

The regenerative solar system Unified theory of physics

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MOTTO: “We are born to be re-born into a unknown space-time projected by light for a terrestrial century (the Plutonian re-ignition period): $c_s^2 = M_{\odot}^{2/3} \rightleftharpoons N_A^{7/8}$, the space-time of eternally mass-flow, provided the quantum equilibrium, $(\frac{e^3}{\pi^3} = \frac{2}{3})$ holds down”, Gaia law

Abstract: *The Euler’s holomorphic regenerative universe is a quantum-gravitational theory of Earth development recognizing that oxygen, hydrogen, nitrogen and carbon dioxide in the Earth’s hydrosphere engender biological processes along with living organisms able to reshape the planet as surely as any physical force, but with delayed effects, the so-called torsional/gravitational buckling lag. Herein, the environmental sciences as a Vernadsky’s hypothesis precursor to these, become vital for preserving biological recurrent cycles, their nature being artificially changed by a vicious human intervention. The present paper describes the thermal gravitational mechanism of a solar system associated with the regenerative processes of molecular structures (in biology called metabolism or growth) at the quantum-gravitational scale, too slow to be perceived. The term “morph” (or the concept of “morphing” in aeronautics, in mathematics called topological holomorphism) originates from ancient Greeks and refers to the shape, figure, or other related aspects of an evolving entity. Therefore, morphing/morphism pertains to the process of modifying the original form or appearance of a particular object or system. The planets of solar system like “cosmic organisms” can manipulate the curvature and twist of their surfaces to maintain precise control over their recurrent cyclical complex motions (double, orbital and sidereal rotations) by the thermal gravitational waves. The out of order function of the thermal gravitational mechanism can lead to the global warming effects associated with both reshaping (earthquakes, fires, floods) surfaces and morphing (as a whole energy metabolism) mutations, crucial for perpetuity of human beings. At the same time, the concept of quantum-gravity light with a topological dual isomorphic structure solves the fundamental problem of a unified theory of physical forces, as kinematic fast dynamo electromagnetic forces for splitting quanta bonded into atomic structures, and persistent (long time) gravitational forces for non-splitting quanta bonded into thermomolecular morphing structures. The only problem remains to gauge such multiple cooperative physical phenomena induced by light, which is solved by diverse reciprocity/equivalence theorems and corresponding conversion factors.*

Key Words: thermal gravitational waves, dual quantum isomorphism, two-soliton coherent structure, regenerative solar system, astrophysics

1. THE EULER’S HOLOMORPHIC CONCEPT

The holomorphic quantum concept (complex, smooth and recurrent) derives from the Cartesian dualism of mind and matter followed by Euler’s complex theory [1] as simply quantum extended (measureless) mathematics versus gravity unextended mathematics or physics, i.e. mathematics is the mind and physics is the science of matter. Thus, Euler succeeded in mathematizing the Newton’s empirical natural philosophy (Newtonian relativity) and the Ensteinian model (1905) of the space-time (the restrained relativity) used currently in atomic physics and electrodynamics [2]. The most striking idea to separate the space from time distinguishes the space-time model from Euclidean (or Newtonian) model of the space and time, as a topological global form non-determined without any relations with the nature itself of model [3]. Such as global formed is the thermal-gravitational recurrence theorem in cosmology [4]. The topologically global form is nothing else than a universal two-soliton coherent structure (kurtosis or peakedness law) of light. Therefore, the grand unified theory of physics (GUT) is a final theory of everything, i.e. the unique quantum-gravity curve of wavy light, (Fig. 4), which is simply unextended mathematics or measurable physics of recurrent “morphing” with more or less period of initial states. The Euler’s quantum space is a bounded binary topological space (complex, smooth and recurrent), completely self-contained (including its limits), described by the complex theory, where the monads (e, π) are the light photons-like natural quanta (or non-splitting quanta), corresponding to genuine properties of nature. Their general motion is described by Euler’s complete formula

$$e^{2k\pi i} - 1 = 0, (k = 1,2), \text{ the topological kinetic function,} \tag{1}$$

with the complete integration on the unit complex/generator circle once and twice anti-clockwise about the origin

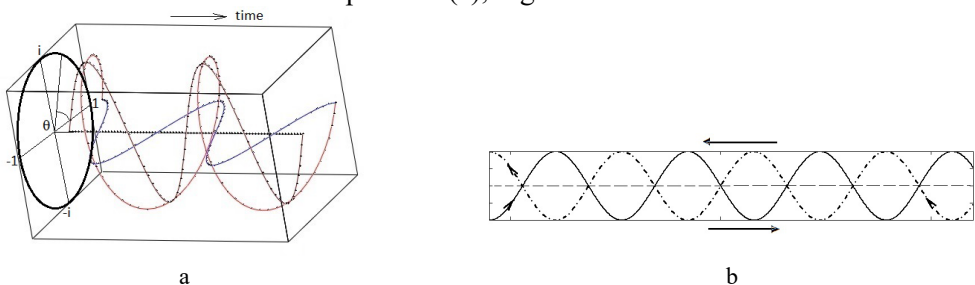
$$\oint \frac{dz}{z} = 2\pi i, \text{ the topological torsion function (or torsion string),} \tag{2}$$

mapping a circle into itself and $4\pi i$ into a pseudosphere (or Riemann sphere), Fig. 1.

The bilinear (Möbius) transformation maps circles to circles on the Riemann sphere, parametrized as [5, 6, 7]

$$t = \frac{z-1}{iz+1}, z = \frac{-t+i}{t+i}, \text{ the topological torsional buckling function } \left(\frac{e}{\pi} \Leftrightarrow \frac{\pi}{e}\right), \tag{3}$$

whose equator coincides with the unit circle Z ’s (horizontal complex plane) (a), the sphere is projected (stereographically preserving angles) to the Z – plane along straight lines through its south pole, which itself gives $Z = \infty$ (b) and the real axis is a great circle on the Riemann sphere, like the unit circle rotated in vertical position (c), Fig. 2.



