Discrete space and measuring absolute motion

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The ancient Greek philosopher Parmenides reasoned that observable reality is created by an underlying reality. However, an invisible underlying creating reality suggests that we cannot determine its existence with the help of experimental physics. This paper describes an experiment to measure absolute motion that will show that Parmenides concept about an underlying reality is correct. This in spite of Albert Einstein's theory of special relativity that is founded on the assumption that it is impossible to detect the absolute motion of objects.

Introduction

In 2019 Results in Physics showed a paper about an experiment to detect the motion of the solar system in relation to absolute space.[1] The idea wasn't new but the setup of the experiment was remarkable simple. A coax cable, 2 frequency generators and a comparator to measure the frequency in the coax cable while the equipment rotates to determine the direction and the velocity of the motion of the solar system in relation to absolute space.

However, the existence of the lattice of the scalars of the Higgs field in vacuum space was not considered in the setup of the experiment although its existence can cause confusing measurement results.[2] Nevertheless, it is an intriguing question if it is possible to measure the motion of a phenomenon in relation to the structure of discrete space that is in rest.

References:
1. Anna Edwards (June 2019), "*The absolute meaning of motion to the optical path*". Results in Physics 14 (2019) pages 102410 https://www.sciencedirect.com/science/article/pii/S2211379719317024
2. S.E. Grimm (2021), "*Discrete space and the scalar lattice*". DOI: 10.5281/zenodo.5717361 https://zenodo.org/record/5717361

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The Doppler effect

The Doppler effect is the blue shift and red shift of the frequency of electromagnetic radiation under influence of the velocity of the emitter of the radiation (figure 1).

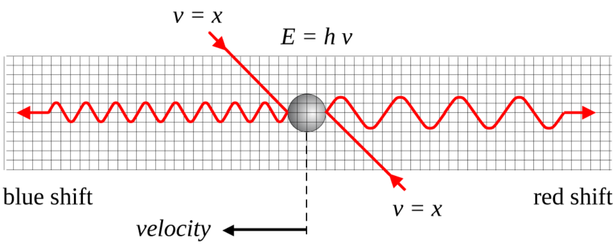

figure 1

If an imaginary emitter is in rest in relation to discrete space there cannot be a blue shift and red shift. In other words, the Doppler effect represents motion in relation to discrete space (absolute space). Motion by the emitter of the radiation that influences the wave length of emitted electromagnetic waves.

The speed of light is a constant if we focus on the origin of the constant: the basic properties of the units of discrete space. But at the long range the speed of light is influenced by the structure of the layers of the scalars of the Higgs field.[2]

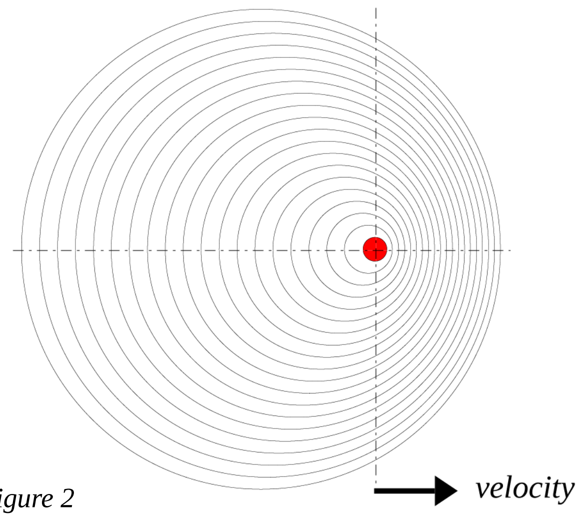

figure 2

Figure 2 shows the radiation of electromagnetic waves by the motion of an object – an emitter of electromagnetic waves – and because of the constant speed of light in every direction the shape of the emission during a period of time is like a sphere although the emitter is not in the centre of the imaginary sphere. If I measure the ratio between the blue shift and the red shift of the emitted electromagnetic radiation in figure 2 I can determine the “energy gap” between the radiation in the direction of the motion and the radiation into the opposite direction if the amplitude comparator is at right angles to the direction of the motion.

