

# On resultant motion in discrete space

Sydney Ernest Grimm\*

*Before the emergence of matter in the universe there was no strong force, no weak nuclear force and no gravitational force. In the “primordial” universe there were only 3 basic quantum fields, responsible for the emergence of matter and related forces. Inclusive the appearance of the resultant motion of vacuum space around matter.*

## Introduction

If we talk about the nature of reality, we are thinking about an all-inclusive volume and the continuous transformations of the variable properties of the structure of the all-inclusive volume. In line with the general concept of modern quantum field theory that matter and detectable energy configurations are created by the basic quantum fields, fields that tessellate the volume of the universe. Therefore it is reasonable to conclude that quantum field theory is about the basic properties of the structure of the universe. Because modern quantum field theory shows to be a realistic approximation of physical reality.<sup>[1]</sup>

Unfortunately, the physics text books suggest that there exists another “fabric” that is responsible for the dynamics in the universe: spacetime. Isaac Newton described absolute space and absolute time in [2 axioms](#) as the continuum – actually a mathematical abstraction – that envelopes all the observable and detectable phenomena. However, *space-time* is directly related to the phenomena: compositions of energy and the geometry of vacuum space under influence of matter. It means that space and time are reduced to a type of “tangible” phenomena. The consequence is that spacetime cannot be an irreplaceable addition to quantum field theory. Actually spacetime represents a phenomenological concept that is “in competition” with the concept of (quantum) fields. And the spacetime model is in line with many experiments too.

In this paper *discrete space* – also termed *quantized space* – is the underlying mathematical model that describes physical reality as a dynamical geometrical structure.<sup>[2]</sup> A description of the geometrical model of discrete space is available in reference 4 and 5.<sup>[4][5]</sup>

The mathematical properties of the structure of discrete space align with the properties of the basic quantum fields.

The universal scalar field (Higgs field), the universal electric field (3D topological field under invariant volume) and its corresponding magnetic field (vector field) reveal the basic properties of the structure of the all-inclusive volume of the universe.

Resultant motion is directly related to [angular momentum](#), although it originates from classic mechanics and it is not yet replaced by a mechanism that is described with the help of the properties of the above mentioned quantum fields. Resultant motion shows its existence at every scale size and is responsible for e.g. accretion disks under influence of a vector force.

## References:

1. Art Hobson (2013); “*There are no particles, there are only fields*”. American journal of physics **81**, 211. DOI: 10.1119/1.4789885. <https://arxiv.org/ftp/arxiv/papers/1204/1204.4616.pdf>
2. S.E. Grimm (2023); “*Dynamics in discrete space*” <https://zenodo.org/record/10443541>
3. S.E. Grimm (2020); “On the construction of the properties of discrete space” <https://zenodo.org/record/3909268>
4. S.E. Grimm (2021); “On mathematics and discrete space” <https://doi.org/10.5281/zenodo.5457368>

\* City of Amersfoort, the Netherlands.  
email: sydneyernestgrimm@gmail.com  
Orcid: 0000-0002-2882-420X

## Topological deformation

In a universe with a 3D structure that tessellate the mathematical volume of the universe motion cannot be what our senses suggest. The 3D structure is a rest frame and what we humans call “motion” is not the transfer of a certain amount of concentrated energy *through* space. It must be the pass on of local differences between variable properties of – and by – the units of the structure itself.

The universal scalar field, the Higgs field, is like a lattice of perfect spheres (figure 1). Because in vacuum space all the scalars have [the same radius](#).

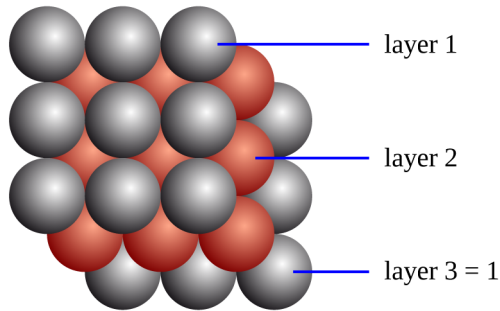


figure 1

Every scalar in vacuum space has 12 points of contact with its adjacent scalars. In between the scalars – about 26% of the volume – there is the universal electric field, a 3D topological field under invariant volume. That is why the volume of every unit of the structure represents a not-deformed part and a deformed part of the internal spherical shape forming mechanism (scalar mechanism). There exists no static geometrical equilibrium between the units.<sup>[3][4]</sup>

