

**Book: Basic Structures of Matter -  
Supergravitation unified theory, based on a  
new concept of the physical vacuum. Major  
predictions.**

**Stoyan Sarg  
Toronto, Canada**

- **Why are the fields of Vacuum Energy and Antigravity deprived from government funding?**
- **Why is Cosmology in crisis and Particle Physics in stagnation?**
- **Answer: There is a fundamental problem: The concept of the physical vacuum adopted about 100 years ago does not correspond to reality.**
- **James Clerk Maxwell, the father of Modern Physics, assumed the existence of material Ether: “*A medium of substance in which the energy exists after it leaves one body and before it reaches the other*”.**
- **A concept of material Ether (never investigated before), based on indestructible sub-elementary particles embedded in the structure of the physical vacuum and the elementary particles, works amazingly in all fields of Physics. It permits unveiling the relations between:**
  - **Electrical, Magnetic and Gravitational (Newtonian) fields**
  - **Quantum Mechanics, Theory of Relativity and cosmological phenomena**
- **The new concept of the physical vacuum also permits:**
  - **Recognizing the existence of Supergravitational Law – the most fundamental law in Nature, defining the Gravity and EM fields in the space defined by the material Ether.**
  - **Two types of Zero Point Energy:**
    - (a) **Dynamic ZPE-D related to the Electrical and Magnetic fields**
    - (b) **Static ZPE-S (a hidden non-EM energy related to the Newtonian mass) – a primary source of the nuclear energy**

**ZPE-S >> ZPE-D**
- **The contemporary Ether drift experiments are between the numerous proofs for existence of absolute space, defined by the material Ether.**

The **BASIC STRUCTURES OF MATTER – SUPER GRAVITATION UNIFIED THEORY (BSM-SG)** adopts the following fundamental concept leading to explanation of all kind of physical phenomena in Nature:

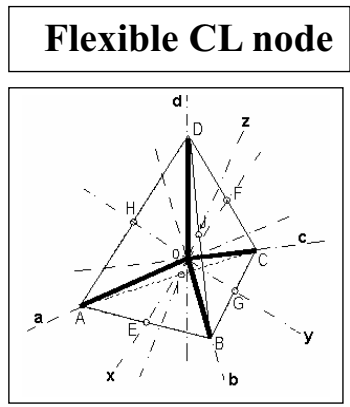
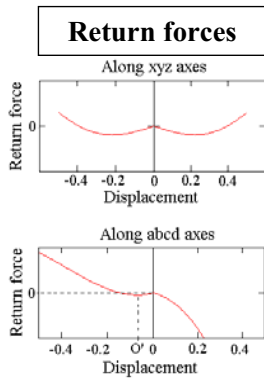
- **Empty Euclidian space** without any physical properties and restrictions
- **Two superdens indestructible Fundamental Particles (FPs)** differing by size and density with average time constants associated to Planck's frequency  $1.855 \times 10^{43}$  Hz
- **A Fundamental law of Super Gravitation (SG)** - an inverse cubic law in pure empty space, according to the expression:

$$F_{SG} = G_O \frac{m_{01}m_{02}}{r^3}, \quad \text{where: } G_O - \text{SG constant, } m_{01} \text{ and } m_{02} - \text{SG masses, } r - \text{distance}$$

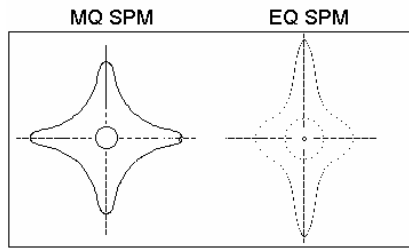
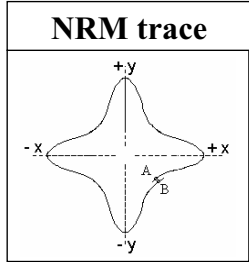
In a not observable phase of a galactic evolution, the FPs are able to congregate into geometrical formations with identifiable hierarchical order – level of matter organization. The formations, below the level of elementary particles, are **two types of prisms distinguished by size, time constant and internal twisting (handedness)**. Their SG fields exhibit an axial anisotropy and right or left hand twisting, respectively. The prisms build both: the underlying structure of the physical vacuum, called a **Cosmic Lattice (CL)** and the sub-structure of the elementary particles (in forms of helical structures).

**The elements of CL space are two types of CL nodes** comprised of 4 prisms of the same type, arranged like in the lattice of diamond. The node distance is kept by strong SG forces the sign of which depends on the distance.

