Mass - Matter — Vacant Space

The absolutely first to state:
The material property of some things is only a question of relative complication and directions of structures - when all building stones of Universe are seen as dimensions.

There is no such thing as the old fix border between a "material" nature and an "abstract" or "spiritual" world.

Fields - Mass/Matter-Charges - Waves:
Elementary, according to the dimension model here, the concepts "fields" - "matter" - "waves" should be possible to connect with dimension degree steps

$4 \rightarrow 3 \rightarrow [2 \rightarrow 1 \rightarrow 0/00]$ respectively.

Matter is then seen as 3-dimensional in relation to 4-dimensional fields, as 3-dimensional superpositions to fields.

Waves, in relation to matter (in a pre-de Broglie-sense!), can structurally be described in terms of dimension degree steps $2 \rightarrow 1 \rightarrow 0/00$, or $(3) \rightarrow 2 \rightarrow 1 \rightarrow 0/00$. In these viewpoints we among other things pay attention to the direction outwards towards the d-degree of motion, the increasing number of external motion moments.

We take as starting point the external form of aggregated masses and material bodies as obeying the Euclidean geometry for volumes proportional to r^3.

Mass and Matter?
There are two concepts: Mass and Matter:

a) "Mass" is a property equivalent with or part in the expression for energy ($E=mc^2$) and is connected with the gravitational force.

"Inertia" as a quality is associated or equivalent with "mass" in this sense.

b) "Matter" is associated with relative "impermeability", with surface structures, uphold through the property of Charges.

It collapses when gravitation is too strong.

Hence, we assume here that Mass is the property created in d-degree step **$4 \rightarrow 3$**, (closer to the field level, and Matter the word for the property created in d-degree step **$3 \rightarrow 2$**, close to the differentiation of Charge.

Mass as "inversion" of fields:
Gravitation is seen as an answer from anti-centre, the 00-pole, to the F_A-force, the outward acceleration force, on the field level, d-degree 4.

Here is assumed that Mass as property is the result of "inversion" of fields from 4th d-degree to the 3rd, dominated by gravitation. Some kind of "inversion". In three respects perhaps:
- "Inversion" as inward direction, interpreted as "negative" direction versus outward acceleration (F_A-force), meaning a building in of fields*,
- "Inversion" as the mathematical operation $y = x$ inverted to $y = 1/x$, a straight line translated to curves.

- Geometrically through angle steps forming one pole with enclosed centre, ("the circular" pole) versus the excluded pole of the surroundings, (the" radial" pole).

> ** Compare, if superposition can be viewed as addition, the 4- dimensional fields plus 3-dimensional mass structure, forming the 7 dimensions that the string theory talks about as underlying, "not developed" ones.*

Compare the inversion of numbers too, all numbers ›+1 or ‹-1, giving fractional numbers near the origin, the Zero.

In old classical physics we have F = m x a, a Force is Mass times Acceleration. That gives:

Mass = Force x 1/a, inversion of acceleration, (s^2/m).

If we regard Forces as 4-dimensional and Time as 0-dimensional, we get the Mass as 3-dimensional. (With Time seen as 1-dimensional, Mass will be 5-dimensional.).

According to first postulates in this model, the concept **Velocity** is identified with the quantum jumps, (along the main axis of a dimension chain).

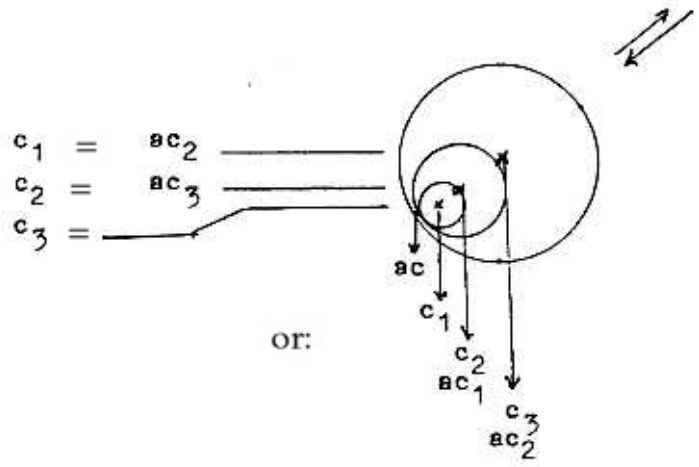
Hence, the Einstein formula $E = mc^2$, where E designates energy, **c** the light velocity, **m** the mass, the energy becomes 5-dimensional, which sounds reasonable, if Time is regarded as 0-dimensional.