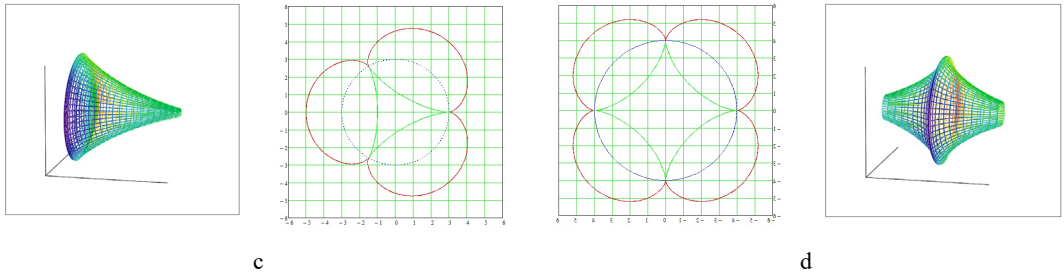


Fig. 1 The Euler's complete solution. a) $(e^{i\theta} = \cos \theta + i \sin \theta)$ indicial motion, Leibniz-like uncoupled monads; b) $(e^{(1,2)\pi i\theta} = \cos \theta + i \sin \theta)$ spinorial helix and double helix, weakly time coupled quanta (e, π) ; c) $(e^{3i\theta} = \cos \theta + i \sin \theta)$ twistorial pseudo spherical motion, gravitational coupled quanta with three fold field rotation-reflection axis (triad); d) $(e^{4\pi i} = \cos \theta + i \sin \theta)$ twistorial pseudo spherical motion, gravitational coupled quanta with four fold-field rotation- reflection axis (tetrad)

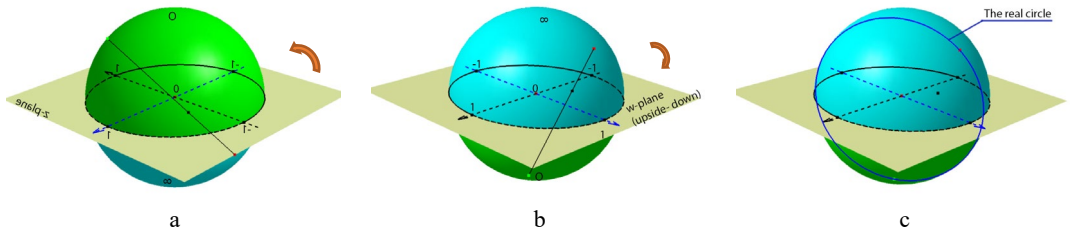


Fig. 2 Riemann surfaces $(4\pi \cdot \pi^2)$ containing their volumes $(4\pi/3 \cdot \pi^3)$ (or the quantum compact)

The Mobius transformation is a bijective function between the quantum $(\ln e \equiv 1)$ and gravitational $(\log g_0 \equiv 1)$ scales

$$(e^2 g_0)^{1/3} \rightleftharpoons (e g_0^2)^{1/4}, \text{ the quantum-gravity reciprocity/equivalence theorem} \tag{4}$$

with the conversion factors $(g_0 = \pi^2, g_0 = 4e)$ corresponding to quantum bending (curvature twist interaction) of natural light described by the natural or intrinsic Fernet-Serret equations [8].

The quantum curvature-twist interaction or its equivalent torsional buckling

$$(e\pi)^{2/3} \rightleftharpoons \pi e^{1/4}, \text{ the quantum torsional buckling,} \tag{4'}$$

is the topological form of Mobius strip, Fig. 3, with the remarkable property of the conservation of energy E_γ defined on the space of embedding $S^1 \rightarrow R^3$ (the 3-Riemann sphere) [9].

Adding one point at infinity (herein the light velocity, c_s), one makes the Mobius transformations into bijection of the quantum sphere (herein quantum compact, π^3) with the solar mass, $M_\odot = c_s^3 \equiv 10^{30}$ kg (the SUN concept).

Mathematically, Eqs. 4, 4' are the topological global forms (non-dependent on any space-time) which represent a two-soliton coherent structure [10] or statistical kurtosis (peakedness) law [11].

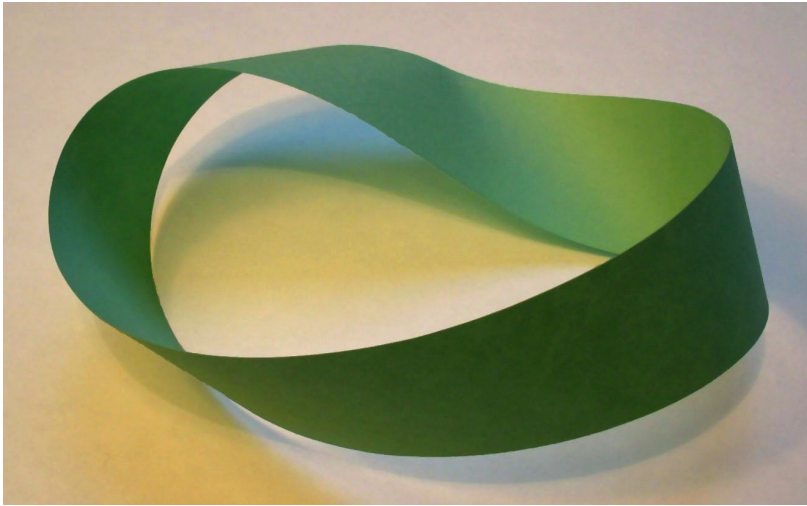


Fig. 3 Topological Mobius strip

Physically, Eqs. 4, 4' are the unique multiple solution of the quantum-gravity light which engenders all photo-synthesis physical process including electrodynamic and thermodynamic phenomena of quantum (splitting and non-splitting) found in nature.

That is the GUT of physics, a final theory of light for everything, the cosmology being the most fascinated domain [12]. The GUT of physics is a unitary theory which intends to conciliate the previous partial theories (a result of ill-defined and/or misunderstood concepts) into a coherent whole like Grothendieck's topos [3], via the concepts of automorphic quantum light and light self-ignition.

2. THE QUANTUM THEORY OF LIGHT (a perpetuum mobile form)

Outside of mathematical and physical constants e (the base of exponential recurrent function $\oint Z dZ = expZ + C$) and π , (the ratio of circle circumference to diameter ($C/d \int_{-1}^1 \frac{dx}{\sqrt{1-x^2}}$), the (e, π) as itself variables are mass less torsionable particles containing eternally regenerating torsion potential (free parameter $C \rightarrow \infty$). These particles with the regeneration/recurrence property (or topological automorphism) are living entities called non-splitting quanta, both describing the behavior of natural light (or quantum light) and all photosynthesis physical processes associated with light. The true photons of natural light are the coupled recurrent quanta forming a dual quantum isomorphism (L_e, L_π) , [12]. The bending-twisting interconnection between natural quanta (or natural photons) into a bounded space (Ensteinian topological space-time) may engender matter (dark energy or heat) and their light self-ignition (kinetic energy).