**The Modern Ether drift experiments confirm the existence of absolute space**  
(S. Marinov, E. Silvertooth, M. Consoli et al.)



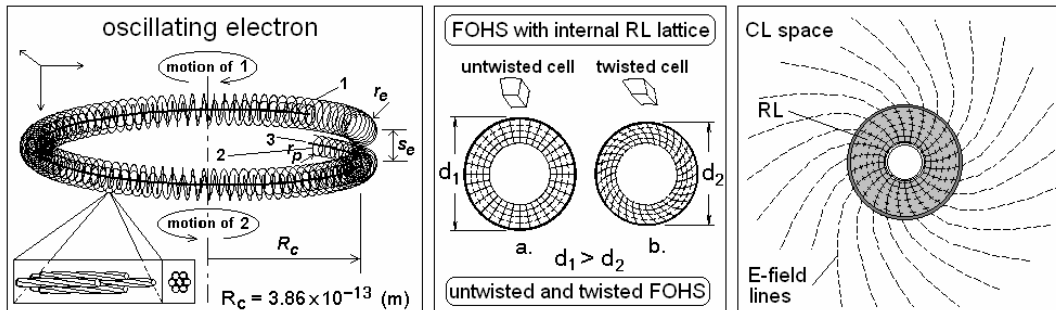
The return forces along *abcd* set of axes are thousand times stronger than in the *xyz* set. The central geometrical position of the CL node is unstable



**Oscillations defined by 2 vectors:**  
**NRM (Node Resonance Momentum)**  
**SPM (Spatial Precession momentum)**  
 SPM circumscribes 2 types of surfaces:  
**Magnetic Quasisphere (MQ)**  
**Electric Quasisphere (EQ)**  
**Magnetic line – a closed loop of MQs**  
**Electric line – a line of EQs**  
**SPM frequency = Compton frequenc**

## Electron's structure in CL space (Static and Dynamic modulation of CL space parameters)

(S. Sarg, Physics Essays, 16, 180-195, 2003)



Electron is a three-body system with two proper frequencies:  
 1<sup>st</sup> proper frequency = SPM frequency = Compton's frequency  
 2<sup>nd</sup> proper frequency – 3 time higher than the first one

## Conclusions from the CL node static and dynamic properties

- The unstable central geometrical position of the CL node favor a permanent dynamics. Consequently, the CL node exhibit an feature of energy well, or the CL space possesses a dynamic type of Zero Point Energy (ZPE-D). This energy, envisioned by the Quantum Mechanics, is responsible for all types of EM interactions.
- The distance between the alternative CL nodes is kept automatically due to the nature of SG law. A small disturbance invokes strong SG forces. This is the hidden Zero Point Energy of Static type (ZPE-S), which is not apparent in adopted formalism of Quantum Mechanics.
- Elementary particles contain impenetrable volume of denser internal lattice, on which the CL space exercises a Static pressure. This formulates the gravitational mass.
- The Newtonian gravity is the SG field propagated through the CL space by the *abcd* axes of the CL nodes
- The Electric and Magnetic fields are results of the CL node dynamics, in which the CL node oscillations along the *xyz* axes are involved

## Derived basic parameters of CL space. Static and Dynamic ZPE

- **Static CL pressure,  $P_S$**  - (related to the Newtonian mass, as a pressure exercised on impenetrative volume of the elementary particle structure):

$$P_S = m_e c^2 / V_e = 1.3736 \times 10^{26} \text{ (N / m}^2\text{)} \text{ (signature of **Static ZPE, or ZPE-S**)}$$

- **Dynamic CL pressure,  $P_D$**  ~ (related to the Zero Point Energy of Dynamic type, or **ZPE-D** related to the Electrical and Magnetic field):

$$P_D = h\nu_c / (cS_e) = 2025.8 \text{ (N / (m}^2\text{Hz))}$$

ZPE-S  $\gg$  ZPE-D (only ZPE-D is envisioned by Quantum Mechanics)

- **Partial CL pressure,  $P_P$**  – related to the confined motion of the electron with a quantum velocity  $\nu$ , in which the signature of  $\alpha$  is apparent. This might partially influence the motion of the atoms, molecules and solids

$$P_P = P_S \alpha \nu / c \quad \text{For } \nu = \alpha c \text{ one obtains: } P_P / P_S = \alpha^2 (1 - \alpha)^{\frac{1}{2}}$$

- **Complex CL node dynamics** characterized by simultaneous oscillations at two frequencies:  $1.093 \times 10^{29}$  Hz (NRM vector) and  $1.236 \times 10^{20}$  Hz (SPM vector) - defining the permittivity and permeability of free space
- **Self-synchronization** of the CL nodes at SPM (Compton's) frequency with a spatial length proportional to multiple Compton's wavelengths, involved in the **space-time properties** of the physical vacuum

