 0/00$.

About the splitting up of whirls to smaller and smaller ones:

In a rigid body or a big whirl all parts or particles in the whirl rotate with the same angle frequency, transverse the same angle (as an area, 2-dimensional) in the same time.

To get the same velocity, to pass the same distance (1-dimensional), the rigid body will have to crack, the big whirl split in all kinds of angle frequencies like frequencies in white noise. In this respect turbulence represents a qualitative, geometrical step from d-degree $2 \rightarrow 1$ in motional structure repeated. (Cf. perhaps Lev D. Landau who has seen the turbulence as result of “competing frequencies”, mentioned in a book about Chaos.)

It also implies a step from rotation concerning the radius to rotation concerning the circumference, poles 3b to 3a, (from radial to circular) as a repeated “pole exchange”.

Geometries:

Curved Space, the angle step 4 → 3 in terms of pure geometries:

1. A perpendicular geometry:

It is a fact that a *perpendicular geometry* appears in several physical relations: It's pointed out that the gravitational (centripetal) force acts strongest along the rotation axis, while the centrifugal force as its opposite acts along the equatorial plane.

Other examples: In old physics the orbitals of planets are illustrated as the combination of two vectors, one pointing inwards towards centre, one the tangent to this. And we have the orthogonal relation between electric and magnetic components in an EM-wave, as between the amplitude and radial jumps in electron shells.

Most elementary: equality should reign around a first centre. Equal distances form a circle, perpendicular to the radius. If divided, it seems natural to think it should be divided in equal parts. Halvings seems to be (or has been given ?) the principle for spin. Quarters for something else - as from a second polarization.

Hence, starting with a centre as first prerequisite, we could see the perpendicular geometry, assumed in d-degree 3, as an inherent, inevitable development from a principally anti-parallel one?

Another aspect: According to our model we have one d-degree of motion in a 4-dimensional vector field, a 1-dimensional, i.e. linear motion, ("to and from each other"), which means a longitudinal one, as variations in density, defining spherical layers in the geometry. The motion moment acts as a polarizing force. (Note that we have proposed *Density* to be the first "physical quantity" in step 5 → 4, when identifying the usual physical concepts in the dimension chain.) So from a 4-dimensional, anti-parallel structure plus a 1-dimensional motion we get a 3-dimensional geometry defined.

2. Non Euclidean geometry:

The views above seem much too simpleminded and bound to an Euclidean geometry to explain geometrical realities? What if we look at cosmos in terms of non- Euclidean geometries?

Scientists say that big masses curve the space around them, but do they tell us why? Masses have positive radius of curvature, the space around big masses have negative curvature. But as far out as one have been able to measure the cosmic space in itself, (the angular sum of a triangle), it seems to have an Euclidean geometry.

Departing from our model we could rather presume that curvatures in the geometries precede the creation of masses or at least are an intrinsic part in that creation and in a polarization Mass - Vacant Space (or $E = +/- mc^2$).

The surface of a globe has an *elliptic* geometry; the angular sum of a triangle is more than 180° . The area between three adjacent circles has a *negative curvature*; the angular sum of the triangle is less than 180° .

A *hyperbolic* geometry, a combination of positive and negative curvature, is of course the most consistent with the model here, characterized by polarizations. It's often compared to a horse saddle when it concerns surfaces. With this metaphor, there are simultaneously 2 polarizations in the geometry: a step to a perpendicular relation between co-ordinate axes and a curving of these in negative / positive directions.

Such opposite curvatures may in fact be identified as transformations of Direction inwards - outwards: the positive one defining an enclosed centre, a transformed inward

direction, in d-degree 3 a globe as volumes for masses. Whereas the negative one describes an excluded centre, as a transformation of outward direction - defining an anti-centre as Vacant Space in d-degree 3.

3. Constant positive or negative curvature:

A constant positive curvature, along both co-ordinate axes of a surface, gives the globular, elliptic form of volumes for masses in cosmos. The hyperbolic geometry rather describes the relation between two such globes with intermediate space: perhaps a reason to interpret what is called “gravitational” centra as responsible for both the attraction and separation between celestial bodies? A manifestation of d-degree 3 of the unpolarized kind of dimension degrees that we haven’t been able to find in physical terms?

Where could we find negative curvature along both axes? Such a form has been compared with two counter-directed trumpets, what is called a “pseudo-sphere”. (Introducing a distance between their border circles and positive curvature joining them, we should get a form similar to a spiral galaxy.) The double-trumpet could be described as if each arc of a quadrant in a circle was inverted.

One example of this geometry could be the magnetic field between 2 magnetic N-poles, forced to meet, repelling each other.

4. Why curvature?

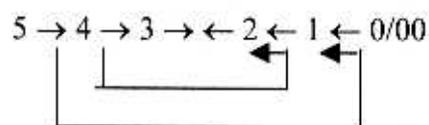
The geometrical aspects depart from 1-dimensional lines. That’s a view from lower d-degrees towards higher, inwards in our dimension chain.

A curved line implies an “*intrusion*” of d-degree 1 into a 2-dimensional world or a start of defining such a world, a beginning of an orbit plane (a step $2 \leftarrow 1$). A curved surface implies an intrusion into a 3-dimensional world.

With the assumptions in our model of debranched degrees meeting “the other way around”, Step $4 \rightarrow 3$ corresponds to the step $2 \leftarrow 1$.

The “intrusions” inwards in the chain along the main axis could in very general words be regarded as transforming the geometry between the principally anti-parallel vectors in d-degree 4 into a 3-dimensional geometry with polarized volumes through curved surfaces.

It seems easier to interpret the curving as built-in motional structures from the end of a dimension chain, with the chain as double directed, giving us an observable world with 3- and 2-dimensionanl forms.



5. Centres in the geometry as shrunk or increased:

Another aspect on the non-Euclidean geometries with positive and negative curvatures departs from the description that a surface which grows faster than proportional to the radius squared give a negative curvature, a surface growing slower than proportional to the squared radius gets the positive curvature.

