Conceptual FrameWorks
Research papers

Relational concepts in generalized quantized space

Sydney Ernest Grimm*

Observations are restricted to the mutual relations between observable phenomena. That is why modern physics is founded on phenomenological physics.[A] Nevertheless, the theoretical framework of phenomenological physics – the description of the basic components and the underlying structure like laws, universal constants and principles – is essential to determine the implications of the basic properties and structure of quantized space.[B]

Introduction

Suppose it is possible to interview 1 unit of quantized space. Now the most interesting question I can ask is about the opinion of the unit in relation of her/his experience of reality. Is she/he aware of the spatial configurations that are created – during some time – by herself/himself and all the other units around? Or is it only the awareness of personal stress if the unit is part of a highly deformed local phenomenon, e.g. a planet, during some time? Because quantized space is in rest in relation to all the observable phenomena.

I don't know her/his answer but I know for sure that the unit has no experience in relation to the state of invariant symmetry.[1] Therefore, if I transform the geometrical changes of one or more units into mathematical equations I am creating relational concepts that originate from the macroscopic scale of observable reality. That means the equations describe the generalized reality of quantized space to facilitate the human imagination to create easy to handle concepts.

In other words, $E = mc^2$ represents a relational concept so I can substitute the equation with: $n\,\underline{h} = m$. This in contrast to our non-local universe. It is impossibility to replace local creations within observable reality by substitutional creations, because every local creation is unique (the consequence of non-locality[C]).

Invariant volume

Every change of a unit is the internal transfer of a fixed amount of topological deformation ($\underline{h}$) to one or more planes of its surface area. The fixed amount of topological deformation is related to Planck's constant (h), the fixed amount of energy during 1 second. So if I decrease the linear transfer of 1 quantum during 1 second to the size of 1 unit of quantized space I get the fixed amount of topological deformation with the energy of one quantum (notation $\underline{h}$). All the units of quantized space tessellate space thus the mass in $E = mc^2$ represents a number of quanta: $m = n\,\underline{h}$.

The cause behind the transfer of the fixed amount of volume within the boundary of a unit is the scalar mechanism of the unit in relation to the scalar mechanisms of all the units around. In practise it is the transfer of exactly the same amount of volume to one or more planes of the unit by 1 or more adjacent units (figure 1). Therefore, the transferred amount of volume by the red and green arrows in the schematic figure 1 – output and input deformation – is identical ($1\underline{h}$). If I decide that output deformation is positive and input deformation is negative, I can write that the sum of all the transfer of volume that changes the shape of the unit – the transfer of volume within its boundary – is zero at every moment. Every unit has 12 faces (figure 2), thus:

$$\sum \Delta V_1 + \Delta V_2 + \ldots + \Delta V_{12} = 0 \qquad [1]$$

or:

$$\sum \Delta V_{input} = \sum \Delta V_{output} \qquad [2]$$

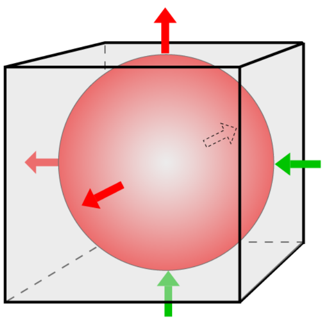

figure 1

Actually, the second equation shows in a natural way the main law in theoretical physics: the law of conservation of energy.[D]

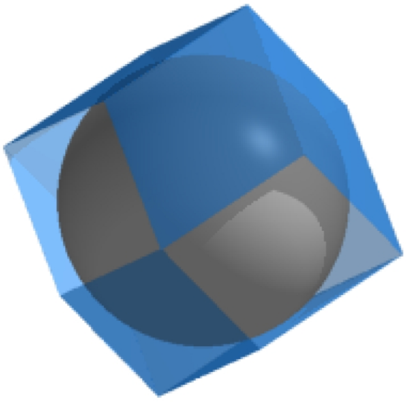

figure 2

The fixed amount of topological deformation of 1 unit ($\underline{h}$) represents a fixed amount of time too (see figure 3). Because the fixed amount of topological deformation is derived from the constant speed of light.

The ratio between Planck's constant *h* and the fixed amount of topological deformation of 1 unit ($\underline{h}$) is the ratio between the length of the linear trajectory of one quantum during 1 second with the speed of light (c) and the size of 1 unit (the minimal length scale $\underline{\lambda}$).[2]

Figure 3 shows in a schematic way the deformation of a simplified unit – figure 1 – in 2 opposite joint faces. An input deformation by the adjacent unit – green arrow – and an output deformation by the unit itself (red arrow).