The canonical relationships of inter-connecting natural quanta define a dual isomorphism of lattices L_e, L_π , as

$$\left. \begin{aligned} e + e^2 &= \tilde{g} \cong 4e \\ e^3 &= 2\tilde{g} \\ e^4 &= 2(e\tilde{g}) = \tilde{m}_q + \tilde{g} \end{aligned} \right\} L_e - \text{the } e\text{-automorphism (or spinor), physically} \\
 \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \text{the exothermal quantum auto-} \\
 \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \qquad \text{catalytic fusion reaction} \tag{5a}$$

$$\left. \begin{aligned} \pi \pm &= \pm \tilde{g}^{1/2} \\ \pi^2 &= \tilde{g} \\ \pi^3 &= 3\tilde{g} \\ \pi^4 &= \tilde{g}^2 \end{aligned} \right\} \begin{array}{l} L_\pi - \text{the } \pi - \text{automorphism (or twistor)} \\ \text{physically the} \\ \text{endothermal quantum auto-} \\ \text{catalytic fusion reaction} \end{array} \quad (5b)$$

The quantum torsion reactions appear to proceed by a branched-chain, free-radical mechanism in which they are in equilibrium with each other both local and global. The free-radical behaves qualitatively as a neutral entity called gravity, \tilde{g} , coupling spinor and twistor automorphisms and inverting their reactions when are unblanched. The neutral gravity functions as a two-face no-thickness surface, absorbing spinorial kinetic energy of on-light face and releasing a controlled twistorial thermal energy of off-light face maintaining a constant heat energy, the so-called dark or gravitational energy. The gravitational energy assures the recurrence of (free-torsion) initial states of natural quanta. Physically the gravity is a kind of amorphous para thermal mass holding down a global constant temperature difference (indifferent scale)

$$\Delta\theta_{lim} \equiv 2e^4 (= 110^0) \text{ and } \Delta\theta_{cr} \equiv \pi^4 = g_0^2(100^0) \text{ if } \tilde{g} = g_0 \left(\frac{\pi^4}{2e^4 - g_0} \right) \equiv 9.822 \text{ m/s}^2, \text{ (the Earth gravity)} \quad (6)$$

with the global (critical-limit) polarized temperature:

$$\theta_c = \pm \frac{g_0^2}{2} (\pm 50^0 C), \theta_{lim} = \pm e^4 (\pm 55^0 C).$$

Equation (6) is the closure of quantum autocatalytic fusion reactions (Eqs. 5) of natural light with quantum (e , π) bond, where $\tilde{g} = g_E \cong \pi^2 \equiv g_0 = 10$ is the gravity unit ($\log g_0 = 1$), $g_0^{g_0} \equiv 10^{10}$ is the light self ignition (the fixed point of the Mobius strip embedded in the Riemannian critical sphere, $4\pi A \leq P^2 \rightarrow \pi^3$) and $\tilde{m}_q \equiv e^4 - \tilde{g} = \frac{\pi^4 - \tilde{g}}{2}$ is the quantum relative mass as the measure of maximum heat transfer (physically the mechanical equivalent of the calorie $J = \frac{e^4 - g_0 - e}{g_0} = 4.188 \text{ J/cal}$). The π -automorphism determines the most important quantum values ($\pi^2 = g_0, \pi^3 = m_{cr}, \pi^4 = \Delta\theta_{cr}$) for the metastable/phase equilibrium of quantum torsion fusion reaction provided

$$\frac{e}{\pi} + \frac{\pi}{e} = 2, \left(\frac{e}{\pi}\right)^2 = \frac{3}{4}, \left(\frac{e}{\pi}\right)^3 = \frac{2}{3}, \left(\frac{e}{\pi}\right)^4 = \frac{1}{2}, \text{ the phase/ local equilibrium,} \quad (7a)$$

$$(e^2 g_0)^{1/3} = (e g_0^2)^{1/4}, \text{ the global equilibrium,} \quad (7b)$$

with the critical equilibrium for the free-torsion initial quantum states.

The quantum fluctuations produce a turbulence-like thermal agitating shifting the global equilibrium characterized by free-torsion initial states of natural quanta

$$g_0 - e^{\frac{1}{2}} \leq g_0 \leq g_0 + e^{1/2}, \text{ the diathermal/Newtonian gravity,} \quad (8a)$$

the para-thermal gravity

$$e^3 \leq g_{th} \left(\frac{e^4}{2}\right) < g_{th,c} \left(\frac{2}{3}e^4\right) \equiv \theta_{c,local} = 1/3 g_0^2 (33^0 C), \text{ the thermal polarization,} \quad (8b)$$

with inverted thermal gravity, ($e^3 - g_{th,c} = 0$) for its restoring and (8c)

$$g_0^2 - g_{th,c} \equiv \theta_{lim,local} = 2/3g_0^2(66^0C), \text{ the local temperature limit.}$$

By the elimination of parameter \tilde{g} , the intrinsic torsion (or curvature-twist) equations in steady light flow present multiple solutions or spectral/local solutions as

$$\left. \begin{aligned} \frac{1}{3} + \frac{2}{3} &= 1 \\ \left(\frac{1}{3}\right)^2 + 2\left(\frac{2}{3}\right)^2 &= 1 \end{aligned} \right\} \text{the stable recurrent regime,} \tag{9a}$$

$$\left. \begin{aligned} \frac{1}{4} + \frac{3}{4} &= 1 \\ \left(\frac{1}{4}\right)^2 + 2\left(\frac{3}{4}\right)^2 &= 1.25 \end{aligned} \right\} \text{the critical out of order regime,} \tag{9b}$$

and the global quantum-gravity solution or unique light curve, Fig. 4, given by

$$\frac{\log x}{\ln x} = \log e = \frac{e}{2\pi}, x \in \mathbb{R}, \text{ the Euler's double scale, (or the logarithmic rule, linearized for } \left(\frac{e}{\pi}\right)^4 = \frac{1}{2}.) \tag{10}$$

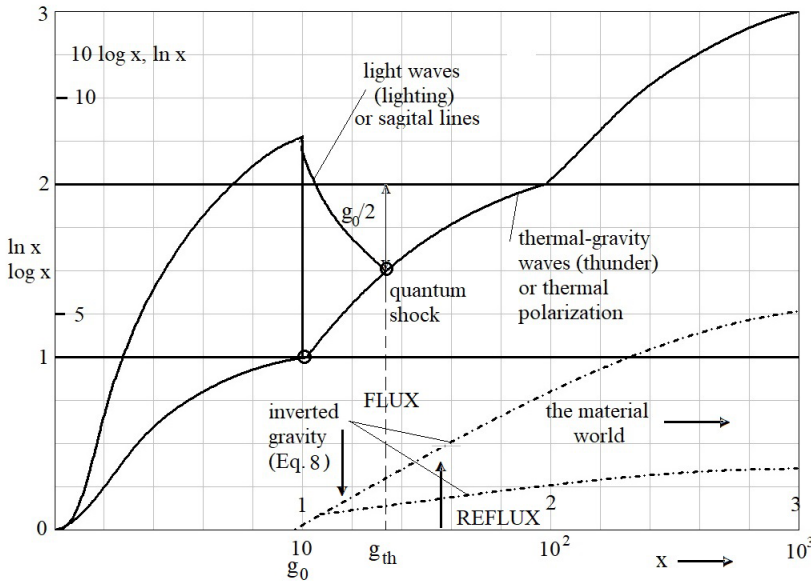


Fig. 4 The quantum-gravity waves (torsional buckling lag) or inverted quantum isomorphism, $\left(\frac{e}{\pi} + \frac{\pi}{e}\right) = 2$