It could be interpreted as an expression for a 5-dimensional relation: Mass as a 3-dimensional structure, and c^2 interpreted as the expression for the 2 quantum steps from d-degree 5 to the Mass degree 3, representing the binding energy in underlying steps.

Mass as inertia:
Mass - Inertia - Heaviness - Gravitation: what difference?

1) It has been said - within the frames of mechanical physics - that Mass as a property is more or less equivalent with "inertia". Inertia as resistance to changes in velocity or motion, when an outer force is applied to it, is an aspect from outside.

A hypothesis in this model is that Mass in this sense - but as an inner property - has its root in what the concept of **"centre displacement"** stands for. (Compare in macrocosm the difference between gravitation centres and mass centres.) First origin of Mass should be found at the anti-centre pole. With growing complexity anticentre of units become centres of superposed units:



We get a stepwise centre displacement as a eoretical foundation during development of dimension chains....

Mass then should be Mass in force of its "strangeness" to use a word from elementary particle physics. (And compare perhaps a flywheel, the inertia of which reasonably grows outwards with bigger radius.)

To compel a unit of an inward directed acceleration, even if inverted, to accelerate outwards, is naturally against its will!

Heaviness, in opposition to Inertia, could be described as a concept for relations between two bodies, as between the human body and the gravitation of earth.

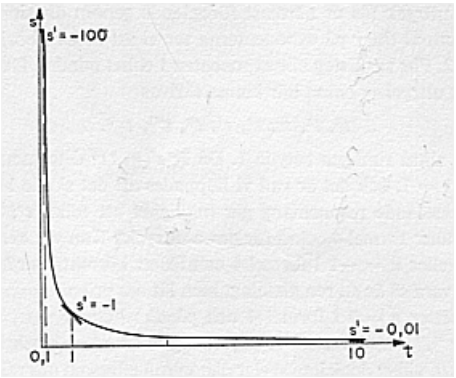
There is a mess of loosely formulated statements about these things. Physicists don't seem to care about congruence between concepts in "classical" physics nowadays.

An example: Two statements seem difficult to unite:

It's said that gravitation is strongest at the surface of an aggregated mass. This is rather simple to understand: On a particle at the surface the gravitational forces are acting only from particles besides and inwards. For a particle deeper in the mass, gravitational forces from others cancel each others.

At the same time we have the statement that gravitation falls off proportional to 1/r inside an aggregated mass, strongest in the centre then, This means we have a factor in gravitation as the inversion of the quality Distance, as in inverted acceleration, see above.

The two statements must be a mix of essentially opposite views, for instance from the single particle as 0-pole and the aggregated mass as 00-pole. Or a "reading" of the gravitational force along two perpendicular co-ordinate axes when the angle 180° of 4th d-degree is transformed to the 90° of 3rd d-degree,



0- and 00-poles along straight angles. Centre and surface. What could that say about the structure of Mass and aggregated masses - and the reason for rotation of celestial bodies !? (*Figure source: Sawyer 1961.* $v = -1/t^2$)

Another problem is how to interpret the Einstein's (Lorentz') formulas, which says that mass grows to infinity when the velocity of a particle or body goes to the light velocity c. And at the same time looses its length dimension, becomes 2-dimensional.

The problem of the first formula arises when the 0- or Zero-pole shows itself as denominator, which it really is in this model, mathematically giving the numerator the role of 00-pole and "infinity", more properly the role of whatsoever. The relation becomes an undefined "infinity". If we allow ourselves to multiply both terms with with denominator zero, we get that Mass in light velocity x 0 = the rest mass.

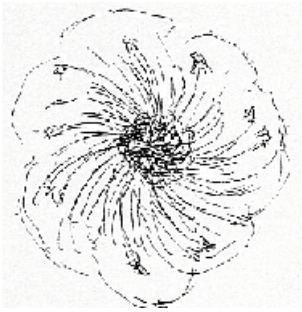
This rest mass becomes zero.