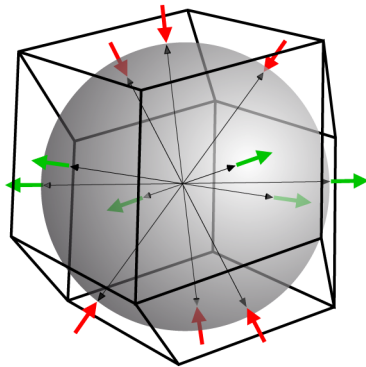


figure 2

I can draw the shape of every unit of the structure with a minimal surface area (in an imaginary static universe) and the result is figure 2: the scalar as the inscribed sphere inside a rhombic dodecahedron. The black arrows (vectors) represent the influence of the not-deformed scalar mechanism on the adjacent scalars of the 12 units around; see figure 1. The red and green arrows symbolize the topological deformation of the 12 “rhombi” at the surface area of the unit. The only purpose of the colours and the direction of the arrows is to show that  $\Delta \text{input} = \Delta \text{output}$  (topological deformation under invariant volume) in every configuration. Nevertheless, figure 2 is a bit too complicated. A cross section of figure 2 is easier to visualize.

The used model of discrete space<sup>[4][5]</sup> is in line with the universal conservation laws – energy and momentum – and the universal constants  $h$  and  $c$  (Planck’s constant and the speed of light), inclusive Heisenberg’s uncertainty prin-

ciple and the principle of non-locality. Therefore it is reasonable to incorporate the mathematical consequence of the model: the synchronization of all the changes of the topological deformation of the surface area of all the units of the structure. The synchronization results in a fixed duration of every smooth deformation of the surface area of the units of the structure: the origin of the constant of quantum time ( $t_q$ ) and Planck’s constant ( $h$ ).

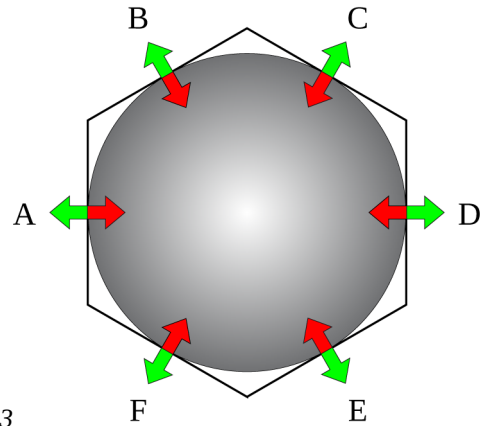


figure 3

The unit in figure 3 (cross-section figure 2) is a unit that configures vacuum space (no decreased scalar) and there are no dominant vectors that influence the direction of the topological deformations of the unit. Now I can state that the net result of all the changes – green and red arrows – during a period of time is (nearly) zero.

But if there are dominant vectors from 1 direction – like gravitational vectors (e.g. the direction  $D \rightarrow A$ ) – the unit generates more topological deformation in the opposite direction (A) than in the other directions. Now the net result of all the topological deformations isn’t nearly zero and the shape of the unit has changed in an asymmetrical way.

In other words, dominant vectors influence the symmetry of the shape of the units in vacuum space, although the size of the inscribed spheres – the scalars – is not affected. The change of surface area under invariant volume is only possible if every unit redistribute some volume within its boundary.<sup>[3][4]</sup> That is why the change of the shape of every unit represents a 3D [topological transformation](#).

The above description is a bit confusing because it is Einstein’s theory of General relativity that describes the deformation of vacuum space around matter.<sup>[5]</sup> Not because of the existence of gravitational vectors, but because the concentrated energy of local matter is thought to force (vacuum) space to change its geometry, although in the model the geometry of space lacks an internal structure.

