13.5. Hypothesis for control of the gravitational and inertial mass of a solid object

Presently, the possibility for control of the gravitational and inertial mass of a solid object is out of vision, so such issue is not discussed in the mainstream journals and media. The attempt to access this issue, while relying on the space concept adopted 100 years ago, usually leads to speculative ideas accompanied by highly abstractive mathematics but without any useful practical recommendations. Advance in this field could not be achieved unless the problem is accessed from a new concept of the physical vacuum.

BSM theory is able to provide understandable relation between the gravity and inertia and between the gravitational, electrical and magnetic fields, using the derived static and dynamical properties of the CL space. This permits to envision what parameters of the physical vacuum must be manipulated in order to affect the gravitational and inertial mass, and what kind of technical methods could be used.

In Chapter 2 it was described that the self oscillating CL nodes can be regarded as Phase Look Loop (PLL) oscillators. Such oscillators possessing a proper frequency are easily synchronised by phase. BSM analysis envisioned the existence of ZPE waves as CL nodes synchronized by a phase propagating with a velocity of light. The average length of the ZPE waves is equal or multiple to the Compton length $\lambda_c = 2.426 \times 10^{-12}$ (m). This is the distance that the phase of SPM vector passes with a light velocity per one SPM cycle of the CL node, the period of which is equal to the Compton time $t_c = 0.809 \times 10^{-20}$(s). For a stationary frame, the ZPE waves appear as continuously recombining, so they are responsible for the equalization of the ZPE-D and for the space-time properties of the physical vacuum. They are also involved in the definition of the permittivity and permeability of free space, which are responsible for the constancy of the velocity of light.

How the Newtonian gravitation of a heavy astronomical body like the Earth attracts a material object? The SG forces between the Earth and the object are propagated through the CL space structure. More specifically, the Super Gravitational field is propagated through the *abcd* axes of the CL nodes (Chapter 2), which are always aligned and separated by automatically supported small gaps (the latter phenomenon is defined by the specific properties of the SG field, which is discussed in Chapter 12). At the same time, every CL node vibrates with its proper resonance frequency ν_R. The SG field of the prism is characterised by the propagation of SGSPM vector, the frequency of which is obtained by division of the primary Planck's frequency (Chapter 12).

$$f_{PL} = \sqrt{\frac{2\pi c^5}{Gh}} = 1.855 \times 10^{43} \text{ (Hz)}$$

While the CL node resonance frequency is $\nu_R = 1.09 \times 10^{29}$(Hz), the frequency of SGSPM vector is higher (the mechanism of frequency division is based on stable frequency modes defined by stable geometrical structures, see Chapter 12). Consequently, the CL node frequency makes an attenuation effect for the long-range propagation of the SG field in CL space. This conclusion of BSM is in agreement with the theoretical derivation of H. E. Puthoff in his article "Gravity as a zero-point-fluctuation force, Phys. Rev. A, v. 39, 2333-2342, (1989). Starting from the Planck's frequency and using one hypothesis of Saharov, he derives the Newtonian gravitation when attenuating the higher frequencies.

The above considerations lead to the following conclusions:

(A). The long-range propagation of the inverse cubic SG field in the CL space appears as a Newtonian gravitational field, which is inverse square dependent on distance)

(B). When analysing the SG propagation through the CL space, the oscillating CL nodes could be regarded as static due to their intrinsically small inertial factor (see Chapter 2 and 12)

(C). The resonance frequency of the CL node imposes some attenuation effect on the propagation of the SG field through the CL space

The feature (B) is very important for understanding the properties of the inertial frame formulated in Special Relativity. It obtains sense when referring to a local mass object. From the other hand, the discovery of this feature permitted a successful analysis and unveiling of the wavetrain shape of the photon and the structure of the magnetic lines (Chapter 2).

From features (A) and (C) it is evident that if the CL nodes between the two material objects are synchronised, the propagation of the SG field will be facilitated. In other words, the propagated SG forces will be stronger, in a case of synchronised CL nodes, in comparison to a case of not synchronised ones. In space environment with a normal ZPE-D, the ZPE waves always keep the synchronization of the CL space microdomains, which keeps the uniformity of the ZPE-D energy. The effect from this is the constancy of the light velocity. Consequently, the Newtonian gravitation regarded as a propagation of the SG field will depend on the permanent existence of the ZPE waves. Then what will happen if the synchronization of the CL nodes is disturbed? Obviously, the propagated strength of the SG field will decrease, which means a decrease of the Newtonian gravitation between the Earth and the object. This exactly is what is necessary for manipulating the gravitation.