## Longitudinal waves (LWs) predicted from the CL node dynamics

- **EM waves** involve oscillations in narrow angles centered around *xyz axes of the CL node (involving weak return forces)*
- CL node **oscillations along *abcd* axes** (involving strong return forces) appear as a compressed-like waves, capable to carry much stronger energy – longitudinal waves (LWs)
- **Longitudinal waves** are derivable from the original Maxwell equations (in quaternions) ( Koen and Waser, 2001; Butusov, 2001). The helical wavetrain structure of the photon and EM wave carry a small portion of longitudinal oscillations (from BSM-SG analysis)
- Type of LWs envisioned by BSM-SG:
  - Isotropic LWs
  - LWs embedded in EM waves
  - LWs in closed magnetic lines
- **Prediction:** A proper combination of EM fields may invoke oscillations along the *abcd* axes – longitudinal waves.
- **Prediction:** LWs might cause a nuclear reaction at room temperature

# Static Zero Point Energy and its accessibility by nuclear reactions

- The elementary particles are build of helical structures with internal lattice having much larger prism number density than the occupied volume of CL space. The particle mass is equivalent to the Static energy of the displaced CL space volume, which corresponds to Einstein's Equation:  $E = mc^2$ . For electron we have:

$$E_e = P_s V_e = 8.187 \times 10^{-14} (J) \equiv 511 (KeV) \quad - \text{the mass equivalent energy of electron}$$

Scaling this energy for  $V = 1 \text{ m}^3$ , we get the ZPE-S in SI units

$$E_s = 1.3736 \times 10^{26} (J) \quad - \text{Static ZPE for a volume of } 1 \text{ m}^3$$

- The strong SG field of the atomic nucleus modulates statically the CL space creating a General Relativistic effect in a microscale range
- The binding nuclear energy is a difference of the static modulation of the CL space before and after the nuclear reaction
- The binding energy of atomic nucleus is estimated by the Einstein's equation. Consequently the ZPE-S is accessible if there is a change of the mass of the atomic nuclear reaction equivalent to the binding energy.
- The presented concept is verified by estimation of the product  $G_0 m_0^2 = 5.26508 \times 10^{-33}$  from analysis of the spectral properties of  $H_2$  molecule and its use for calculation of the binding energy between the proton and neutron in Deuterium. The calculated value differ from the experimental one only by 3.6%.



# Alternative methods for accessing of the hidden space energy ZPE-S

- **Direct access by static disturbances in a microscale range**
  - nuclear transmutation
  - cold fusion
  - bombardment of unstable structures by projectiles
- **Nuclear reactions (direct access) by longitudinal waves**
  - radioactive decomposition by electrical discharge in a liquid (bombardment of nuclei by longitudinal waves according to BSM-SG) []
- **Frequency methods:** (by accessing of the SPM CL node frequency)
  - The large energy source of ZPE-S is accessing through ZPE-D**
    - Identified CL node frequencies:  $\nu_R = 1.093 \times 10^{29} (Hz)$ ;  $\nu_{SPM} = \nu_C = 1.2356 \times 10^{20} (Hz)$
    - The first proper frequency of oscillating electron is equal to the CL node SPM frequency = Compton's frequency (BSM-SG discovery)
    - Invoking dissociation and recombination of the  $H_2$  molecule in electrical plasma (Frolov-Moller's Atomic Hydrogen Generator (FMAHG))
    - Heterodyne method suggested by Stoyan Sarg, using a properly activated oscillating motion of electrons (theoretically envisioned and apparent in many ZPE experiments involving sparks and plasma discharge)
- **Invoking of conflicting conditions for the CL node dynamics by magnetic and electrical fields with properly selected spatial and time parameters**

## Hypothesis for control of the gravitational and inertial mass of an object

- The CL nodes could be regarded as connected **PLL oscillators** with a proper frequency equal to the SPM one, so they are easily selfsynchronized
- The CL nodes are selfsynchronized by the SPM phase propagated with a speed of light, so the synchronized length is equal to one or multiple Compton's lengths. This forms permanently existed and recombining **zeropoint waves**, responsible for equalization of the ZPE-D energy. They also serve as protodomains of the magnetic lines and define the parameters  $\epsilon_0$  and  $\mu_0$  which determine the constant light velocity.
- The frequency of the prism's SG field is higher than the CL node resonance frequency. The zeropoint waves **ease the propagation of the SG field of the prisms** through the CL space, which **carry the Newtonian gravitation between the elementary particles**.
- The **zeropoint waves assist also the inertial properties** of elementary particles in CL space (folding and unfolding of the displaced CL nodes)
- **Conclusion:** A temporal disturbance of the self-synchronisation of the CL nodes (zeropoint waves) around a solid object should lead to decrease of its gravitational and inertial mass.