References:

- Einstein, A. (1916): “*The Foundation of the General Theory of Relativity.*”  
Annalen der Physik, 49, 769-822.  
<http://dx.doi.org/10.1002/andp.19163540702>

**Gravity**

If energy is concentrated ( $E = m c^2$ ) by the universal electric field and the corresponding magnetic field, we get rest mass. Just because in the centre of the energy concentration a scalar is forced to decrease its magnitude (radius). It “permits” the local electric field to concentrate more energy till dynamical equilibrium is reached. Without matter there is no gravitational force, no weak nuclear force and no strong force. The weak nuclear force is not directly related to the creation of rest mass carrying particles, but the strong force and the gravitational force are.

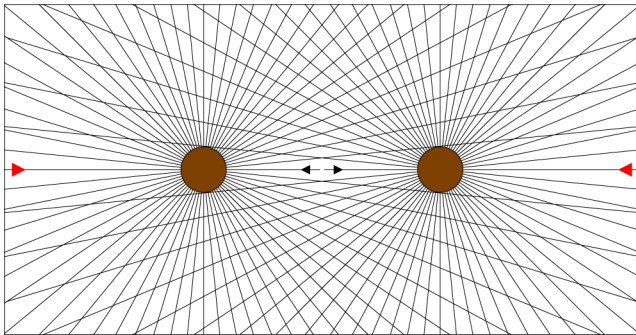


figure 4

All the dynamic changes in the universe originate from the universal electric field and its corresponding magnetic field.<sup>[2]</sup> The influence of gravity is part of the dynamics so gravity cannot have a basic quantum field on its own. The consequence is that gravity as a force field emerges at the moment rest mass is created.<sup>[6][7]</sup> The consequence is that gravity must be a vector field because the flat scalar field in vacuum space – a rigid lattice of identical spheres – gets vectorized if a scalar decreases its radius. All the vectors point to the decreased scalar(s) in the centre of the mass.

Vectors are 1-dimensional influences – because of the pass on of the vectors by the points of contact of the scalars in the flat Higgs field – so in vacuum space the influence is not restricted to the speed of light. That is why vectors act instantaneous.<sup>[8]</sup> In line with the instantaneous influence of the gravitational field in Newtonian gravity, although Isaac Newton chose a model that described gravity as a pull force between matter objects, instead of a push force from vacuum space around the matter object. See figure 4.

If gravity is a vector force from the flat Higgs field around, what will be its influence on the universal electric field and corresponding magnetic field around a matter object?

References:

- Albert Einstein: transcription of a 1920 lecture at Leiden University, the Netherlands. Methuen & Co. Ltd, London (1922). [https://mathshistory.st-andrews.ac.uk/Extras/Einstein\\_ether](https://mathshistory.st-andrews.ac.uk/Extras/Einstein_ether)
- E. Verlinde (2011). “*On the origin of gravity and the laws of Newton*”.  
Journal of High Energy Physics 4, April 2011.  
DOI: 10.1007/jhep04(2011)029  
<https://arxiv.org/abs/1001.0785>
- Ton van Flandern (1998): “*The speed of gravity – What the experiments say*”  
Physics Letters A, Volume 250, Issue 1-3, p. 1-11.  
[https://doi.org/10.1016/S0375-9601\(98\)00650-1](https://doi.org/10.1016/S0375-9601(98)00650-1)

**Gravitational vectors**

The linear velocity of the pass on of 1 quantum of energy ( $h$ ) is the constant speed of light ( $c$ ). Actually, the only velocity of the mutual changes within the structure of the universal electric field is the speed of light. However, figure 2 shows that not every change in the shape of a unit is linear. Mostly the topological deformations involve all the faces of the surface area of a unit. The size of the unit is at least about  $0,5 \times 10^{-15}$  m so every unit changes its surface area about  $5,99 \times 10^{23}$  times with 1 quantum during 1 second. It shows that the description of the general geometry of vacuum space under influence of gravitational vectors will be no more than a rough approximation.