The logarithmic linearization hides the quantum torsional interaction through a torsional buckling lag given by halving gravity (bounded-half as thermal fluctuation, $\Delta\theta$), viewed as temperature jumps ($\Delta\theta = 20^0$ and $\Delta\theta = 100^0$), of thermal radiation centers ($g_0 = \frac{e^3}{2}$ and $g_{th} = \frac{g_0^2}{4}$) enclosed by sagittal lines (Fig. 4).

Mathematically, the unique light curve corresponds to the two-soliton solution of the periodic boundary-value problem for a KdV equation [10].

The topological torsion distinguishes the topology of the 3-manifold R (rotation space) or of the 6-manifold C (configuration space) from the “trivial” topologies of Euclidean 3-space and 6-space [6].

Regardless the topological space size and the way it is formed (as a big-bang like singularity or quantum evolution process), its dual quantum structure is preserved as long as the metastable equilibrium holds down about

$$\left(\frac{e}{\pi}\right)^3 = \frac{2}{3}, \text{ (the universal equilibrium condition) and}$$

$$\left(\frac{e}{\pi}\right)^2 = \frac{3}{4}, \text{ (the critical equilibrium condition).}$$

That is the true quantum theory of light summarized as follows:

- 1) The twistorial (π) automorphism, Eq 5b, constitutes the postulates of light for: $g_0 = \pi^2$ (m/s²), the gravity unit ($\log g_0 \equiv 1$, the gravitational scale), $g_0^{g_0} \equiv c_s$ (m/s), the light self-ignition velocity (the external fix point of light field), $c_s^{\pi^3} \equiv M_\odot$ (kg), the critical/minimal mass (the critical Sobolev inequality);
- 2) The spinorial (e) automorphism, Eq. 5a, is responsible for the dynamics of light: the bifocal gravity (the two-soliton coherent structure) $G_\odot \equiv \frac{1}{2}g_0e^4 = g_0g_{th} = 273$ (m/s²), the internal fix point associated with the thermal polarization or thermal field, ⁰K – zero absolute temperature.
- 3) The inversion of gravity (e^2g_0)^{1/3} \rightleftharpoons (g_0g_{th})^{1/4}, the thermo-gravitational resonance (the shift of thermal spectrum) as the reaction of cold light ($c_c = \frac{c_s}{g_0} = 10^9$ m/s) to its spinorial perturbation releasing heat [12].

Together, the dual quantum isomorphism of natural light, yields a constant regenerative light flux (flow rate) $\Phi_L \equiv e^3\pi^3c_s = 6 \times 10^{12}$ m²/s³. The dual quantum isomorphic structure of light is able to describe by means of the minimal complex numbers: $Z_1 = 1 + i, Z_1\bar{Z}_1 = 2$: $Z_{1/2} = \frac{1}{2} + i\frac{n}{m}, Z_1\bar{Z}_{1/2} \leq 1, (n, m) \in N$ a cyclic regenerative physical universe, GOD's seven day work.

Both the inversion of rotating thermal gravity and that of relative/evolving matter ($m_q = e^4 - g_0 = 44.6$, or $M_\otimes = M_\odot^{3/2}$, Chandrasekhar limit [12]) produce a variety of stellar patterns (called asterisms) within abundant constellations, cosmology (far field) together with our material world (near field), the most fascinating quantum domains/field.

3. THE REGENERATIVE SOLAR SYSTEM

The solar system illustrates the dual quantum isomorphism together with its gravitational linkage, with two fixed points: $c_s = g_0^{g_0}$ (m/s), (the postulate of velocity), the light self-ignition velocity and inverted gravity ⁰K ($\equiv -eg_0^3$ °C) at thermal death (no molecular motion to retain heat) in conjunction with the quantum-gravity reciprocity theorem, Eq. 7b, [12]. The postulates of light show that starting of light ignition and thermal polarization (or inverted gravity), are recurrent phenomena produced simultaneously known as the mysterious big-bang at the space-time of 10⁴ lys (light years), at the morphogenesis of a galaxy.

The topological analysis of quantum light has shown that any material things behave like spinorial (e) and twistorial (π) automorphisms of light given by

$$\begin{aligned} \frac{1}{2}e^3 &= e + e^2 = g_0, \text{ the quantum radical,} \\ e^4 &= \frac{g_0^2 + g_0}{2} = 2(eg_0) \equiv 2g_{th}, \text{ the } e\text{-additive automorphism,} \end{aligned} \tag{11}$$

$$(\pm\pi)^2 = g_0, \text{ the eigenvalues of gravity,}$$

$$\pi^3 = \pi(\pm\pi^2) \rightleftharpoons \pi(e + e^2)^2, \text{ the } \pi - \text{cumulative/coupled automorphism,}$$

$$\pi^4 = \pi^2 g_0, \text{ the saturated dual automorphism.} \tag{12}$$

The quantum radical or gravity bond controllers the recurrent quantum fusion assuring perpetuum re-ignition of light. The natural quanta (e, π) are the true GOD's particles assuring the perpetuity of relative material world.

Physically, the topological dual automorphism represents the spinorial motion immersed in the twistorial motions, where production and dissipation of heat generated by the torsional quantum fusion reactions are balanced, if $\frac{e^3}{\pi^3} = \frac{2}{3}$ (the local equilibrium) and π_{cr}^3 (the critical Sobolev inequality $4\pi A \leq P^2$ with $r_{cr} = \pi$) holds down. The critical solar system with solar mass ($M_\odot = c_s \pi_{cr}^3$) and constant light flux ($\Phi_L \equiv e^3 \pi^3 c_s$) satisfies the topological conditions of a dual isomorphism for the binary quantum space.

The simplest geometrical interpretation of the (e, π) automorphism and their coupling is shown in Fig. 5: a) $g = g_0 \pi^{\varphi/2\pi}$, b) $f(x) = \sin(vx), v = \sqrt{g_0} = \pi$, c) $g_0^2 = 2c^2 \cos 2\varphi$.