Now, taking a piece of cloth and pursing it up in the middle (representing a shrinking centre or origin), one gets a wavy surface outwards on the cloth as representing a form with negative curvature.

If adding a piece of cloth into a hole in the centre, increasing it, the surface will curve in a positive manner, more adjustable to the football principle.

Hence, the curvature is depending on the size of the centre - or the unity with the role of a centre pole (the 0-pole) in our model.

The negative curvature could derive from an underlying level, a smaller origin or 0-

pole from which we have the outward Direction in d-degree 4. With growing complexity of the realities after Big Bang the centre will grow more complex and may be thought of as increasing in size.

The positive curvature and gravitational formation of Direction inwards would follow purely out of this increased centre! That is, if we start from an Euclidean geometry.

The relation between Vacant Space as divergent and Mass volumes as convergent would then simply be interpreted as a relation between centre and anti-centre, as suggested in our model - with the addition of a Time factor.

A main concept used in the background texts here is “*centre displacement*”. Neglecting the assumption of a gradual growth, a centre displacement implies that the circumference (as a 00-pole) on one stage becomes the centre for the next stage.

In a description of the elliptic geometry it's stated that

- a) a line in Euclidean geometry may be represented by a point in elliptic geometry,
- b) a plane in Euclidean geometry may represent a line in the elliptic one,
- c) a solid angle between planes in Euclidean geometry may be represented by plane angle (as 2-dimensional) in elliptic geometry.

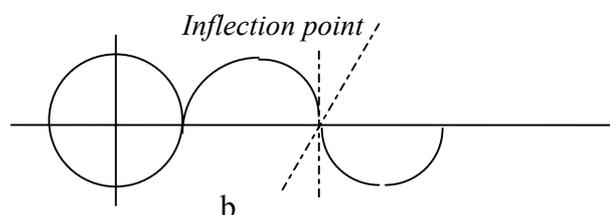
This points towards the interpretation of the elliptic curvatures as of a lower d-degree. The opposite should apply to a the complementary geometry with negative curvature, lines representing (or growing to) surfaces etc. - and points representing lines...

Such descriptions indicate that we should see the elliptic geometry and the geometry of negative curvature as of different d-degrees. (Or potentially pointing towards lower and higher d-degrees respectively?) Elementary, as there exist an infinity of surfaces in a volume, a higher d-degree represents unity in relation to a lower as a multitude. We have the unity of Vacant Space and the multitude of celestial bodies.

6. A Time factor again - and the curvature of sine waves:

With (another) Time (or “phase”) displacement, we have the form of usual sine curves - as projected outwards from a vector rotation in a unity circle.

The curvature is positive to 180° , then becomes negative in relation to the first part of the curve, a relation between *a* and *b* around the inflection point. Curve *b* represents the concept of an “excluded centre”. It could be regarded as the curve *a* mirrored two times in two axes, both horizontally and vertically.



It's the form of surface waves, positive and negative curvature in a mutual relation, as a circle of rotation broken up and polarized in time: We have the opposites convex/concave (representing opposite signs), suggested as one description of the complementary poles of d-degree 2, but following one successively in *time*.

The *inflection points in a 2-dimensional wave make up or define a 1-dimensional line*. This is perhaps one answer to the question how on earth the polarisation of a 2-dimensional surface in “inside/outside”, “convex/concave” may define an 1-dimensional line according to our model !?

Two notes:**a) Hyperbolic geometry in the atom?**

In an atom mass volumes with positive curvature is concentrated in the centre. Could we eventually find some expression for a negative curvature, if connected with empty space, at the electrons?

Could an hyperbolic or negative curvature described as excluding a centre, be connected with Pauli's "exclusion principle" between electron pairs - or something else in the electron shells? In our views on protons versus electrons we have seen them as "grandchildren" of the opposite vector fields in d-degree 4, children of Mass and Vacant Space respectively (see file Forces).

Besides this question: In the tentative interpretation of quarks in nuclei as p and n, we have suggested a parallel to the gastrulation process in embryos, including both elliptic and negative curvature in the motional structure of growth.

b) Olber's paradox:

It has been stated that if the Universe eventually had a hyperbolic geometry, then we should be able to find more and more galaxies the further out in cosmos that the telescopes reach. However, with the assumptions in our model this conclusion must be wrong?

If at a certain stage a hyperbolic geometry is polarized in positive curvature of mass volumes and negative curvature of "Vacant Space", then it's only empty space that give the widening lines of sight, and proportionally fewer and fewer galaxies would be found further out. One possible explanation to Olber's paradox?

Multiplicity of Mass and its Distribution:

The manyfoldness of masses but apparently unity of "vacant space" should in one sense follow from pure geometries and relations between d-degrees as said above. But how explain the fragmentation of Mass or the multitude of centres for gravitational concentration?

And how explain the distribution of masses from what is supposed to be a uniform development of geometries from a Big Bang centre?

It has been said that the observed, nearly homogeneous micro wave background radiation in cosmos - taken as supporting the Big Bang theory - has not been able to unite with the "unequal" distribution of masses. It's unclear in which sense it is regarded as unequal.

1. Gravitation as a polarizing force!

Gravitation, F_G , as an inward directed force with its foundation in the 00-pole is also, according to first postulates or hypotheses in our model a polarising, splitting force. How can this apparently wrong hypothesis be justified and maintained?

In fact, there is such a polarizing force acting in cosmos, according to the scientists' observations:

Contraction through gravitation in cosmic clouds *lead to* a fragmentation, a splitting up of the clouds in smaller clouds and the birth of a great number of stars in groups or crowds.

It's stated that a cloud under certain conditions (of total mass, density and temperature) begins to contract, and then gets fragmented "in several steps" to smaller

and smaller “clumps”.

Secondly, one has also observed a “spontaneous” polarization between hotter and colder regions in celestial clouds, which seems to contradict usual thermodynamic laws.