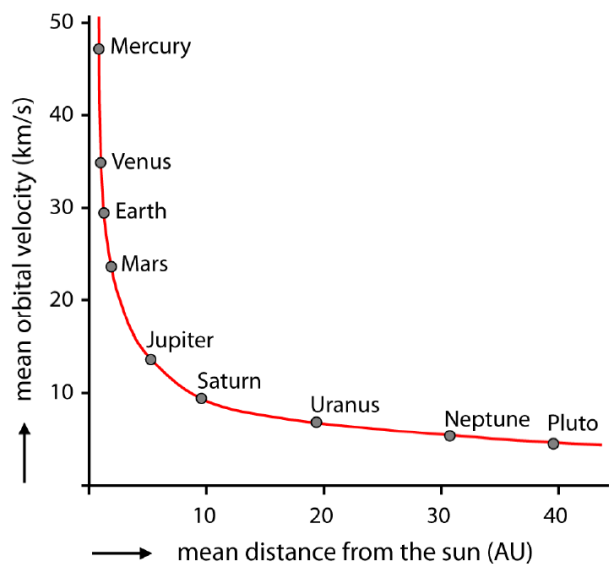


figure 5

The observed and calculated mean velocity and mean distance of the orbits of the planets of the solar system are displayed in Kepler's diagram (figure 5). The graph (red curve) shows the influence of the gravitational field of the sun on the orbits of the planets of the solar system. However, each planet has the same graph (curve) in relation to the orbits of its (small) moons (see the JWST picture of the planet Uranus and some of its moons). A type of influence that is visualized in figure 4. These (resultant) gravitational vectors that point to the centre of every rest mass originate from the decreased scalars of the Higgs field.

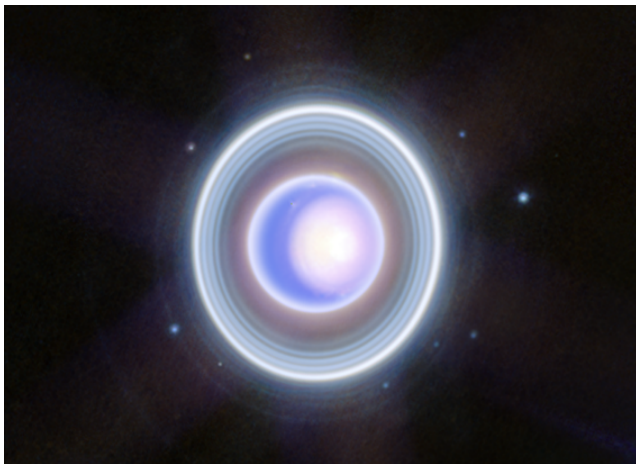


Figure 3 (cross section) visualizes the continuous topological deformation of a unit in vacuum space (no decreased scalar). If the unit represents a unit in vacuum space under influence of gravitational vectors – super positioned on the vectors of the magnetic field – the shape of the unit will deform in an asymmetrical way. That means that if we make a “photograph” of the related deformation of the shapes of the units of the structure of the universal electric field, it is like the matter object is surrounded by some kind of a smooth density enclosure. The closer to the object and the more mass, the higher the density of the topological deformation of the universal electric field. Figure 6 shows the imaginary density grid of the deformed electric field around matter objects (source ESA).

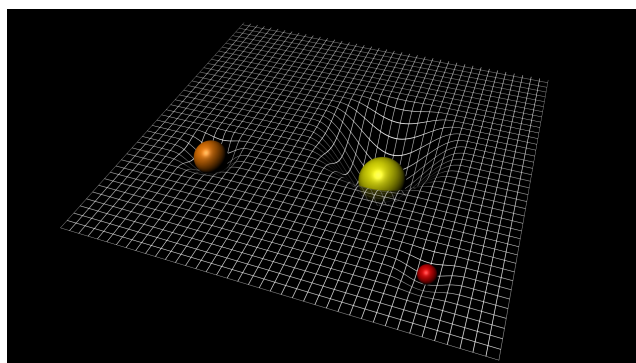


figure 6

If gravitational vectors are responsible for the deformation of the structure of the universal electric field around matter objects, we have to conclude that curved spacetime is a limited (classical) model to describe physical reality in relation to the force of gravitation. Because Albert Einstein transposed the cause behind gravity with the effect of the influence of gravity on the universal electric field.

### Resultant motion

Although every matter object is in motion in relation to the structure of the basic quantum fields, we can interpret every matter object as an impenetrable wall for the freedom to deform in every direction by the units of the structure of the basic quantum fields. But the influence of the impenetrable wall on the freedom to deform depends on the distance between the wall and the distinct unit.