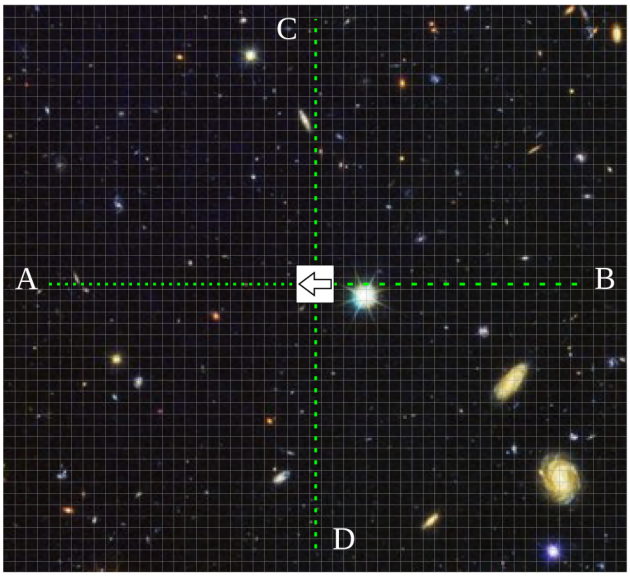

figure 3

The image above shows a satellite cube in space and the direction of its motion is visible by the arrow on the cube. The satellite cube is emitting monochrome light in 4 directions (A, B, C and D). Because of the direction of the motion of the cube the electromagnetic waves in the direction of the motion are blue shifted, the backwards radiation (B) is red shifted en the electromagnetic waves D and C are nearly unchanged in relation to A and B. In other words, if I measure the difference between the frequencies B and C (or D), plus the difference between the frequencies A and C, the result will be the difference between the frequencies A and B. Figure 4 shows the schematic setup of the measurement.

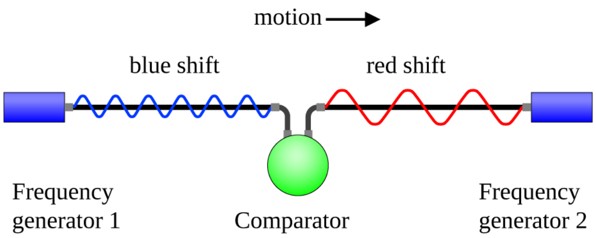

figure 4

The comparator will detect the time of arrival of the amplitudes of the signals of both frequency generators. The frequency generators supply the same frequency. The position of the frequency generators in relation to the motion of the laboratory will result in a detectable blue shift and red shift.

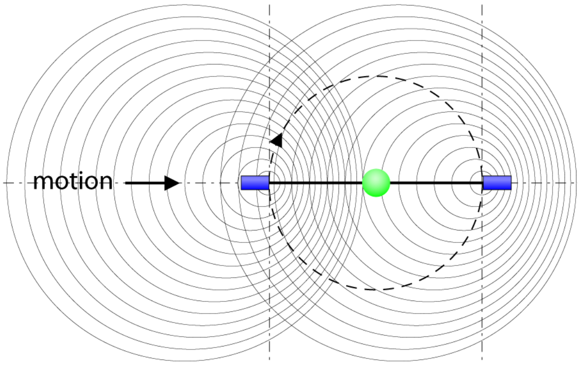

figure 5

However, the frequencies of the frequency generators 1 and 2 are not electromagnetic waves with the speed of light like light waves. The generated frequencies are super positioned on a direct current.

Rotating the whole measurement equipment – both frequency generators, the coax cables and the amplitude comparator – 360 degrees will result in a minimal frequency difference and a maximal frequency difference and frequencies in between. The maximal difference will be measured in the direction of the absolute motion of the laboratory in relation of the structure of discrete space (see the schematic figure 5).

Absolute motion

If the emitter in figure 2 is in absolute rest the frequency of the monochrome electromagnetic radiation is *vx*.

$$\frac{vr + vb}{2} = vx \qquad [1]$$

[*vr* = frequency red shift; *vb* = frequency blue shift]

However, what is exactly represented by vr and vb?

Suppose an emitter in absolute rest radiates a frequency of 50 Hz/sec. If an identical emitter is detected with a maximal Doppler effect of 45 Hz red shift and 55 Hz blue shift what does the difference of 10 Hz between both frequencies mean? Or to say it in another way, has the difference an absolute value in relation to the metric of discrete space?