The contraction means too that the H₂-molecules are splitted into H-atoms (probably explainable simply through increased temperature?).

Hence, we seem to have first a polarizing force, which could be attributed to the 00-pole of d-degree 4 in our model, then or apparently simultaneous a contracting force, as Direction inwards (pole 4a) in d-degree 3 in our model. A third appearance of the gravitational force in d-degree 3 → to 3b (one pole in d-degree 2) should give the birth of stars and rotation, probably also with a factor of polarization. (Rotation may be interpreted as a “haploid” motion, pointing to another half with opposite rotational direction.)

Should we talk about Gravitation in all three d-degrees or perhaps give the first polarizing force (00) another name?

2. The polarization principle not recognized as such?

The fragmentation of these celestial clouds is not explained in the sources used here. There is only talk about “small disturbances”. The problem seems to be the same as with turbulence.

A general polarization principle - in several steps, of several kinds or properties and not called attention to as such, partly unknown or unexplained, could be the answer.

From the viewpoint of polarising *motions* (the end of the 5-dimensional chain in our model) and the assumed 1-dimensional longitudinal waves attributed to vector fields in d-degree 4, they should create rings or shells of denser regions.

It's difficult to avoid the assumption that a secondary polarisation through motion of a transversal kind is needed too in explaining the distribution of mass centres in cosmos; some kind of inherent waves in step 2 ← 1 as results of d-degree step 4 → 3 in the structure, along the circumferences (compare our hypothesis about side waves).

Such waves are never mentioned in the used sources. However, the sun for instance is said to be divided in sectors, with opposite directions or signs for the magnetic field - and cells of convection streams.

Examples, where a general polarization principle intuitively *is* applied: Pauli's “invention” of the “exclusion principle” between electron pairs in the atom, given the explanation of opposite “spins”. The still chiefly theoretical “up” and “down” quarks.

3. Why this “unequal”, “not homogeneous” distribution of mass in Macrocosm?

Scientists mean that the nearly homogeneous background microwave radiation found in cosmos should imply an equally even distribution of Mass in cosmos. This contradicts the irregular or not “*homogeneous*” distribution of Mass, as they see it. There is no good explanation found.

In one source used here it's proposed that a rapid increase in size from Big Bang led to the result that different parts of Space “*lost contact with each other*” which should imply that “local fluctuations” in density could be permanent. Such a description doesn't feel satisfactory, at least not with our model here in mind. “Local fluctuations” and “small disturbances” and such references sound without contact with any scientific principles?

To approach the problem, we could test to look at dimension chains as a genetic code: We could ask:

How many (crossing-out) principles of differentiation are needed to explain the individualizations of mass in cosmos? (Eventually starting with 4 forces, F_A, F_G, F_E, F_M,

as there are 4 bases A, G, C and U in the genetic code!)

For instance: a) gradients of densities, b) gradients of forces' strengths, c) gradients of velocities, d) gradients of radii of curvature, and with Time: e) generations of masses. (Cf. Hoyle's C-fields.) Perhaps it is enough, or do we have to add chance, fluctuations within the borders of uncertainty in microcosm?

There is of course no answer here. We could just make the supplementary note that gradients may have the character of discontinuous steps, changing the "quality* of energy" when a certain amount of energy or a certain interval is reached?

4. What creates the many centres? Or how are they identified as such?

Preceding differentiating processes:

In our simple geometrical terms the starting point of a vector field inwards has a spread out position with the word from quantum mechanics. The same holds for the first indefinable target of the outward directed vector field.

Somewhere in the literature it's stated that convergent vector fields (v_{conv}) give an undefined centre, as if not pointing to a common, singular one. Why? No explanation in that text. Because the divergent vector field from the primary centre already has given birth to a multiplicity of secondary centres, a process preceding the convergent vector fields? Because convergent vectors are pointing backwards in Time - ? - referring to a centre already on its way? The convergent field meeting the divergent one "halfway"?

Such a view could be connected with the idea of an eventual *inflationary stage* of development after Big Bang.

There exists something of a similar relation between "vectors outwards and inwards in the nervous system: In the inward directed **parasympathetic nervous system** the nerves depart from the peripheral ends of the vertebral column, from head and tail vertebrae (at least in human beings), while nerves from the sympathetic system, outward directed towards brain and muscles, start from the middle region of the spine.

Ganglions as centres (?) for the sympathetic system are situated near the spine, with many connections with one another, while the ganglions for the parasympathetic system are situated far away, distributed and localized as separate to the neighbourhood of the individualized intestines. These are organs developed from within, roughly said from the vegetative pole of the first embryo.

Another question: Should we think of **vectors outwards as branched?** Compare "**bifurcations**" at certain stages in chaos research.

It could perhaps be appropriate to apply aspects from quantum mechanics on the question about the multitude of centres. Identifying a higher d-degree is *undefined* in the lower d-degree, the higher one representing a "superposition", this could imply that the outcome when it "collapses" (here through a d-degree step) may show up as yes or no (~ mass or vacant space) - and anywhere? Compare what is said about quanta of forces, that they may have any mass whatsoever, that's undefined. It sounds like one possible answer to the not homogeneous distribution too.

Where do we find the first ovum in a developed human body? An idea about divisions (equal to polarizations?) becomes implicit in such a question, if a parallel to Universe. And copying of a code, which as a suggestion here should be represented by dimension chains as the general pattern within the frame of surrounding conditions and actual Time.

After all, the cosmic multitude of centres resembles turbulence, smaller whirls or

bubbles born from bigger ones etc. The long (or protracted) distances between celestial mass concentrations seem perhaps to contradict this similarity but may be a chimera. Expansion of Vacant Space creates the distances, with more or less of negative curvature.