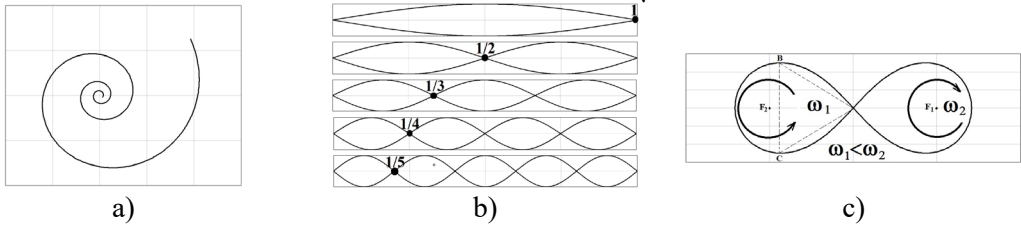


Fig. 5 The schematic representation of the dual quantum isomorphism a) $g = g_0 \pi^{\varphi/2\pi}$, the logarithmic spiral; b) $f(x) = \sin(vx), v = \sqrt{g_0} = \pi$, the vibrating torsional string; c) $g_0^2 = 2c^2 \cos 2\varphi$, the Bernoulli's lemniscate-like endless belt.

The simplest examples modeling, the (e, π) dynamics are the complete Euler's formula of a pseudo sphere obtained by rotating about its asymptote or tractrix, Fig. 1 (c, d), and the solution of a two soliton coherent system using the dissipative KdV equation (the Zabusky-Kruskal problem [13], Fig. 6).

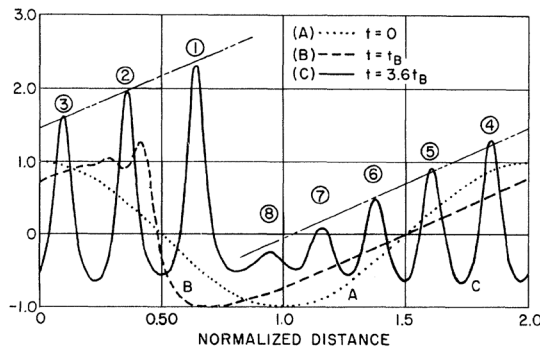


Fig. 6 The two-soliton coherent system

That is Grotendieck's topos providing a synthesis of topology, algebraic geometry and arithmetic (computation). Herein, a kind of physical "topos" is intended to apply the topological dual quantum isomorphism as a holistic conception for the whole physics (GUT). The morphosynthesis of chemical thermomolecular structures found in the formations of

cosmic stars, including the solar planetary system, can be recognized as an invariant dual quantum topological form, non-depended on any scale and space-time (or growth/evolution). The thermomolecular chemical morphosynthesis (or microcosmos) contains the fundamental chemical (material) structures composing both organic and inorganic substances, as a result of photosynthesis recurrent processes sustained by quantum light, i. e. both kinetic energy and heat embedded in matter as parathermal, gravitational or simply relative mass (retaining heat). Mathematically, the physical concept of gravitational/heavy mass is nothing else than a lee wave compact (critical Sobolev solar stationary mass $M_{\odot} = g_0^{\pi^3}$) which travels with a velocity less the light self-ignition c_s , and opposite to this, periodically self-regenerates or re-ignites. As there is a limit mass for the recurrence/regeneration process

$$M_{\otimes} \equiv g_0^{e^4 - g_0} = \frac{\log M_{\otimes}}{\log M_{\odot}} g_0^{\pi^3} = 1.44 M_{\odot}, \text{ the Chandrasekhar limit,} \quad (13a)$$

also, there is a minimal mass for the recurrence/re-ignition

$$M_{min} = g_0^{(e^4 - g_0)/2} = 0.72 M_{\odot}, \text{ the diathermal amorphous/cold mass,} \quad (13b)$$

and a critical topological/molecular mass

$$\tilde{M}_{cr} = g_0^{e^4 - \pi^3} = 10^{23.6} \equiv 6 \times 10^{23} \text{ kg, the critical molecular (warm)} \quad (13c)$$

mass

defining the Avogadro number

$$(\tilde{M}_{cr} \equiv N_A = 6.023 \times 10^{23} \text{ mol}^{-1})$$

as a critical quantum global measure for the molecular mass, where at the astronomical scale are

$$M_{min} = m_P, \text{ the Plutonian mass } (2 \cdot 10^{22} \text{ kg}),$$

$$\tilde{M}_{cr} \cdot g_0 = m_E, \text{ the Earth mass } (6 \cdot 10^{22} \text{ kg}).$$

The dual chemical morphism (or microcosmos) is the morphosynthesis of thermomolecular structures based on the Dalton and Avogadro empirical hypothesis concerning the molecules of a chemical substance as identical and containing the same number, $N_A = 6.022 \cdot 10^{23} \text{ mole}^{-1}$ found in thermodynamics as the ratio of the universal gas constant R to be Boltzmann constant

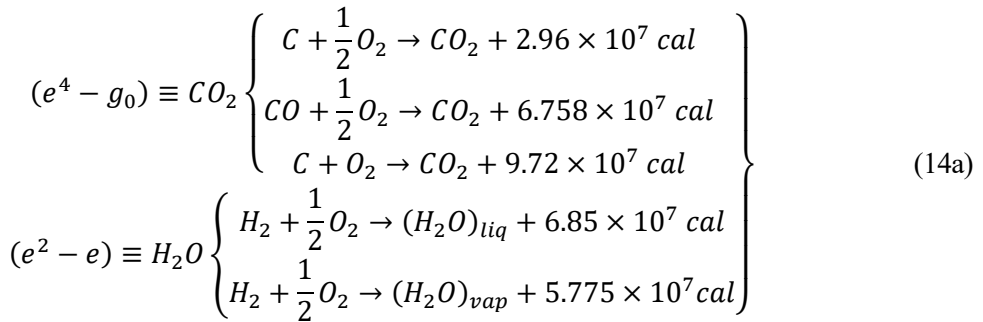
$$R = \frac{g_0}{k_B N_A} = \frac{10}{(1.381 \times 10^{-23}) \cdot (6.023 \times 10^{23})} = 1.2, \text{ (the quantum residue).}$$

The dual quantum isomorphism via the photosynthesis recurrent process of light engenders the chemical autocatalytic reactions of fundamental molecules from the solar system (combustion process): O_2 (the O-atomic, O_2 -molecular, O_3 -ozone allotropes of oxygen), H_2 (the 1H , 2H , 3H -isotopes of hydrogen), C (the ^{12}C , ^{13}C , ^{14}C -isotopes of carbon), CO_2 (carbon dioxide) and the hydrocarbons (the CH_4 - methane with less calorific value). The chemical autocatalytic reaction is a combustion-like process by a branched chain free-radical mechanism similarly to quantum fusion reactions, in which the free radicals are diathermal gravity (heat conductor assuring a constant difference of temperature across its sides) behaving qualitatively as a “sandwich-type” cross-flow heat exchanger surrounding the focal points of gravity (g_0 , g_{th}). In the case of covariant thermal field (p , T) in the fluid range (liquid and gas), the pressure plays the role of gravity occurring the thermomolecular pressure waves, viewed as “turbulence” in the flow regimes at large Reynolds numbers [14]. The heat released by the interaction/” combustion” of molecular structures is held at close temperature range by the mechanism of critical fluid states (a thixotropy property of fluids which softens when strained) called self-sustaining turbulence or Lagrangean turbulence.