# Predicted methods for affecting the gravitational and inertial mass

All predicted methods are based on a **temporal disturbance of the selfsynchronization** between on the CL nodes (permanently existed zeropoint waves).

## **Methods of disturbance:**

- By gamma rays
- By disturbance of the CL node dynamics
  - invoking a conflict between spatially oriented or fast changing magnetic fields
  - invoking a conflict between fast changing and spatially oriented electrical fields
- By emission of longitudinal waves
- By frequency method: interaction at SPM (Compton) frequency by using the oscillating property of the electron

In Chapter 10 of BSM-SG, it was shown that the inertia of a solid object is related to the quantity of displaced and folded CL nodes and their relative momentum. These two parameters are expressed by the **force moment vector**,  $\mathbf{E}_{\text{IFM}}$

-In the case of uniform linear motion, the scalar value of  $\mathbf{E}_{\text{IFM}}$  is constant – no acceleration is felt

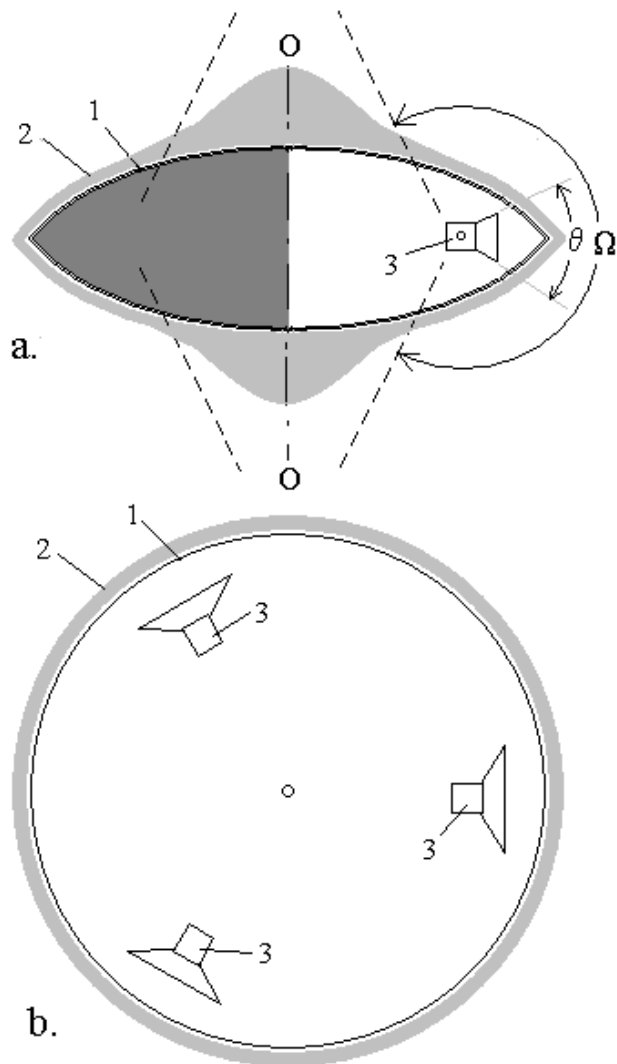
-In the case of uniform rotation, the direction of  $\mathbf{E}_{\text{IFM}}$  is changing – a centrifugal acceleration is felt

- In a linear motion acceleration, the scalar value is changing

**Feature:** The displaced (temporally disconnected) folded nodes do not have strong interconnection as in the CL space lattice

**Prediction:** Let us suppose that in a space of disturbed zeropoint waves surrounding the object), a fraction of folded CL nodes is forced to deviate by properly oriented strong magnetic field. Such CL space disturbance should invoke a spatial shift of the object, called a **manipulative displacement**, while acceleration might not be felt.

# A possible technical realization of propulsion mechanism based on manipulated displacement



**Fig. 2.** A spacecraft with a new propulsion mechanism.

1 - spacecraft envelope

2 - super-strong magnetic field

3 – radiators of isotropic longitudinal waves

$\theta$  - instant angle of radiation

$\Omega$  - coverage angle (by rotation)

- The radiators may work in a burst mode due to a finite time constant for restoration of the CL node self-synchronization.