The amount of topological deformation is $\underline{h}$ (fixed amount of transferred volume – V_{input} or V_{output} – within the boundary of the unit). The transfer of a fixed flux of infinite small amounts of volume has a duration: the fixed amount of time ($\underline{t}$) it costs to create the deformation of 1 $\underline{h}$. But the observer will conclude that 1 $\underline{t}$ is the time it costs to transfer 1 $\underline{h}$ from position 1 to position 2 (phenomenological reality). In between 1 $\underline{t}$ there is no detectable observable change within the electric field (Heisenberg's uncertainty principle[3]).

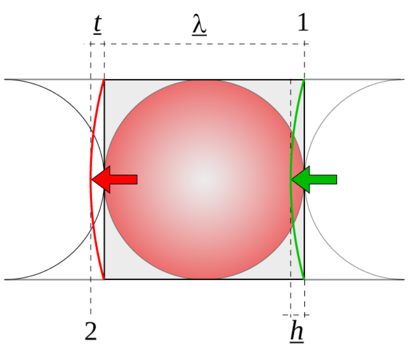

figure 3

Enumeration

The observable energy of a unit ($\underline{h}$) is the transfer of a fixed amount of volume within its boundary.

The size of the unit ("diameter") is the minimal length scale ($\underline{\lambda}$).

The constant speed of light is the linear transfer of 1 quantum ($\underline{h}$) over a distance of 1 $\underline{\lambda}$ during 1 $\underline{t}$.

Invariance of deformation

The scalar mechanism of every unit of quantized space is equal to the scalar mechanisms of all the other units in the universe. Moreover, the resistance against deforming of every scalar mechanism is infinite.[E]

However, the observable influence of the scalar mechanism is the deformed part of the unit, the volume we have named the electric field in physics.

Figure 4 shows a schematic linear deformation of a unit and to show in an easy way the geometrical consequences the deformation seems to be a transfer of the whole volume of the "electric field".

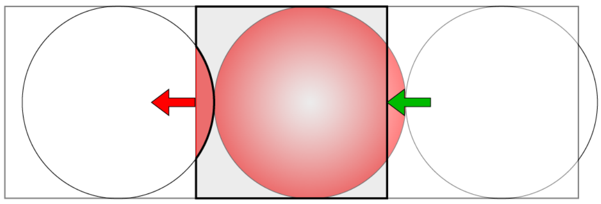

figure 4

The surface area of the whole unit has increased but the surface area of the deformed part of the scalar mechanism of the unit hasn't changed at all. In other words, the inscribed sphere of the unit – the scalar of the local flat Higgs field – is not involved in the topological deformations of the unit.[E] The invariance of the properties of the deformed part of the unit – volume and surface area – shows why the scalar mechanism of the units of quantized space can deform on and on without any local or universal disturbance of the evolution of the universe.

However, the Higgs field isn't flat everywhere in the universe. Rest mass and black holes are the result of local decreased scalars. That means that the decrease of a local scalar have to occur within the invariance of deformation.

Figure 5 shows a further increase of the deformation of the unit in the centre of figure 4. The deformation is the

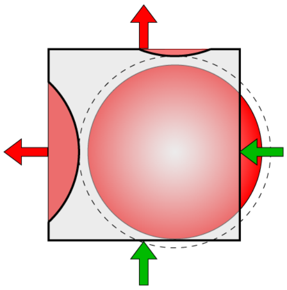

figure 5

result of a further transfer of quanta within its boundary – forced by all the units around – and will keep: $\sum \Delta V_1 + \Delta V_2 + \ldots + \Delta V_{12} = 0$ [1].

Nevertheless, figure 5 shows an increase of the asymmetry between the centre of the inscribed sphere and the "centre" of the deformed part of the unit (see the hypothetical symmetrical unit in figure 2).

The transfer of volume within the boundary of a unit is caused by the scalar mechanism of the unit in relation to the scalar mechanisms of all the other units in the universe. That means that the shape of the unit is forced to change according to the invariance of topological deformation.

Conservation of scalar vectors

The increase or decrease of the topological deformation of the "electric part" of every unit of quantized space will create vectors within the scalars of the flat Higgs field. That means that all the scalar vectors represent the deformation of the electric part of the units of quantized space.

Figure 6 shows the principle of topological deformation between 2 invariant volumes. The blue arrows show the transfer of volume to *decrease* the deformation. B is V_{output} and A, C are V_{input} [2] if my point of view is the bottommost volume. But A, B and C represent alterations from the minimal joint surface area of both volumes (the dotted horizontal line). That means that decreasing the topological deformation will result in a "double" decrease of the corresponding vectors.

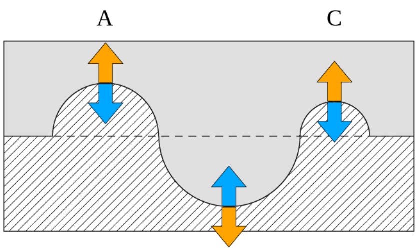

figure 6

However, the scalar vectors within the flat Higgs field – actually vacuum space – don't represent energy. The scalar vectors influence the direction of the transfer of quanta (<u>h</u>) to one or more joint faces.