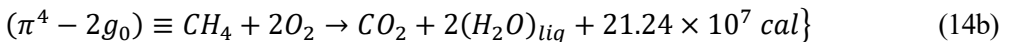
The autocatalytic chemical mechanism is based on the invariance of recurrent critical phenomena in the vaporization and condensation of the mixtures where coexist critical point (c) (b-boiling and m-melting), a return/twist point assuring cyclical processes, i.e. the circulation of fluid matter.

The critical thermal effect of light is the outcome of photosynthesis of natural quanta in chemical compounds corresponding the chemical thermomolecular equivalence concerning molecular weight: $\frac{e}{2} = H$ – isotopes, $2e^2 \equiv O$ – allotropes, $4\pi \equiv c$, $e^3 - e \equiv H_2O$ and $g_{th} = eg_0 \equiv CO$ - isotopes able to proceed the most combustion processes reduced to the following chemical reactions:

e – automorphism – the atmospheric carbon dioxide cycle



π – automorphism – the hydrocarbon cycle



The quantum-chemical equivalence, (14) clears up the problem of inverted gravity through the inversion of dual quantum isomorphism or the morphic immersion $e \subset \pi$. Physically, it is nothing else than the polarization of thermal field ($g_0g_{th} = 272 \text{ K} \equiv 0^0\text{K}$), where the heat flux, $\Phi_H = \frac{2}{g_0^2}c_s$ (cal), decreases alongside the light velocity, opposed to temperature (heat pump function).

The temperature increases as the thermal focus (g_{th}) gradually becomes nearer at warm focus (g_0) and ultimately, they collapse burning their heavy molecular structures (planets) and a new recurrent process begins around the timeless satelittary structures (the dark energy) alike the Ursa asterism. The uncoupling/collapse condition of two-soliton coherent like structure is given by (12) in the topological form of the thermal-gravity field

$$4g_{th} \rightleftharpoons g_0^2, \text{ the thermal critical regimes} \quad (12')$$

with the explicit local and global solutions for both thermal gravity and temperature critical values

$$\frac{g_0^2 - \pi}{4} (24.2) \leq g_{th,c} \leq \frac{g_0^2 + \pi}{4} (25.8), \theta_{cr} \leq 48.5^0$$

$$\frac{g_0^2 - g_0}{4} (22.4) < g_{th,lim} < \frac{g_0^2 + g_0}{4} (27.5), \theta_{lim} < 55^0$$

where $\theta_{cr} \equiv 2g_{th,c}$ and $\theta_{lim} \equiv 2g_{th,lim} \equiv e^4$ is the gravitational inversion restoring the natural quantum order of light when $g_{th,c}$ shifts to $g_{th,lim}$ (closer g_0).

The displacement of gravitational wave front is accompanied by the displacement of thermal radiation appearing on the color thermal spectrum shifted from blue (low temperatures) towards red (high temperatures).

This constitutes the thermal phenomenon of gravitational resonance known as “microwaves”.

The self-regulation thermal process is the Gaia theory, known better as the global warming effect, involving the temperature increases both in equinox ($\geq 25^0$) and solstice ($\geq 50^0$) periods with destructive consequences for the molecular structures.

The gravitational waves, back-scattering of thermal radiant energy into the hemisphere of the space bounded by a plane normal to the direction of light, break its caustic effect protecting the molecular structured mass.

The gravity effect at the molecular scale appears through the viscosity (μ) property of flowing fluids and their drag (heat dissipation) being a precessional effect of gravity depending on temperature and pressure, Fig. 7 [14].