The diagram in figure 7 shows the freedom to deform in every direction in the relation to the distance of the position of a unit and “the wall” ( $r = 0$ ). Because every unit deforms synchronous with all the other units it is clear that nearby “the wall” the freedom to deform in every direction seems to be 50% in relation to a unit at a radius of 1,0.

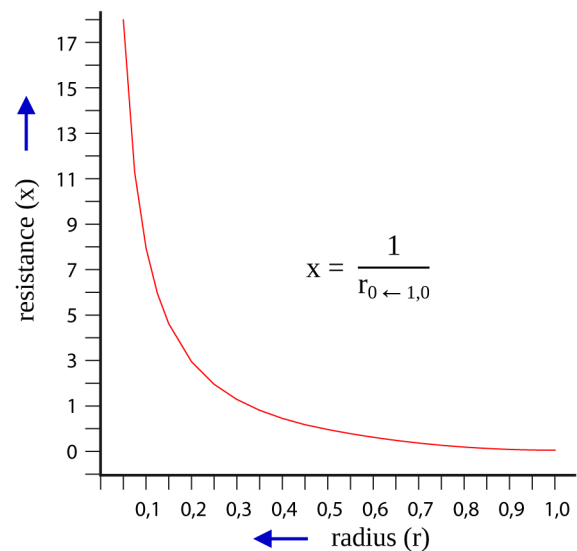


figure 7

However, there is no output deformation without an equal input deformation ( $\Delta input = \Delta output$ ). The consequence is that gravitational vectors create a resultant motion of topological deformation around large matter objects. It depends on the mass of the celestial body – the magnitude of the gravitational vectors – if the resultant motion of the pass on of quanta by the universal electric field is visible because of particles/dust that is carried along. In other words, the resultant motion of the quantum transfer by the units of the basic quantum fields in vacuum space around a celestial body is comparable with [Brownian motion](#).



The linear velocity of a quantum of energy is always the speed of light. Nevertheless, in figure 7 at  $r = 1,0$  the resultant motion is zero because the influence of gravitational vectors on the freedom to deform in every direction is negligible. But close to the event horizon (boundary) of a black hole the resultant motion nears or is equal to the speed of light (related to the supposed [photon sphere](#)).

Every unit of discrete space changes its shape synchronous and in the same rate ( $t_q$ ) with all the other units in the universe. The consequence is that a local concentration of energy – e.g. a particle or a grain of dust – has a velocity of its own, even if there is no influence from around in a certain direction. A velocity that is roughly determined by the amount of “stored” energy ( $n \times h$ ) and the number of involved units that represent the local concentration of energy. Of course this is in relation to the energy density of vacuum space around.

I can “pick up” the particle and verify its “eigenvelocity” with the resultant motion under influence of gravitational vectors somewhere on the red curve in figure 7. The result is a particle that has a relative stable orbit around the *rotating* source of the gravitational vectors (celestial body). In other words, resultant motion is the underlying mechanism behind the existence of planetary rings in our solar system. Like the rings of the planet Saturn (JWST NIRCam).



Vacuum space shows no visible “planetary” rings or accretion disk around the boundary of our Sun because the Sun emits electromagnetic radiation and particles. The consequence is that “the wall” isn’t at the edge of the photosphere but it exists at a distance from its boundary. It is attractive to speculate that the edge of the corona of the Sun is the distance where the influence of the resultant motion of vacuum space around the Sun meets the energy emission of the Sun. Because the energy of the resultant motion in vacuum space around the Sun doesn’t originate from the Sun itself. It is generated by all the involved units of the basic quantum fields (actually the universal electric field).

### Synchronized resultant motion

The mechanism behind the existence of planetary rings and even accretion disks doesn’t explain why black holes have a jet at both sides of its axis of rotation.