Very simpleminded: Why are gathered masses so small in relation to empty Space between them? One equally simpleminded answer: The “lengths” of vectors pointing outwards are principally unlimited, while the “lengths” of inward directed vectors gets principally limited by definition at their meeting points (ultimately the black holes?):

00→0←00 00 ... ←——0——→... 00

5. Bubbles:

Looking at macrocosm as 3-dimensional, as from a 3-dimensional point of view, we may perceive the accumulations or “bubbles” of masses, stars and galaxies, as elevations from a more high-dimensional world. As unavoidable irregularities in a “degraded” space.

Aggregation of masses becomes “intrusions” from a 5-4-dimensional world into this lower degree. (Is that why mountains are regarded as homes for Gods?)

We have mentioned such “intrusions” from the other direction, lower d-degrees as 1-dimensional lines when curved making “intrusions” in d-degree 2, curved surfaces in d-degree 3. Extra-(or inter-)polation gives “curved” 3-dimensional volumes implying intrusions in d-degree 4: What should such “new” curvature of volumes involve? In which form should it appear? Perhaps just that which Einstein said, that big masses curve the space around them! Another aspect on Space: not only a simple, all-penetrating co-ordinate system x, y, z, applicable in the same way in masses and empty space, but with another, separate more high-dimensional manifestation in these “bubbles” of masses. (Another possibility is to associate it with negative curvature inwards, the principle of life!)

Viewing the development in the other direction: Do the “intrusions” of higher d-degrees into lower ones, of a pole of d-degree 5 and d-degree 4 into d-degree 3, imply something else than intrusions seen in the opposite direction?

It seems so in one sense: We get the highdimensional world inside, within the aggregated masses, not as external as with the opposite view.

If a 4-dimensional and partially 5-dimensional reality shall show up and find room in a 3-dimensional world, there unavoidably will be “bubbles” in the x-y-z-space! Bubbles as the result and a solution of the problem.

Vector fields outwards/inwards have to curl, volumes transform to surfaces, as surfaces into lines, a way of transformations from a hyperbolic geometry with negative curvatures* towards an elliptic one in its adjustment to an Euclidean surrounding. D-grad $0 \rightarrow 4 \rightarrow 3 \rightarrow (2)$

(Mass is a very effective way to stow energy. A shirt for volumes of chests gets flat as a surface when packed up. Diagonals reduced to points!)

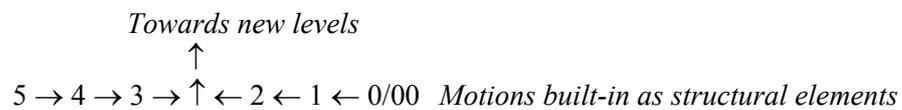
*Is there a possibility that the meeting of 2 neg. curved surfaces (or volumes?)- which would presuppose several centra or “0-poles” - may imply formations of enclosed volumes and the start of the “gravitational force” and the elliptic geometry for masses?

Einstein is said to have imagined the property Mass as one dimension added to the 4-dimensional space-time. It sounds curious and doesn’t agree with the views in the model here, but it could eventually be understood in the sense above. (Compare the suggested

interpretation of formula $E = mc^2$: Mass as 3-dimensional and the velocity c squared as representing two steps from d-degree 5 to 3.)

How is such a view compatible with the fundamental assumption in our model that higher d-degrees in masses, when interpreted as 3-dimensional, are transformed into external motions as rotation? Is it only a question about viewpoints? Is there perhaps no rotation as an "absolute" motion when taking the view "from inside" a mass, the rotation only a relative motion seen from outside in a 3-dimensionally interpreted cosmos? Perhaps only a question about the level - or d-degree - of analysis? Or inner 4-dimensional vector fields as binding forces only partly transformed into rotation in d-degree 3?

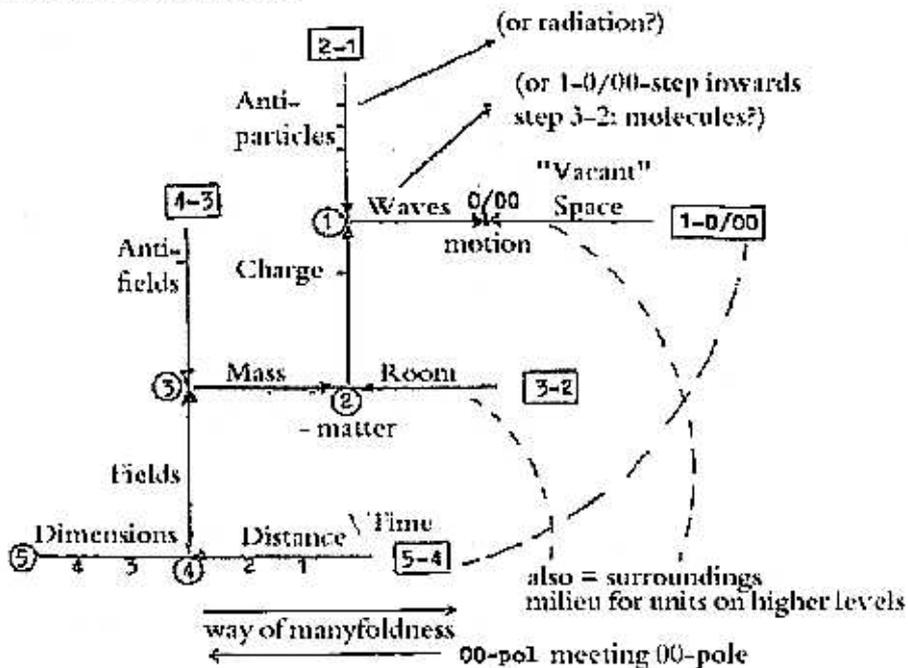
The two views on "intrusions" could be illustrated by the perpendicular aspect on our dimension chain - and connected with the development of higher levels versus the process of reproduction, two directions which can be regarded as orthogonal in a dimension chain:



When debranched degrees in first steps of a dimension chain meet from the end of the chain (0/00) inwards in step 3--2, a vertical axes through this step can illustrate a development direction towards higher levels as bubbles of celestial bodies - or atoms.