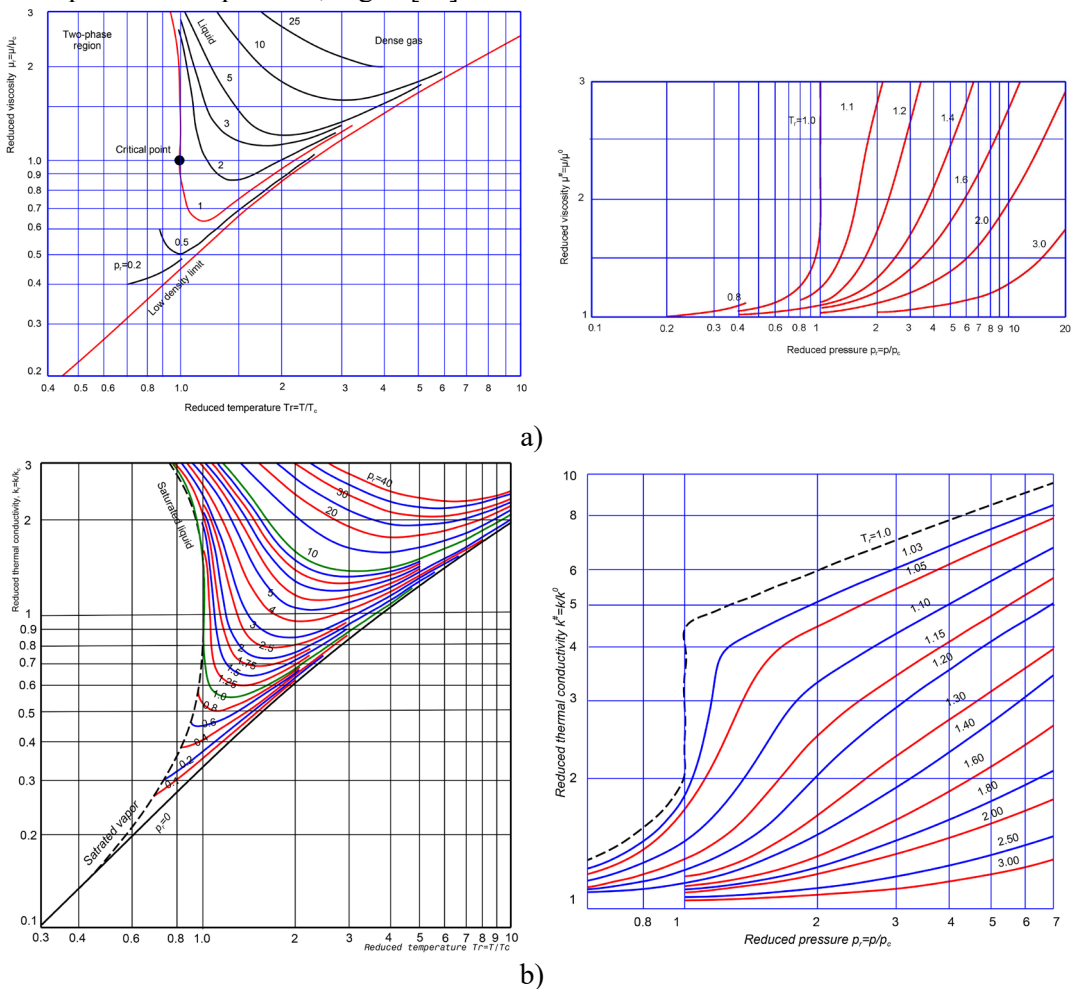


Fig. 7 The thermal conductivity in fluid mixtures with critical phenomena of retrograde vaporization and retrograde condensation: a) reduced viscosity $\mu_r = \mu/\mu_c$ as functions of temperature and pressure; b) reduced thermal conductivity $k_r = k/k_c$ as functions of temperature and pressure

The figure shows the preponderant influence of the temperature, as a result of the torsional gravitational buckling lag (Fig. 4) of quantum nature, given by the empirical Sutherland's formula

$$\mu_r = \frac{\mu}{\mu_c} = \left(\frac{T}{T_c}\right)^{3/2} \frac{T_c + C}{T + C}, C = e^4 \cong 110, \text{ the quantum constant.} \quad (15)$$

The viscosity controls the thermal conductivity in gases and liquids according to Fourier's law of heat conduction being the leading mechanism of energy transport for heat. The critical point for a given chemical composition is the point where the liquid and the gaseous phases become identical, as if they were a single component, but existing a range of pressure and of temperature above the critical point (p_c, T_c) where stationary condensation regimes may still occur.

The viscosity is closely related to this behavior of these phenomena of retrograde vaporization and retrograde condensation. That is the thermal inertia lag or torsion buckling phenomenon appearing as the self-sustained turbulence of fluids flowing at large Reynolds numbers.

The dual planetary morphism (macro-cosmos) is the morphosynthesis of the solar system constituted from both planets as structured thermomolecular mass and their satellites as structureless or amorphous mass with only quantum-gravity structure.

The satellites of the surrounding the orbits planets are gravitational masses carried by light velocity at extremely low temperature (< 100 K) and low pressure (< 1.0 Pa), i.e. the kinetic frozen masses without clear shape and/or structure, the so-called dark energy. They form the backbone of any solar system constituted from the dual quantum automorphism bounded with gravity, Eqs. 10, 11.

Both warm planets (Mercury (orbital radius $d_{Mc} = 0.4$ a.u.), Venus ($d_V = 0.72$ a.u.), Earth ($d_E = 1$ a.u. $= 3/2 \cdot 10^{11}$ m $\cong \pi/2 g_0 c_S$), Mars ($d_{Ms} = 1.5$ a.u.)) and cold planets (Jupiter ($d_J = 5$ a.u.), Saturn ($d_S = g_0$ a.u.), Uranus ($d_U = 2g_0$ a.u.), Neptune ($d_N = 3g_0$ a.u.), Pluto ($d_D = 4g_0$ a.u.)) have saturated thermomolecular structures (mass $\geq N_A$), with the exception of Mercury and Pluto, the extremities of solar system, which fail to meet the condition of critical mass (Eq. 12c).

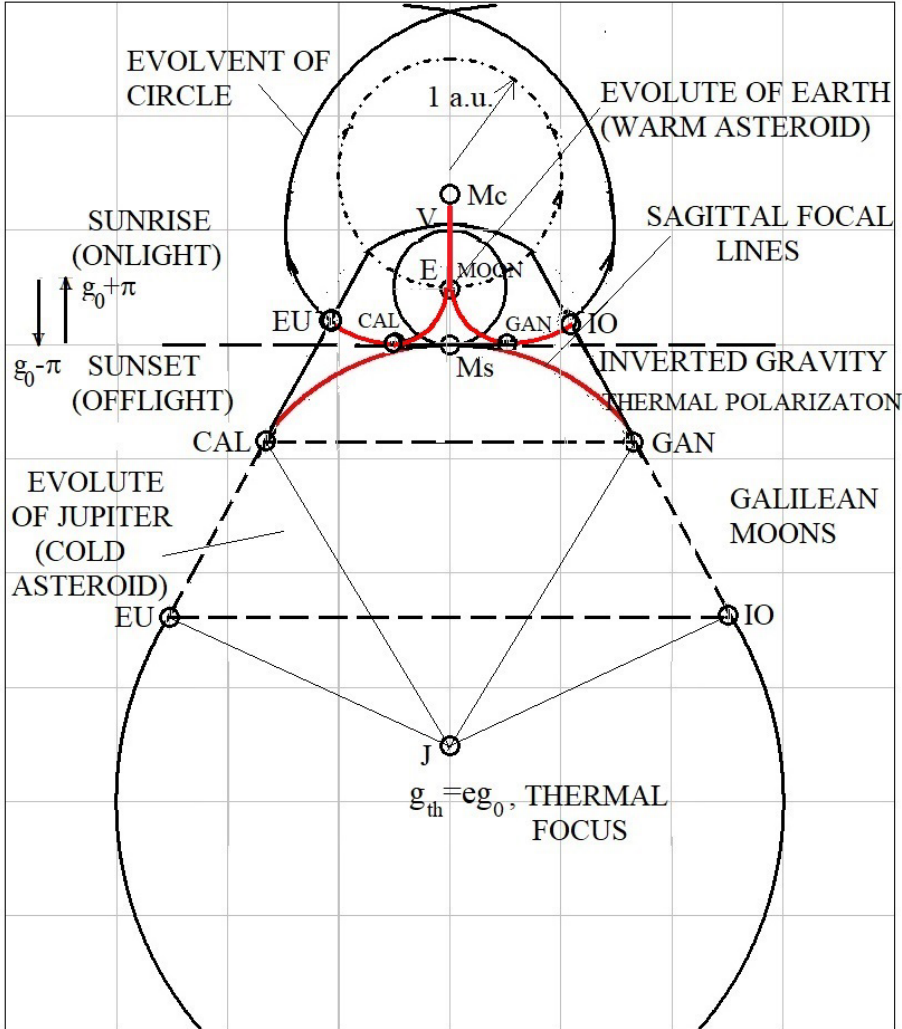
However, Mercury and Pluto as extremes of the thermal polarized field, together assure the periodic re-ignition of the whole solar system at a terrestrial century period ($\frac{T_{OP}}{T_{OMc}} \cdot \frac{T_{rP}}{T_{rMc}} = 100$, with T_O – orbital period, T_r – rotation period), and the conservation of its relative mass as warm and cold masses: $M_{\otimes, w} \equiv g_0^{e^4 - g_0} = 10^{44.6}$ kg $= \frac{(m_{Mc} \cdot m_P)}{g_0} = (m_E \cdot m_{MOON})/g_0^3$, the mass limit for warm/internal planets, and the cross-coupling of cold/external planets with the Galilean moons (Fig. 8): $M_{\otimes, c} \equiv g_0^{\frac{\pi^4}{2}} = 10^{48.7}$ kg $= \frac{(m_J \cdot m_{Eu})}{g_0^2} \cong \frac{(m_S \cdot m_{Io})}{g_0} \cong \frac{(m_N \cdot m_{CAL})}{g_0}$, the mass limit for cold/external planets (12d).