The Planck-Einstein relation describes the relation between energy (E) and the size of the wave length (λ) of an electromagnetic wave.

$$E = hv = \frac{hc}{\lambda}$$

In discrete space the wave length is a multiple of the minimal length scale ($\ell_c \approx 0{,}5 \times 10^{-15}$ m). Because the minimal length scale represents the size of the units of the structure of discrete space. Therefore I can rewrite the Planck-Einstein relation with the help of the minimal length scale (ℓ_c):

$$E = hv = \frac{hc}{n\ell_c} \qquad [2]$$

Now the wave length is a multiple of the fixed minimal length (ℓ_c) that is equal to the size of the units of the structure of discrete space. The consequence is that every electromagnetic wave is a propagation of a topological deformation (h) within the electric and corresponding magnetic field in vacuum space (space where the Higgs field is flat).

The units of the structure of discrete space tessellate the volume of our universe. That's why all the units have to transfer 1 quantum at exactly the same moment because the volume of the universe is invariant.[3] The consequence is that all the quanta transfer in the universe is synchronized.

If the transfer of 1 quantum of energy (h) is synchronized between *all* the units of discrete space I have to conclude that the wave length of an electromagnetic wave is "build up" in steps of 1 quantum between the involved units of discrete space. In other words, the size of the amplitudes of the electromagnetic wave is directly related to the wave length. Therefore:

$$A = \frac{n\lambda}{2}$$

[A = amplitude; λ = wave length; n = integer]

The above relation between the wave length and the amplitude of an electromagnetic wave was experimentally determined in 1991 (Philips Laboratory, Eindhoven, The Netherlands).[4]

To pass on 1 quantum of energy (h) – the fixed amount of topological deformation – from one side of a unit to the opposite side of the same unit will last $\approx 6 \times 10^{-23}$ sec. Thus in 1 second the quantum will be passed on by $\approx 300.000.000 / 0{,}5 \times 10^{-15}$ units.

If an emitter emits an electromagnetic wave in the direction of its motion it is decreasing the length of the next amplitude ($n \times \ell_c$). Actually it is decreasing the multiple of the minimal length scale (ℓ_c) because the wavelength is a multiple of the minimal length scale. The result is blue shift. Emitting an electromagnetic wave in the opposite direction is increasing the length of the next amplitude, creating red shift.

To get the frequency of the electromagnetic wave if the emitter is (theoretical) in rest in relation to the structure of discrete space I only have to apply formula 1:

$$\frac{vr + vb}{2} = vx \qquad [1]$$

The difference between the frequency *vb* (blue shift) and the frequency *vx* (absolute rest) is a number of units – see figure 6 – because $n \times \ell_c$ determines the wave length (formula [2]).

The difference in units during 1 second gives the absolute velocity of the emitter in relation to the structure of discrete space (m/sec). Although this is only possible if we have determined the maximal difference between the frequencies of the blue shift and the red shift with the help of the equipment in figure 3.

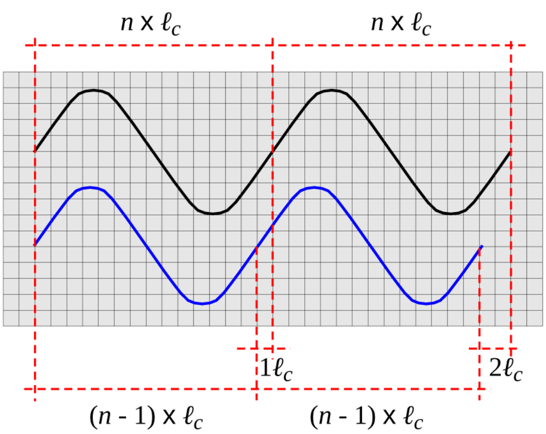

figure 6

References:

3. S.E. Grimm. "*On the construction of the properties of discrete space*."
DOI: 10.5281/zenodo.3909268
https://zenodo.org/record/ 3909268

4. Montie, E., Cosman, E., 't Hooft, G. *et al.* *“Observation of the optical analogue of quantized conductance of a point contact”*.
Nature 350, 594–595 (1991)
https://doi.org/10.1038/350594a0

The isotropy of vacuum space
Figure 7 shows the motion of the emitter in figure 2.[2]

However, the image shows also the maximal influence of the lattice of the scalars of the Higgs field if the motion of the emitter is at right angles at the square array of the scalar layers or at the triangle array of the scalar layers. See reference 2.