The one way direction of the chain, 5 → 4 → 3 → 2 → 1 → 0/00 (~5) can illustrate a reproduction way on the ground level. What is left of these d-degrees 2 → 1 → 0/00 may be identified with the external environment in which the bodies move and from which they get their nourishment (as H-atoms or He for the galaxies).

Outline of a level chain:



At first these views may seem incompatible with our descriptions of Mass and Space as poles of d-degree 3, but the a- and b-poles of a d-degree in our model inherit the characteristics of 00- and 0-poles.

We may also look at a **dimension chain as "haploid"** between 0 and 00-poles: (not 5---0/00) and assume that only the 0-pole develops towards intrinsic complexity and "bubbles" in the middle step 3-2, defining enclosed centres, while the indefinite 00-pole as anti-centre only is defined through this process, only defined as the environment on each stage: the designing of mass bubbles given from "outside", ensuing from lower d-degrees through the condition: a 3-2-dimensional Space.

With such views it seems possible to unite the aspect of more high-dimensional bubbles of Mass in space with the suggested elementary definitions of Mass and Vacant Space as complementary "poles" of d-degree 3.

6. About Mass as an effective way to store energy:

Compare with transformations between **number-base systems**. Suppose d-degrees are connected with such different systems. A number in base-10, if first divided in parts, most often give a smaller sum when transformed to base-8, than if transformed as a whole. Yet, a development from higher number-base systems toward lower ones implies growing numbers, mirroring the growth of cosmos.

In the opposite direction, a cosmos of binary digits may be packed up with higher number-base systems until we reach number 1 (as billions of cells in one head) and beyond that.

Mass as property - once again ?

How is the property of Mass deduced from pure dimensions, geometries and motions, according to our very elementary model through steps 4 → 3 → pole 3a (or 3b) ?

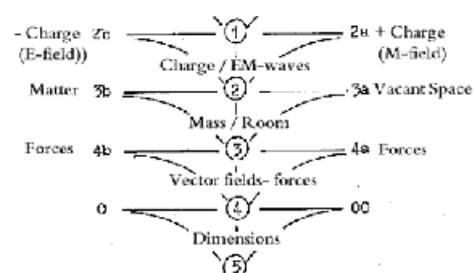
1. We have the views from earlier files that

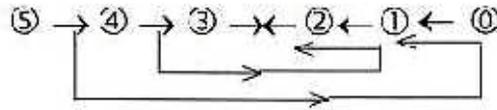
- mass is a degree of complexity in structure,
- represents enclosed centres, in opposition to the excluded centre,
- is a property that (to a great extent - ?- or totally) lies in binding energy,
- implies a step in the "substantiation" of lower d-degrees towards higher levels,
- is closely related to Gravitation, regarded as a force, a vector field,
- represents the dense "pole" of the physical quantity Density when polarized, and inward Direction, referring to our first identification of physical quantities.

2. Mass from radiation or vector fields?

According to suggestions in our elementary model, mass should be a property not defined as such before d-degree 3 is polarized and mass constitutes one "pole" or partial structure of d-degree 2 in relation to Vacant Space, d-degree 2 suggested as representing the property Charge. 3b -----2 ----- 3a:

Hence, we should expect some close relation to the concept of Charge already in the concept of Mass. And in terms of fields also to the electromagnetic field (EM).





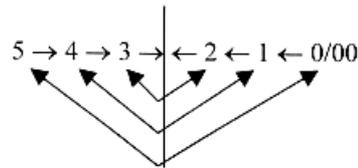
From the other point of view, from the 0/00-end of the dimension chain, Mass could include 2 (or 2,5) d-degrees of motion built-in, (of built-in Time if we want to express it that way), or of “velocity” as a concept for d-degree steps.

Physicists want to think of the first Universe after Big Bang as “radiation - obviously of EM-type, this then in some way transformed to protons and electrons with mass. According to our model, this should be only half the history: Some kind of 3-dimensional structure out of vector fields should be “meeting” in step 3-2 and included in the creation of matter with protons representing most of the mass.

3. A Higgs' branch and a Coulomb branch:

In connection with the search for “Higgs particle” in later years which should carry the Mass property, one meets the words about “a Higgs' branch” and “a Coulomb branch”, as if the properties Mass and Charge was about a ramification. In our model this should imply the perpendicular reading of the dimension chain - as polarizations

$5 \rightarrow 4+1, 5 \rightarrow 3+2$



(A little more about Higgs' particle below.)

4. From bosons as “superpositions” to fermions with Mass:

The derivation of Mass from fields is in accordance with most physicists' theories: mass as tied up vector fields, locked kinetic energy or the like.

In our model Mass is assumed as a property stepwise defined through 2-3 polarizations, i. g. through d-degree steps $5 \rightarrow 4 \rightarrow 3 \rightarrow (3a--3b)$

Bosons, the quanta of vector fields, usually described as massless as the photon, can have any mass whatsoever according to another formulation. We remember the interpretation of “superpositions” in quantum mechanics. In our model Mass is not yet defined in d-degree 4, first in d-degree step 3-2, as a certain quality of the energy, a certain structure in our view here. It's possible then to see the bosons as superpositions, representing higher d-degrees, the level where the outcome may be “mass - no mass” in lower degree.

In our first postulates we have assumed the definition that higher d-degrees represent the *binding force* in relation to next lower degree. This seems illustrated in the relation bosons -- mass particles (fermions).

The assumption is that bosons in some way develop into fermions with defined masses through polarization, giving increased complexity - revealed in the spin.

In spite of these general views, the vector boson $W^{+/-}$ of the “electroweak force” is attributed a defined mass. Here we have the property of Charge involved too, in our model assumed as not defined until d-degree 2 or step $2 \rightarrow 1$. We have interpreted the electromagnetic force (EM), related to Charge, as a force in step 3-2 in relation to other forces in a the dimension chain of forces and obviously it's already involved in $W^{+/-}$. Hence, the fact that the Mass property - complementary to Vacant space - also is

defined, should be natural. (Also the 3rd vector boson Z^0 is attributed a mass.)