The synchronous transfer of <u>h</u> by every unit in quantized space at the moment "now" – the conservation of quanta transfer[D] – is not comparable with the "amplitudes" of the deformation in A, B and C of figure 6. In other words, the concentration of quanta – the creation of mass and rest mass – will decrease the average "amplitudes" of the topological deformation in the universe. As a result, the scalar vectors will decrease too.

Electromagnetic waves – see figure 7 – are a propagation of deformation in space with a local magnitude of 1 quantum ($E = h$ f). That means that the topological deformation of the quantum generates a scalar vector with the magnitude of one quantum and visa versa.

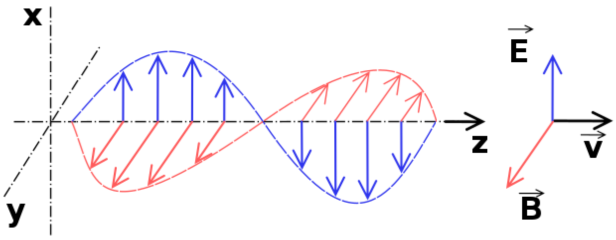

figure 7

The quanta of the electromagnetic wave are super positioned on the amplitudes of deformation, like A, B and C in figure 6, and are part of the generated scalar vectors of these local amplitudes of the involved units, the magnetic field.[4]

If I decrease the frequency of an electromagnetic wave the energy of the electromagnetic wave will decrease correspondingly and visa versa. However, what mechanism is responsible for the creation of the frequency of the electromagnetic wave? It is the size of the configuration of the emitter of the wave. Because a small sized configuration needs less internal quanta transfer to supply the quantum in relation to a large sized configuration.

The formula $E = h$ f doesn't describe the amount of transferred quanta of the electromagnetic wave. The formula only states that a higher frequency will result in the transfer of more quanta during 1 second. And that's obvious.

The concentration of topological deformation will decrease the average magnitudes of the amplitudes of the electric field in vacuum space. In other words, if our non-local universe is creating more mass and rest mass during its evolution the magnitudes of the amplitudes of the electric field everywhere in vacuum space will slowly decrease over time. The consequence is that the scalar vectors of the magnetic field decrease in a corresponding way.

There are 2 questions that have to be answered. The first question is about the underlying mechanism of the amplitudes of the electric field (the deformed parts of all the units of quantized space). The second question is about the invariance of all the scalar vectors in the universe.

The basic properties of the units of quantized space – actually the identical scalar mechanism of every unit – results in the existence of "wave forms". The continuous and synchronous change of the shape of every unit.

Figure 8 shows the deformation between 2 units in cross section and the diamond represents the joint face of the unit at the right side. The amount of deformation of the unit at the right side represents a flux of infinite small amounts of volume during a certain amount of time (n $\underline{t}$). The unit doesn't "like" a huge amount of deformation because the scalar mechanism of every unit tries to become a full scalar (the whole volume transforms into a sphere).

A huge amount of deformation in one or more faces represents the temporarily unbalance of the scalar mechanism of the distinct unit. The unit "prefers" the situation in figure 2 (a symmetrical shape). Unfortunately, a huge deformation in one or more joint faces is impossible without a huge deformation in the other joint faces, because $\uparrow V_{input} = \uparrow V_{output}$.

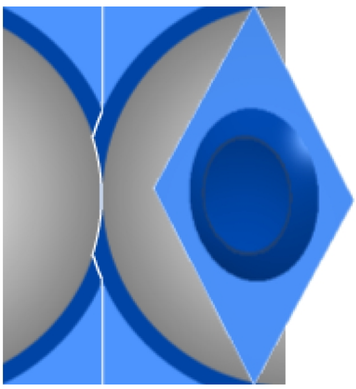

figure 8

Every unit has 12 joint faces with the units around thus a local increase of deformation will result in an increase of deformation of the units around. Actually the increase of the magnitudes of the amplitudes in figure 6 (dark yellow arrows). That's why the scalar mechanism tries to minimize the magnitude of the amplitudes; the temporarily unbalance of the scalar mechanism: $\downarrow V_{input} = \downarrow V_{output}$.

If the temporarily unbalance of the scalar mechanism of a unit decreases, the unbalance of the units around decreases too. Now the scalar vectors are less dominant in a preferred direction, resulting in the widening of the amplitudes (comparable with a 2D wave length).