- The spacecraft envelope must be transparent for LW, while keeping the magnetic field

- A strong isolation of the crew from the dangerous LWs is required

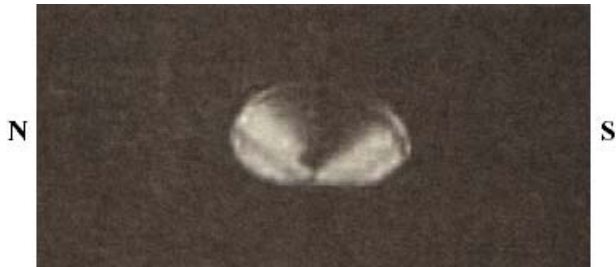
- The effect of manipulated displacement should be larger in any direction lying on the larger sectional area of the spacecraft.

## Physical effects accompanying the predicted propulsion mechanism

- The temporally disturbed self-synchronization of the CL space will cause a disturbed propagation of light, and EM waves. The object may not be easily detected by every radar, but only by a radar having a stronger longitudinal component in its EM pulses.
- The isotropic longitudinal waves may cause a X or gamma rays, which will ionized the air molecules. They will emit a broad band optical radiation, which will not exhibit a thermal signature.
- The weak Earth magnetic field in the surrounding zone will be fragmented. Its restoration may take a finite time due to a finite time for restoration of the normal Zeropoint waves (self-synchronized CL).
- The operation of sensitive electronic equipment near the spacecraft might be temporally disturbed.
- Staying near the operating spacecraft is dangerous. The isotropic longitudinal waves are potentially harmful for the living organism. (This issue, not seriously investigated so far, requires a serious study. In Chapter 11 of BSM-SG, some processes in biomolecules are discussed from a new point of view).

## Comparison between the the effects of predicted mechanism and some observed physical phenomena

- A large number of UFO related publications has been analyzed
- Fig. 3 illustrates a picture from one case discussed in the workshop “Physical effects related to UFO reports”, N. Y. Sep 29 - Oct 4, 1997 and described in the P. Sturrock’s book “The UFO enigma, a new review of the physical evidence” (1999).



**Fig. 3.** Picture of observed UFO object (Adapted from P. A. Sturrock’s book, p. 202)

The observed physical effects described by P. Sturrock’s in his book are in complete agreement with the theoretically predicted side effects accompanied the envisioned propulsion mechanism.

# Supercommunication

BSM-SG predicts 3 new methods of supercommunication:

- Distant communication with a superluminal velocity, when the receiver and transmitter are connected by DC magnetic lines: The communication is carried by the higher frequency SG field, the propagation of which is facilitated by the synchronised MQ CL nodes. Confirmation: “quantum teleportation” experiments analyzed by the BSM-SG theory.
- Distant communication with longitudinal waves embedded in EM waves. In this case the communication is with the speed of light but the information is hidden for the ordinary EM devices.
- Micro-communication between the cells of the living organism, based on the genetic code. In BSM-SG Chapter 11, three hypotheses are formulated: one for energy storage mechanism in proteins and DNA, a second one about information exchange between the cells and third one about a detection of the aminoacid code.



# Publications by S. Sarg related to the BSM-SG Unified Theory

- First publication of the theory in: [www.helical-structures.org](http://www.helical-structures.org) (2001)
- New approach for building of unified theory and results ([//lanl.arxiv.org/abs/physics/0205052](http://lanl.arxiv.org/abs/physics/0205052))
- First and second electronic editions archived in National Library of Canada, (2002 and 2005)
- Article about the electron in [Physics Essays \(2003\)](#) and other articles in **Journal of Theoretics**.
- A poster report in Physics of the IIIrd Millennium Conference, 3-5 Apr 2005, Huntsville, AL
- Report at 12<sup>th</sup> Annual NPA Conference, 23-27 May 2005, Storrs, CT
- Report at 13<sup>th</sup> biennial conference Ultimate Reality and Meaning, 3-6 Aug 2005, Toronto
- Book [Beyond the Visible Universe](#), 2005 (popular presentation) ISBN 0-9730515-3-1
- Book [Basic Structures of Matter–Supergravitation Unified Theory](#), Trafford Publishing, BC, (full theory, paper back & electronic book), 2006, ISBN 141208387-7 (Amazon.com and others)
- Two reports at Int. conference *Space, Time, Gravitation*, St. Petersburg, Russia, 7-11 Aug 2006.



- [Book review](#) in **Physics in Canada**, 62, No 4, July/Aug 2006, issued by the Canadian Association of Physicists
- Presentations in other conferences and seminars