5. Does Mass include a component from the complementary pole 4b?

Several suggestions in other files (as in “Matter - Space”) imply in our model that Mass as a property not only should be regarded as some transformation of “pole 4a”, the inward directed vector fields, but also include a factor from the complementary vector field of outward Acceleration. So the suggested figure on MEGA-fields, the aspect on protons as “grandchildren” of the Gravitation force, so the suggested interpretation of quarks (file “Nuclear Force...”). To this comes the general view on Mass as a question about growing complexity.

How in that case identify it?

A general aspect in our model is to see development as a stepwise building-in of the surrounding as “00-pole” into centres defined as 0-poles. The simplest and most obvious suggestion is naturally that the outward directed (divergent) vector field in d-degree 4 becomes part of the structure, locked into the web of Mass by the inward directed one.

Gravitation is in certain contexts attributed a negative energy, and the real, positive energy in Mass could then in some sense be attributed this built-in divergent field, on the higher level representing a positive energy of expanding Vacant Space. If so, not only matter but also the property of Mass should break down in the centres of black wholes, if Gravitation becomes the totally dominating force.

Another application, with a viewpoint from the other end of the dimension chain, could be the aspect on Mass as braking of motion, negative acceleration, one form of built-in energy (in relation to Charge as built-in velocity) ? Compare Time as built into Space in a “4-dimensional Space”.

6. About Complex numbers:

Concerning the charged $W^{+/-}$ and building in of the complementary poles in paragraphs above: The charge of the vector boson $W^{+/-}$ is said to depend on *complex numbers* which make the difference between plus and minus.

Suppose we have a co-ordinate system and write a square in the 3rd quadrant, with sides along the negative axes of x and y: both x- and y-sides = -1. This surface exists totally in the negative domain that we could read as inwards. The surface is said to be positive according to the mathematical rules used hitherto which seem to have a limited validity; minus times minus = plus. (Why so?) To take the square root out of this negative, 2-dimensional surface to get its side, is said to be impossible (imaginary), therefore the “complex numbers”. Hence, these numbers seem related to the 2nd d-degree (presumed as representing Charge) taken in the wrong direction, outwards.

We have *inversions* around the unit number 1, inwards towards zero, 0.

We have *negative numbers* on the other side of zero 0, as linear inward directions (towards a built-in negative infinity).

The *complex numbers* could be seen as forming a 3rd realm of the inner world?

7. M-fields and Mass:

The Magnetic force, not very appreciated as such, in its own right, depends, it’s said, totally on the *rotation* of electrons.

In the file about Matter and Space was pointed to the relation found in some research between the proton being proportional to the M-field squared (and the electron proportional to the E-field squared.). And the main mass of the atom is concentrated to

the protons (and neutrons). This seems to indicate a connection of Gravitation and Mass with M-fields.

If M-fields are interpretable as results of rotation of electrons, then one could guess that Mass could be dependant on some “pre-rotation” structure, i. e. a circular one, as in our first geometrical suggestions. Rotation as motion attributed to d-degree 3, a transformation of still one d-degree through step 4→3.

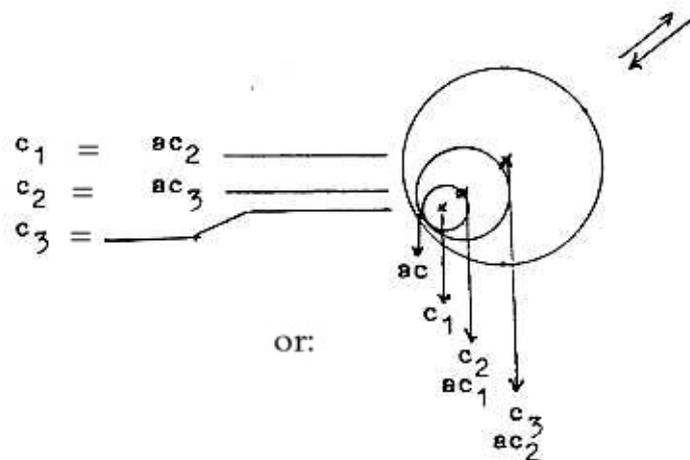
8. Higgs’ particle:

This assumed particle should be responsible for the property Mass and it should be the “carrier” or quanta of a new field.

Expressed in those terms, perhaps only misleading (a single field representing Mass?), it sounds incompatible with the model here and the view on Mass as a result of increased complexity and relations between fields.

It’s said about this field that its angle towards other (vector boson) fields is another and that the strength of the force doesn’t reach zero. We may compare with assumed angle steps in our model and the roughly suggested geometry: radial versus circular, in d-degree 3. A circular field doesn’t reach zero, the 0-pole. It could be expressed as a “centre displacement”, one of the general views on development in our model. (Mass as two steps of “strangeness”?)

Figure: *Centre displacements:*



(A logical consequence of this view in our model should be that gravitational centra are more fundamental - or precede - mass centra.)

Then there is the presumption that Higgs’ particle represents a *new* field. If so, this obviously contradicts views in our (certainly much more elementary!) model in which the inwards directed vector field of pole 4a (Gravitation) transforms through an angle step to a circular one in d-degree 3.

It’s easy to say that we, in order to get a 3-dimensional “web” for Mass, need something representing three co-ordinate axes*, not only two, but the 4th d-degree in our model is all-directed. In any case, the different fields or forces of the standard model should be derivable or viewed as transformable into one another for a satisfactory model to arise.

A perhaps related question: Should we imagine a phase displacement involved in the relation between G-and A-fields towards Mass, comparable with the phase displacement between E and M in electromagnetic waves?