Without penetrating the equations behind, we could assume here that the formula concerns mass as inertia, and that velocity, reaching c, implies a transformation to another co-ordinate axis - and d-degree 2 according to the second formula (compare the figure above). The Mass concept will then get another meaning.

Lower d-degrees always represent an infinity - and "anti-centre" - in relation to higher d-degrees. (There are an infinity of surfaces in a volume, e.g.)

We have also in first formula a complex relation (as "division") between the "rest mass" as numerator and velocity in the denominator, both rest and motion. In the model here the quantum jumps between d-degrees are identified as the concept Velocity. They represent then happenings between structures and motions.

Figuratively Mass could be called a dimension fountain - of inversions, - or a "matter flower " out of underlying fields and dimensional networks of branches. A converted maelstrom.



(The Mass more like a source of unrest. As built-in energy:
As the spring in a winded up watch. As the aviation
force in a bumblebee. As the spider when it spins
the thread of its path. Mass in itself just that
"being winded up" in a spring.)

Matter:

Matter as a concept is - in a certain contrast to "mass" - connected with a more "material", "particle" like structure, generally speaking: particles with enclosed centres, with surfaces.

It is an aspect on the relative **impermeability** of quanta, associated with this physical quality. .

It can be interpreted as a certain degree of complexity in the structure, of "**substantiation**".

With the inwards / outwards development of dimension chains, the particle character in the structure increases. Hence, for matter as the property of being material there are differences in degrees.

Matter is also connected with the charge concept, with the charges of quarks, even if zero charged as some mesons and the neutrons.

Charge is in this model assumed to be a property of d-degree 2 (in relation to Mass analysed as a property of d-degree 3). That's a reason to see "matter" here as a concept in d-degree 3-2:

Protons, e.g., as a pole 3a of 3 dimensions curled and rolled up into them selves in inward direction (*compare the String theory).*

We know that electromagnetic waves, outward directed as waves, in inward direction* can create / transform to pairs of charges as electrons/positrons (e+/e-) momentarily.

* Interpretation in this model.

Since the level of analysis is optional, the structure of matter as tied-up energy should alternatively be possible to describe
- as stratified shells,
- as stabilised , relatively closed processes (of polarisations/ depolarisations), à la "standing waves",
- as conglomerated, curly lines,
- as built-in movements, more or less stabilised.

This seen from lower dimension degrees 2 ← 1 ←0/00.

Spin:

Matter particles are "fermions", are composed by quarks according to assumptions in the standard model. They have mass, and spin 1/2.

Spin 1/2 means, according to Hawking, that the particle has to be turned twice (!) round for appearing the same again, (in opposition to quanta of forces, which only have to be turned one round).

A suggestion here is to think about a band twisted once to an "8": The band has a 2-dimensional structure, an inside and an outside. Following the outside we come to the inside and after two round to the outside starting point again.

Generally speaking this indicates a more complicated structure. More about spin on pages Charge and Spin.)

Vacant Space:

Time has been called "an aspect on the relative motions of bodies". Space could be seen as equal "relative", **an aspect on the relative positions of single units**, as quanta or material bodies.

Space is defined through distances relations and direction relations of 1st degree and through motions. Through surfaces as enclosing and excluding centres, through material bodies and their movements.

The answer to the question how forces can act over distances must be that it is the forces that create distances and Space.

Vacant Space is here defined as the complementary pole to Mass. It's seen as characterised by the outward acceleration, the F_A-force in d-degree 4, more fundamentally in the negative expression "$-E=mc^{2}$" in Dirac's hole theory, whose equations gave two results

$+E=mc^2$

$- E=mc^2$.

The first polarisation of the Entirety in d-degree 5 into the poles 0 and 00 is here presumed as a polarisation in +/- E for Energy.

According to first simple hypothesis in this model the opposite poles of 3rd d-degree get

the forms of **"radial" versus "circular" geometries**. That is to say that the radial structure of vector fields in d-degree 4 are preserved in d-degree 3 for the pole 3 representing outward direction, while mass or matter as an "answer" from the 00-pole gets "circular" structure.(About d-degree step 4→3, see another file.)

Through a pole exchange Vacant space as radial, open structure gets the role of anti-centre to normal mass - and matter of positive energy.