Now let us consider how the synchronisation of the CL nodes, or in other words the ZPE waves, could be disturbed in the space surrounding the solid body, in order to decrease its gravitational (and probably inertial) mass. Without entering into details, we may envision the following methods:

- disturbing of the CL node synchronization by emission of longitudinal (scalar) waves (LWs)
- disturbing of the CL node synchronization by gamma rays
- disturbing of the CL node synchronization by invoking a conflict of magnetic line directions, based on the properties of the CL node oscillations included in the magnetic line (MQ SPM is discussed in Chapter 2).
- disturbing of the electrical field of accumulated charge by invoking a conflict of the electrical lines formed by EQ CL nodes (EQ SPM is discussed in Chapter 2).
- disturbing of the CL node synchronization by using the oscillating properties of the electrons

Considering the case of using LWs, we must keep in mind that they contain a longitudinal component resulted from a compressible effect of the CL space, in which the strong SG forces are directly involved. From one hand, the LWs interact directly with the strong hidden ZPE-S energy, so they may carry much stronger energy than the ordinary EM waves and for this reason they are very penetrative. From the other hand, they may effectively destroy the CL node synchronization for a finite time interval, during which the following effects will occur:

(1) a decreased gravitation between the object and the Earth

(2) disturbed EM waves in the space surrounding the object

(3) a blurred appearance of the object in the visible image

The effect (1) is what we need in order to manipulate the gravitational mass. At the same time, the disturbed synchronization affects the permittivity and permeability of the surrounding space, so the EM field and the propagation of the light in this zone will be also disturbed. This causes the side effects (2) and (3).

Now let us see what might happen with the inertial mass. When an elementary particle, such as proton, neutron or electron moves through the CL space, its impenetrable FOHS structures are ablated by the CL nodes (see Chapter 10). This physical phenomenon defines the inertia of the particle. All elementary particles contain FOHSs of the same type (Chapter 2, 3 and 6). Therefore, the inertial phenomenon is valid for all real particles, atoms, molecules, gas, liquids and solids. If the velocity approaches the speed of light, the elementary particle or the solid object experiences an increasing resistance. The reason for this is that the rate of separating CL nodes (converted temporally to folded) approaches the CL node resonance frequency. This effect is behind the relativistic increase of the inertial mass according to Einstein Special Relativity (the relativistic gamma factor for the electron was derived in Chapter 3, based on its structure).

From the analysis of the astronomical observations in Chapter 10 and 12, it becomes evident that the space of the Milky Way (and other galaxies) could be considered as an absolute reference frame. This is confirmed by a large number of properly arranged experiments. Among them is the laboratory experiments of Stefan Marinov (1975, 1980), who was able to detect our motion around Milky Way centre and measure the velocity. One of his experiments is repeated by E. W. Silvertooth, (1986). Even the re-estimation of the original data from the Michelson-Morley experiment by M. Consoli and E Costanzo (2003) proves this . This is in full agreement with the BSM scenario of Alternative Cosmology presented in Chapter 12, as a consequence from the new concept of the physical vacuum. It demonstrates that the galactic redshift is not of Doppler type, while offering an explanation, which is in excellent agreement with many observed cosmological phenomena. To open a bracket, Edwin Hubble, the discoverer of the galactic redshift, did not believe in expanding Universe until the end of his life.

Understanding the existence of absolute frame of reference is important issue for further analysis of our motion through space, which helps to unveil the possible velocity restrictions.

Now let us analyse the inertial mass from a point of view of the acceleration. In Chapter 10 it was proved that the inertia of the solid object is directly related to the number of folded CL nodes and their relative momentum (the latter parameter is presented by a force moment vector). In a uniform translational motion, these two parameters are constant - there is no acceleration. In a uniform rotational motion, only the direction of force moment vector is changing, so a centrifugal acceleration is felt. In the case of linear motion with acceleration, the magnitude of the force moment vector is continuously changing, so a continuous force is felt. Normally all CL nodes which are in the path way of the translating object oblate the elementary particle to the level of their impenetrable FOHSs. Now, we must emphasize one important feature of the folded CL nodes. They do not have strong connections between themselves such as the normal nodes connected into CL structure. Then we may conclude:

(D). A fraction of folded nodes could be deviated and guided by a strong magnetic field with a proper configuration

(E). The properly deviated and guided folded nodes will cause a displacement of the object without feeling a force as in a normal acceleration (or at least - feeling a reduced force). We may call this predicted effect a **manipulated displacement.**

(F). If the maximal velocity in a manipulated displacement is in the range of our rotational velocity around the Milky Way centre (including the Earth orbital motion), we are sure that the equivalence between the gravitational and inertial mass will be preserved.

The feature (F) means that both - the inertial and the gravitational mass will appear equal but smaller during a manipulated displacement, which leads to the following important conclusions:

(J). In manipulative displacement the object will be able to make sharp turn or reversal of the direction without feeling an excessive acceleration

(H). The acceleration of the object in the case of manipulative displacement will require less force and energy

13.6. Hypothesis about spacecraft based on a new propulsion mechanism

Below is a briefly presented hypothetical version of a new propulsion mechanism, while focusing only on the physical principle and some secondary effects. From the considerations discussed in the previous section, it is apparent that the geometrical shape of the spacecraft is important. Figure 1 shows two views of such spacecraft. .

Fig. 1. Spacecraft with a new propulsion mechanism. 1 - spacecraft envelope, 2 - super-strong magnetic field, 3 - radiators of longitudinal waves, θ - instant angle of radiation, Ω - coverage angle (by rotation of the radiator)

The spacecraft enclosure 1, made of proper material, must transmit the LWs from the radiators