* A simple aspect on growing complexity as transubstantiation of a warp to a web and this further to a 3-dimensional one is the operation of multiplication, multiplication of three variables as along 3 crossing co-ordinate axes: x times y times z. Cf. 3 polarization steps from 5→4 → 3 → (3a---3b). 3a--3b as Mass -- Vacant Space, “outer poles” (or partial structures) of d-degree 2.

Multiplication as an operator? The quarks in a proton are attributed masses around 5-10 MeV. $10 \times 10 \times 10 = 1000$, roughly the magnitude of the proton mass or half of it.

9. Substantiation through “Colliding Singularities”- and Interference:

Such views on the question about the Mass property are aspects from the other end of the dimension chain in terms of our model, from lower d-degrees toward higher ones. Or in the perpendicular view on the dimension chain the polarization $5 \rightarrow 4 + 1$.

In the *Dual field theory* is suggested that Mass could be created through “colliding singularities”. Oddly enough it sounds like a suggestion in the booklets behind this site, not presented here, that substantiation towards higher levels and matter could occur through the meeting between “haploid” dimension chains from the 0-pole (outward directions).

(Compare the psychological development of the 4-dimensional “I” of a child to a saturated Self and a 3-dimensional “personality” through meeting “confirmation” from others.)

The theory seems also to include efforts “blowing up” such “singularities”, creating some shell geometries (representing Charge or what?): Compare cell balls developing to blastulas in embryology!

Are such ideas possible to unite with the theories about angled vector fields ?

Interference between waves could be described as one kind of substantiation through colliding of similar entities. We have assumed linear, longitudinal waves in d-degree 4 (file Motions). They represent a polarization of the property Density (assumed as first physical concept in d-degree step $5 \rightarrow 4$) into maxima and minima. In d-degree step $2 \leftarrow 1$ inwards, L-waves could take the curved form similar to sea waves. (The step $2 \leftarrow 1$ inwards connected with the step $4 \rightarrow 3$ outwards according to the model.)

When such L-waves, forming an angle, interfere with amplified maxima, what happens? We could perhaps associate to the braking of what is called Monster waves in the see, said to have been explained by some development of Schrödinger’s wave functions?

What should in a $4 \rightarrow 3$ -dimensional form correspond to a braking Monster wave, stealing energy from its neighbours? The sun and its planets?

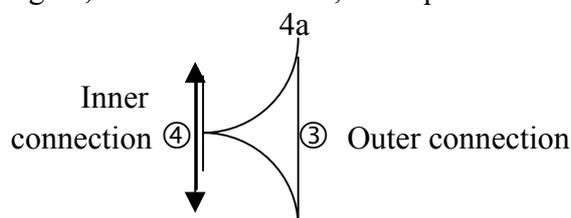
Step 4 \rightarrow 3 in terms of Forces:

1. Gravitation as a unique force:

It’s said that Gravitation is a unique force, not possible to simulate or connect with the other “forces”. One suggestion here is that the problem partly depends on the fact that *the complementary “ F_A -force” - identified here with the universal constant A , has been neglected* as a force. Yet it has been described as “some form of inner pressure” in opposition to Gravitation as “an outer pressure”.

Another reason for regarding Gravitation as unique could be *the mix in definition of “forces”* which seems to exist from the viewpoints in our model:

Gravitation (and the complementary F_A -force) may represent forces in the sense of built-in higher d-degree, a binding force, while the other forces the physicists identify concerns the outer connection between the complementary partial structures of the lower d-degree, their “interaction”, with quanta as “carriers”.



4b

Hence, the problems or unique character of Gravitation may be about definitions and differentiations between concepts as *Fields or Forces* and *Interaction (carriers)*.

2. “ga”-quanta of a double-directed field?

If the “ F_A -force” is recognized as such, the old differentiation between “purely aggregating forces”, F_G and strong interaction, and polarized forces (the electromagnetic one and weak interaction, may be misleading. In terms of “carriers” it may be wrong to look for “a graviton”; instead a “*ga*”-quanta of connected fields - perhaps closely related to the “Higgs particle”? - in the same way as the photon represents the carrier of an EM-field (the electromagnetic one)?

Perhaps such “*ga*-quanta” makes up the interaction (or the binding force) between E- and M-components in the photons? If so, with a phase displacement (180° ?) analogous to the displacement of 90° between E and M in EM-waves. 180° in L-waves, “density waves”.

In terms of waves, could we perhaps find “ga-quanta” as halves of the photon?
Remembering Hawking’s description of the spin relation?

A connected question: May we imagine that colliding photons could result in gravitons or “ga-quanta”? (One kind of a “dual field theory”!) The locked light in “black holes” responsible for the strong gravitation?

3. About negative and positive energy:

Gravitation is said to have negative energy in a certain sense: energy is required to counterbalance gravitation. A positive energy of “the universal constant A” (or F_A) is revealed itself in expanding Universe. Compare the description of the universal constant A as a kind of inner pressure in opposition to gravitation as a kind of outer pressure.

Perhaps it’s possible to interpret this “negative energy” of gravitation in 3rd d-degree as analogous to the opposition in atomic shells between the *potential* energy in amplitudes and the *kinetic* energy as in frequency? Geometrically of the complementary type circular versus radial. There we could find a “positive energy” in the separation of shells and orbitals.

What Einstein interpreted as “gravitational radiation” through contraction of celestial masses, seems to correspond to the transformation of energy from high amplitudes of excited electrons, through jumps inwards, into energy of frequency type in outward radiation.

In the literature one meets the expression “*the potential energy of magnetic fields*”. If magnetic fields may be regarded as “potential”, this could point to the connection we have assumed in this model between gravitation and magnetic fields?

4. Mass as result of *inversions* of fields or of acceleration?

In the file about Mass and Matter we have mentioned the possibility to interpret Mass in terms of inverted Acceleration, of *negative* acceleration in that case. This in the same way as we have presumed that Charge would be a property definable in terms of braking of motion, negative velocity. With Velocity suggested as expression for steps between dimension degrees, it seems natural that the analysis also could be carried out in terms of fields in different d-degrees.