(Another aspect is to see mass and matter as the result when a cosmos of "haploid" dimension chains are "saturated" through meeting and combining with another one - and see vacant space as the unsaturated rest.)

Density, here chosen as concept for a primary physical quantity (rather quality), between centre and anti-centre, in d-degree step 5 →4, is in outward direction imagined as polarised in e.g. Mass per Volume unit in 3rd dimension degree.

Density is expressed too in quantities (or qualities) as the strengths of vector fields and in density of charge - as in Schrödinger's wave functions - and is intrinsic in the concept of distance (-closeness): that is in lower d-degrees.

(In the same way as Forces are interpreted as transformed into qualities of lower d-degrees as Mass - Distance - Time.)

The "negative" energy of vacant space should not be interpreted as just lack of energy. It should be understood as a world "below the E0-line" (se further down).

Different signs (+) and (-) are viewed as representing complementary poles, at bottom opposite directions.

If we presume that there are plus- and minus-potentials developed in matter, and have the multiplication of minus-energy with minus-potentials (as in the expression for energy: Force x Distance), we can get positive results, (the radial ones, compare repulsion), and minus-energy on the plus-potentials, (circular), of the nucleus, compare attraction).

Vacant space will be **a working force**, giving both plus- and minus-energy depending on the sign (or direction) of that phenomenon which it is acting on, etc.

The matter is not so simple:

According to the main geometrical views in this model the anti-centre pole as surrounding is step by step built in into the counterpole units with enclosed centres towards superposed levels.

This implies that we should expect mass/matter and vacant space being **complementary combinations** of both 0- and 00-poles and F_A and F_G , a complementary construction of elements from the field level. Compare views on the nuclear force. We could find "holes" or factors of "anti-matter" . (as earlier assumptions by physicists) in our ordinary matter.

On the level of atomic structures there are for instance the intervals between electron shells and distances between electron shells and nuclei. Cf. also Electromagnetic waves.

If we accept the view about electromagnetic waves, that the waves uphold their existence thanks to the continuous access to vacant space as "nourishment", then we could imagine Matter being still more complicatedly dependant on vacant space for its existence. Presumably we could say that Matter as atoms"is breathing vacant space".

Hence, we see the particle like structures as stabilised processes where matter, roughly interpreted as plus-energy, all the time must be uphold through communication

with the original Entirety, via (+/-)-energies on underlying levels, i.e. with that original Entirety which also is environment.
When for example tremendously dense neutron stars implodes in so called **gravity collapses**, and explodes into supernovas, the interpretation could be that the access to "vacant space" in the inner of the stars has been strangled to a certain density limit. Matter - as just structure, is ruined (perishes) or revolts.

Different degrees of Vacant Space and Gravitation:
In more general terms we could imagine that there in the neighbourhood of big celestial bodies, where the field level so to say has been "used up" at the inversion to mass, are another degree of vacant space: gravitational fields as a sweating of vacant space: the negative energy of vacant space sucked out, making it extra or "collapsingly" empty, with losses in its"radial force", curved towards circular forms.

Masses are then depending on the outward acceleration force and Vacant space. According to new information too it isn't the galaxies that are flying outwards from us in cosmos but the space that is expanding, "carrying" them away.

Microcosm - macrocosm will then become 0-00-poles in a complex combination of matter and vacant space:
matter built-in into vacant space in macrocosm, and
vacant space built-in into the matter in microcosm.

Motions
Motions could be called the communication between $+E=mc^2$ and $-E=mc^2$
(D-degree 0/00 of Motion as the ultimate expression or translation for the Entirety of 5th d-degree.)

Compare forces as interactions, with quanta of forces which include the complementary pole of vacant space.

The E0-line:
With accepting the theory of "two worlds" of +/- $E=mc^2$ we have to assume that the first Entirety of d-degree 5 represents E0, 0 for Zero, a border line between the regions, a kind of mirror.
Osmosis, the penetration into surroundings, is a process generated by a Density difference. It doesn't claim any energy. Big Bang as osmosis?!

Said in another way: the concept of Energy isn't yet defined. According to the abstracts of this model: first when we have a relation between between derived d-degrees as force relative to structure (~Force x potentials as Distance), there is a measurable "energy".
Still the border line or E0 will be the real energy well.