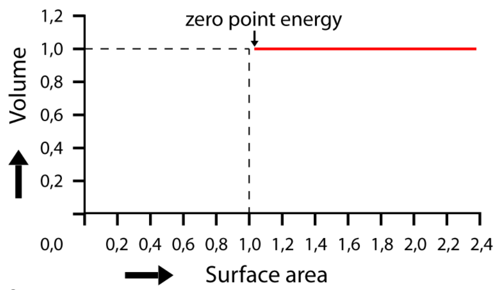

figure 9

If the amplitudes of the electric field are slowly decreasing during the creation of mass and rest mass, the light of distant galaxies will be influenced too. The result is an increasing redshift.[5]

There is an average amount of topological deformation in the universe, a point somewhere on the horizontal red line in figure 9. If the average amount of topological deformation in vacuum space is decreasing because of the local concentration of quanta (n $\underline{h}$), the scalar vectors of the magnetic field will decrease too. But the amount of topological deformation in the whole universe is conserved. Therefore I have to conclude that the amount of scalar vectors (the magnitudes) must be conserved too.

Mass is the local concentration of quanta within vacuum space. That means that mass have corresponding scalar vectors. Rest mass, on the other hand, is a concentration of quanta that results in the decrease of one or more scalars of the flat Higgs field.

The decrease of a scalar interrupts the lattice of inscribed spheres in vacuum space. Disconnecting the points of contact between the decreased scalar(s) and all the other scalars within the flat Higgs field.

A scalar will decrease if the unit has to transfer a quantum and all the other units around cannot facilitate the deformation of the unit. That means that the scalar has to decrease an amount of volume of 1 quantum (at that moment). Now the quantum will become part of the deformed volume of the unit, the electric field.

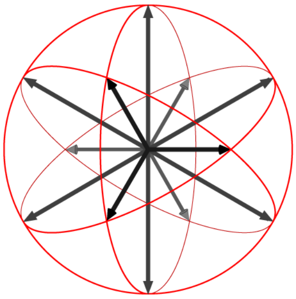

figure 10

The magnetic field – the scalar vectors in vacuum space – are super positioned upon the scalar vectors of the inscribed spheres itself (figure 10). The scalar mechanism of every inscribed sphere "pushes" against the other inscribed spheres around.[F] Decreasing one scalar is changing the direction of the involved scalar vectors. The result is Newtonian gravity.[G]

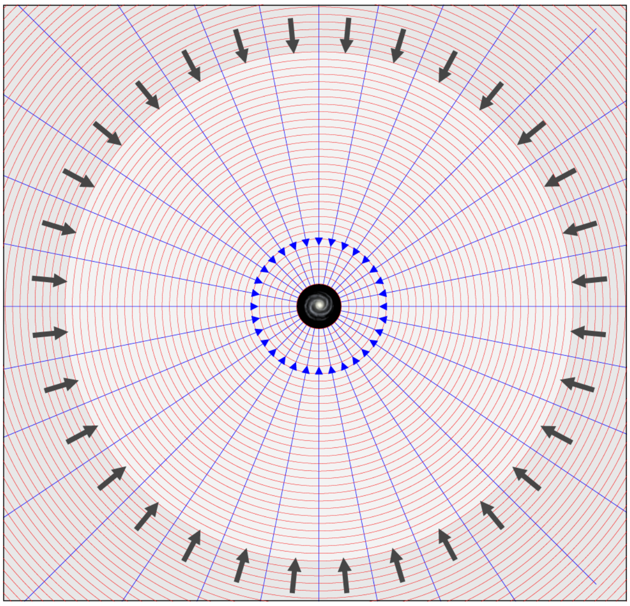

figure 11

In the centre of figure 11 there is a galaxy. All the mass and rest mass is concentrated by the huge volume of the electric field (dark grey arrows and concentric circles). The created resulting vectors – because of the decreased scalars – are the blue arrows (Newtonian gravity). In other words, the magnitudes of all the scalar vectors that are created by the corresponding amplitudes of the electric field in our universe are conserved (direction of topological transformations).

"Enclosures"

A. "*Empiricism and empirical information*"
https://zenodo.org/record/3592378

B. "*The objective reality of space and time*"
https://zenodo.org/record/3593872

C. "*On a non-local universe*"
https://zenodo.org/record/3659701

D. "*Quanta transfer in space is conserved*".
https://zenodo.org/record/3572846

E. "*On the concept of (quantum) fields*"
https://zenodo.org/record/3585790

F. "*Tessellation and concentration in quantized space*"
https://zenodo.org/record/3684959

G. "*On quantum gravity*"
https://zenodo.org/record/3590404

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4. C. Riek, D. V. Seletskiy, A. S. Moskalenko, et al. "*Direct sampling of electric-field vacuum fluctuations*"Science (2015), Vol. 350, Issue 6259, pp. 420-423
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5. Ruth Durrer (2002). "*Frontiers of the universe: What do we know, what do we understand?*"
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* City of Amersfoort, the Netherlands
mail: segrimm@conceptualframeworks.org
orcid: 0000-0002-2882-420X