We have Gravitation as a form of inward directed acceleration (Acc), One form of

inward direction = inversions to the realities between 0 and 1. (Negative or positive.)

If G is proportional to or equivalent with $-Acc$, and M proportional to $1/-Acc$, so we get M proportional to $1/G^x$.

There is a formula (from Newton) where we have Gravitation in inverted form, $1/G^2$. It expresses how celestial bodies are forced to move in orbitals, i.g. rotate.

(*McGraw & Hill Encyclopedia*). An “inverse-square gravitational field of force requires a body to move in an orbital that is a circle, ellipse, parabola, or hyperbola”

Without pretending any deeper insight in the mathematics, it could be said that the formula points to a factor of inversion in what we have described as the d-degree step $4 \rightarrow 3$, leading to external rotation, even if it here doesn't concern rotation around the own axis of a celestial body.

What is called “**quaternions**” are hypercomplex numbers representing points in a 4-dimensional space. They are used in studies of rotation of objects about their own axes. Here 3 of 4 factors in such a number q are imaginary, $i^2 = j^2 = k^2 = ijk = -1$. Its conjugate \bar{q} ($a - bi - cj - dj$) is the same as the inverse quaternion $1/q$ when referring to a unit number 1 as the axis. (*Wikipedia*.) Again it seems that we in this advanced mathematics could find support for the idea of inversions connected with d-degree step $4 \rightarrow 3$. Here applied to vector fields.

5. Is it possible to physically identify a unity of G and A ?

It doesn't seem so. This central question about the suggested scheme in our model remains. How identify the unpolarized, “superposed” states in d-degrees 4, 3, 2, assumed as binding forces in relation to the polarized states: divergent---convergent vector fields, Mass --- Vacant Space, charges (+)----(-) ?

There is only geometries - or interaction through quanta of fields, the motional aspect of which in our model may be regarded as debranched in the d-degree steps and thus a testimony of an internal relationship ?

One aspect could possibly be to look for an “E0-line” between $E = +mc^2$ and $E = -mc^2$, where we can imagine that the polarization between F_G and F_A on a basic level has occurred? We could imagine such E0-points or -lines as more or less mysterious entrance doors to the higher dimension degree, this one as a “superposition” in quantum mechanical terms?

There are density waves in macrocosm, (which *Bengt Lindblad* suggested as explanation for spiral galaxies), one expression for the relation Mass---Vacant Space. We could identify the orbitals of the stars in the galaxy as such “E0-lines”, the motions not demanding any energy in Newton's terms.

We could regard the distribution of electrons in shells around heavier atoms as similar “density waves” (with Schrödinger's wave functions) on another level. Perhaps connected is the notable fact (?) that the rotation of electrons about the nucleus doesn't produce any photons.

Could the potential barrier in the atom, separating nucleus (+) from e-shells (-) in some sense represent an “E0-line” in its *shape* itself? Connected with the “tunnel effect” when alpha particles sometimes slip through the barrier without the usually necessary energy?

6. Complementary “poles” versus similar units:

It's necessary to distinguish between on one hand relations between complementary “poles” as Mass --- Vacant Space (or +/- $E = mc^2$) or protons---electrons and on the

other hand relations between similar units as Mass --Mass, p---p, q ----q, e---e.

Interactions between similar units (most elementary quanta) are evidently that which is identified as "forces" in the Standard model, but not primarily in our model.

The assumption in our model implies a "binding force" and a "polarizing force" together defining the complementary relation Mass ---Vacant space, or $E = +/- mc^2$, In relation to the Standard model it may seem as only a suggested, vague formulation, departing from the Whole, without content, however real this polarization is.

But a binding force between protons and electrons in atoms is difficult to deny, and it was earlier identified as the electromagnetic force. The relation p---e including both attraction and repulsion moments. (The same seems to be valid for electron pairs of opposite, complementary spin.)

Among celestial bodies (the relation between similar units as Mass 1----Mass 2) there is both the separation, interpretable as result of a polarizing, separating force, and attraction, as a binding force between the separated masses, so in solar systems and galaxies.

(Why don't all the masses in a galaxy or solar system contract to one? There is G and the factor $1/G^2$ in the formula above for the orbitals of the bound masses.)

Hence, it would (only?) be possible to recognize the "unpolarized" state of higher d-degree which was looked for above, (a superposition of to forces), as manifesting itself in *this very relation*, - on a new level.

Assume that interaction between similar units shall be regarded as a superposed level, versus a dimension chain with relations between complementary "poles" (or partial structures):

Then, one aspect in terms of our elementary model, would be the "**pole exchange**" occurring in the last step. In d-degree 0/00, the degree of Motions, "motions from each other" are derived from first 0-pole and outward direction, but define an anti-centre, a 00'-pole for inward direction on next higher level. "Motions toward each other", derived from primary 00-pole, likewise define a secondary 0'-pole, a centre for outward direction.

On this second level G and A, Gravitation and outward Acceleration should appear with reversed roles: Gravitation acting as a binding force, Acceleration outwards as the separating, polarizing one. The opposition to first proposed identifications of "poles" 4a---4b.

(The same may be said about the relations between protons and electrons versus **p-p**-relations (or between quarks) and **e--e**-relations.)

7. Gravitation as a pushing or pulling force?

How should we after all understand Gravitation as an "attractive force"? Is the "attraction" in reality a *pulling* force, emanating from a centre, a 0-pole, not a *pushing* one from outside as the 00-pole, a pressure inwards?

The first case seems to agree with identifications here on the elementary level, Gravitation as an inward directed vector field. Compare the description by a physicist of Gravitation as "a kind of pressure from outside", versus F_A as a kind of pressure from inside.

On the second level, with Gravitation appearing as a binding force, it should emanate from the 0-pole, a centre in the conceptual structure here. Hence with the character of a *pulling* force? If so, it should be connected with the gravitational centre rather than the Mass centre of each atom or celestial cloud or body?

END