In d-degree 4 we could see the lost d-degree, transformed to motion, as this border line E0: expressed, say, in the increasing/decreasing Density of longitudinal waves.
And then: Rotation as "E0" in d-degree 3.

Mass - Vacant space in relation to Distance and Time:

Time	(directions)	Distance
mass	——————→	space: **frequency**-modulating
mass	←——————	space: **amplitude**-modulating

Time: inverted to frequencies outwards the space: waves...
Distance: as wavelengths inverted to amplitudes inwards: mass property.
Compare the same in the atom and in the nervous system.

A curious question seems to follow from first postulates in this model. A 3-dimensional space "should have" movements in remaining 2 d-degrees, expressions for the "lost" dimensions in steps $5 \rightarrow 4 \rightarrow 3$.

Hence Space, analysed as 3-dimensional and an entity in its own right, should have some 2-dimensional motion. If we can see rotation as such a motion for its complementary "circular" pole, for Matter. the Vacant Space should have a motion of "radial" character, perhaps possible to identify as negative curving of surfaces in space? (Added here: As in some kind of hyperbolic geometry?)

Is Vacant Space quantified?
Shall we think that the vacant space in itself is quantified or only as a result of the quantified matter?

When, for instance, the positive energy levels in the electron shells of atoms are quantified, the space or the negative energies between the levels are by that simultaneously quantified.

In terms of quantum jumps versus continuum, the vacant space, in its role of a relative 00-pole, should still correspond to continuum, in that sense then be quantified by the counterpole, by matter.Yet, at bottom, the principle should be the same as in longitudinal waves: a simultaneous quantification through thinning - condensation (motions "to/from each other").

According to the model here we should be able to find **co-**resonances in both "structures" , between matter and vacant space, coupled through a joint, unpolarised underlying level.

See further some notes on the experiments which became the foundation of quantum mechanics.

Some critical notes here:

1) According to this model there should be a 3-dimensional structure, geometrically called **Volume, still unpolarised** into Mass and Vacant Space. What should that be? It gets very abstract and hard to imagine otherwise than in mathematical terms, as 3-dimensional functions or vector fields.

We could possibly imagine a 3-dimensional, Euclidean "room", polarised into an elliptical and a hyperbolical geometry for mass and vacant space respectively? (Or with positive and negative curvature.)

The concept Volume is a scalar, but imagined as 3-dimensional vector fields we have a much more dynamic world.

2) How can such an abstract "volume" be interpreted as the **"binding force"** between Mass and Vacant Space? As their "inner connection"?

Simplest we could see the motions of material units as an expression for this binding force. (It's not least thanks to empty space that material bodies can move!)

In quantum mechanics we can think about **Feynman's "way integral"**, his interpretation of behaviour and "path way" of electrons in quantum experiments, the quanta taking "all ways" to a split in a screen. The "way integral" seems to just define the concept "Volume".

Compare too forces as interactions and their "carriers" in the standard model - as expressions for this binding force.

3) Is it possible to state that the polarisation between mass and vacant space defines d-degree 2 as Surfaces - in a more than a rather silly way? As a physical structure "in its own right"? Possible to identify with Charge as concept? We leave the question to that chapter.

4) In which sense is it allowed, if at all so, to look at Mass as a 3-dimensional property?

Well, celestial bodies and atoms, even nuclei?, occupy a 3-dimensional Euclidean space. And perhaps there is a connection with the physicists' statement that the strong, nuclear force falls of proportional to $1/r^3$, the cube of the radius.

Still, it should be possible in this model to include the aspect on a 4-dimensional "meta-room", already defined on the vector field level, where one d-degree is not yet transformed into external motion - not contradicting the 4th d-degree of the room in Kaluza's calculations.

(About 11 dimensions, see some notes to the String Theory.)

Special notes to this chapter in anadditional file:

- Waves before Mass?
- Matter as de Broglie waves
- Mass - transformed into other physical quantities
- Some numbers
- The lacking Mass or Matter in Universe
- Can new matter be created in our Universe?
- The splitting up or interference-diffraction of the Mass
- Vacant Space and the Future

The d-degree step 4 $\rightarrow$ 3 and the manyfoldness of mass, see file 4 $\rightarrow$3 issues...