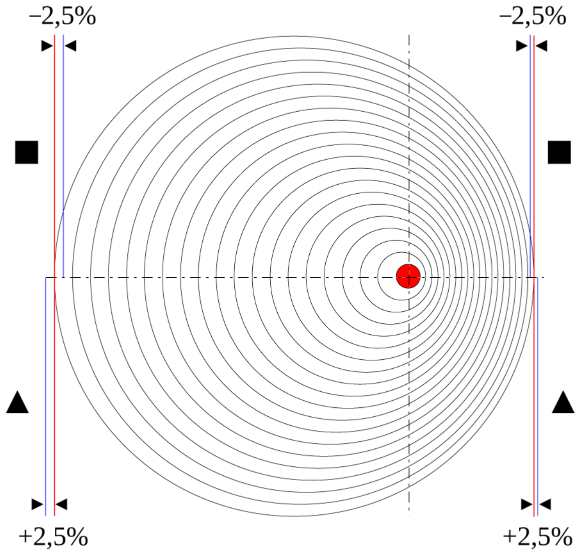

figure 7

Figure 8 shows the connected points of contact on the surface of a scalar. Points of contact between the scalar and the 12 adjacent scalars around. In figure 9 I have filled the triangle areas so it seems we are looking inside “the empty volume” of the *lattice*. Every triangle area has an opposite triangle at the other side of the centre of the scalar. Every open square has an opposite square too at the other side of the centre of the scalar. In other words, the structure of the lattice of the scalars of the Higgs field doesn’t influence the synchronous comparison of the blue shifted and red shifted amplitudes of the electromagnetic waves in the coax cables (symmetrical geometry).

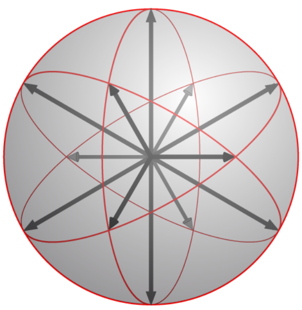

figure 8

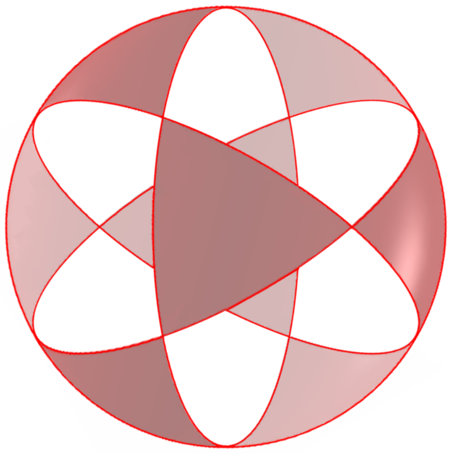

figure 9

Conclusion
In discrete space time is a constant (t_c). The consequence is that I can replace the minimal length scale (ℓ_c) in figure 6 with the constant of time (t_c) and visa versa to make an accurate calculation of the absolute direction and velocity of the laboratory possible. See figure 10.

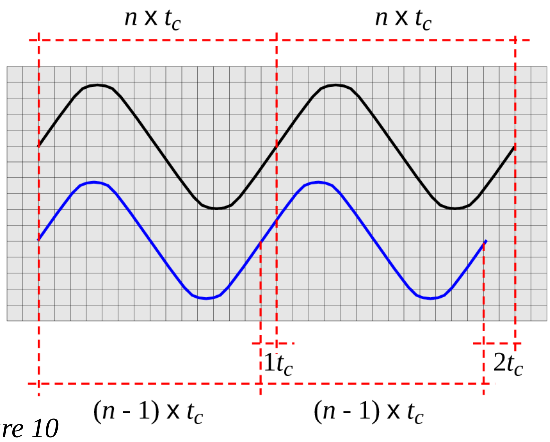

figure 10

The detection of the scalars of the Higgs field – see reference 2 – and the detection of the absolute motion of an object in relation to the structure of discrete space is at odds with the theory of Special and General relativity. A “tangible” scalar lattice cannot exists if vacuum space is curved by the existence of matter. Moreover, the detection of the absolute motion of objects in relation to the structure of discrete space shows that relativity is a limited concept that is not in line with the nature of reality at the smallest scale size.