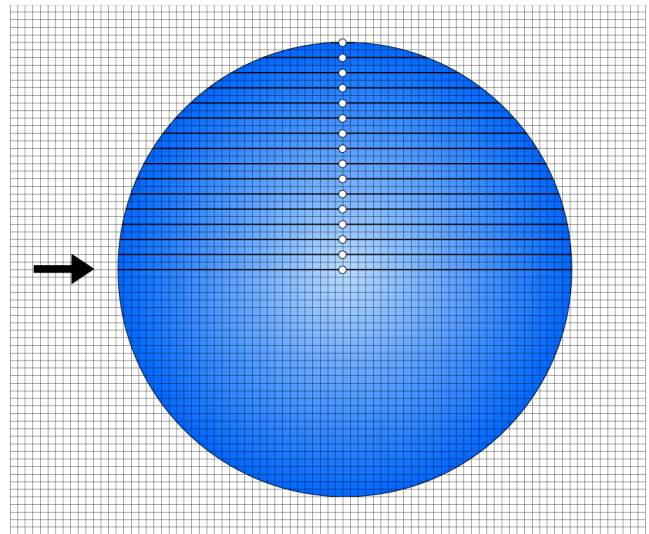


figure 8

The image above (figure 8) shows the units of the structure of the basic quantum fields in a schematic way. The black hole is transformed into a “blue hole” to get some visible differentiation. At the boundary of the black hole every gravitational vector has nearly the same magnitude so I can state that the white dots near the surface of the black hole – actually quanta of the universal electric field – share the same resultant motion.

Figure 9 shows the top view of the black hole and the white curved line shows the position of every white dot at the moment the white dot (quantum of energy) at the “equator” has finished 1 rotation.

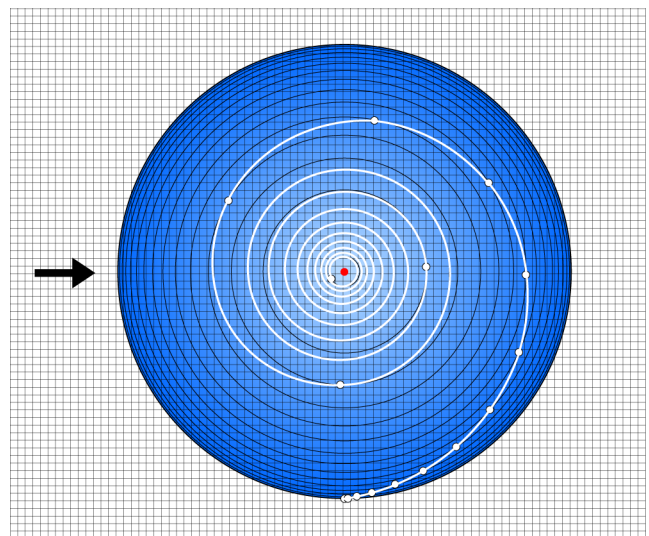


figure 9

Every unit of the structure of the basic quantum fields shares its surface area with 12 adjacent units. But this isn't the only reason why vacuum space around a black hole creates a jet at each "pole" of a black hole. Every quantum of energy near the surface area of a black hole has the same resultant motion/velocity.

If there is no matter pushed in the direction of a black hole we don't see an accretion disk and both jets. Because the emission of radiation by accelerated matter unveils the existence of the resultant motion of the quanta transfer in vacuum space around celestial bodies (inclusive galaxies) under influence of gravitational vectors.

Actually "quantum transfer" is the pass on of fixed topological deformation under invariant volume within the structure of the basic quantum fields. That is why the resultant motion in vacuum space creates corresponding magnetic fields. Because the universal electric field and the magnetic field are corresponding fields. The idea that magnetic fields are created by the motion of electrons (like an electromagnet) originate from phenomenological physics.

Fortunately there is some evidence about corresponding magnetic fields and the existence of the jets of a black hole without the emission of abundant radiation because of the lack of a surplus of entering matter.<sup>[8][9]</sup>

#### References:

8. Scott C. Mackey et al (2024), "*X-Rays from a Central 'Exhaust Vent' of the Galactic Center Chimney*"  
The Astrophysical Journal, Volume 966, Number 2.  
DOI: 10.3847/2041-8213/ad3248  
<https://iopscience.iop.org/article/10.3847/2041-8213/ad3248>
9. J. Xu, J.L Han (2024), "*The huge magnetic toroids in the Milky Way halo*"  
The Astrophysical Journal, Volume 966, Number 2.  
DOI: 10.3847/1538-4357/ad3a61  
<https://iopscience.iop.org/article/10.3847/1538-4357/ad3a61>