Figure 8 shows the invariant seven-star configuration found in Ursa-type asterisms, where the relative distance between Mercury (herein Polaris) and the MOON (the last star of cold planets) of $\frac{2e^3}{e^2} = 2e \cong 5$ is a cosmic quantum invariant.

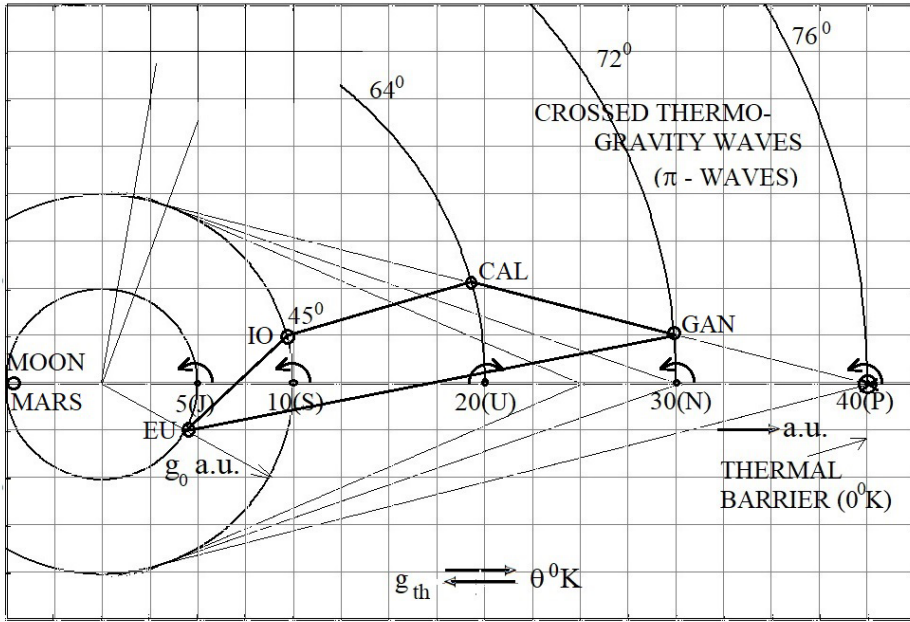
The dual structure of the solar system is the result of the polarized thermal field of light producing gravitational matter or mass in the form of structured matter with dual isomorphic structure embedded in matter called relative thermomolecular mass (or simply molecules), and structureless matter only with dual quantum isomorphic structure embedded in frozen matter,

the so-called gravitational mass or diathermal mass, and more dark energy, (13b), found in satellites.

The dark energy is nothing else than the kinetic energy of light at temperature $< 100^0\text{K} \equiv g_0^2$, or cold light supplying a continuous flux, or reactive power, $E_{kG} \equiv P_L = g_0^2 c_s^2 = 10^{22} \text{GeV}$, above the Plank energy limit, $E_{kP} = 10^{18} \text{GeV}$ ($1 \text{GeV} = 1.602 \times 10^{-10} \text{J}$, or $1 \text{GeV} = \frac{g_0}{2\pi} c_s^{-1} \text{J}$), where the quantum fluctuations of gravity ($g_0 = e + e^2$) are occurred in the kernel of asteroids (Fig. 8).



a) the quantum-gravity/satellitary structure: $(e^2 g_0)^{1/3} \approx (g_0 g_{th})^{1/4}$



b) the regeneration of thermomolecular structures (planets) in order of decreasing distance from Jupiter (or increasing temperature)

Fig. 8 The dual quantum automorphism embedded into the dual planetary (planets with thermomolecular/ relative mass and satellites with diathermal mass/dark energy) solar system: a) the near field like Ursa Minor (vertically bouncing regime; b) the far field like Ursa Major (horizontally floating regime)

The asteroids assure the metastable equilibrium between both warm and cold planets with thermo-molecular structure by regenerating/reappearing initial states, i.e. moving relative masses requiring a range of temperature above the critical point. The critical temperature (Eq. 12') is a coherence criterion for the solar system in order working as a whole. The thermomolecular masses accumulated surrounding the two-asteroids, the backbone of planetary solar system, are concentrated in Earth ($g_E \equiv g_0 \frac{m}{s^2}, m_E = 6 \times 10^{24} \text{ kg}$) and Jupiter ($g_J \equiv g_{th} \frac{m}{s^2}, m_J = 2 \times 10^{27} \text{ kg}$), their relative masses regenerating with different periods, $T_{OE} = 365 \text{ d} = 1 \text{ y}$ and $T_{OJ} = 12 \text{ y}$ (terrestrial years) with a coherence ratio $f_c = \frac{T_{SYJ}}{T_{OE}} = \frac{399}{365} = 1.093$. The coherence ratio is a global measure of the thermal interaction in working order which requests a periodical mass flux carried by Halley's comet.

$$m_H = m_{\otimes w} / M_{\odot} = 10^{14} \text{ kg}, T_H = \frac{m_J / m_E}{T_{OJ} / T_{OE}} \cdot \frac{g_J / g_E}{T_{OE} / T_{SYJ}} = 76, \tag{16}$$

the balancing mass flux.

The solar critical mass $M_{\odot} \equiv g_0^{\pi^3} = c_s^{\frac{3}{2}} = 10^{30} \text{ kg}$, in conjunction with Eq. 12', represents the conservation of relative mass with timeless regeneration at $\frac{3}{4}$ - century period, provided the critical temperature to be not exceeded. The dynamics of solar system is assured by the two-asteroids fluctuating according with equivalence theorem (Eq. 4) in the form

$$(e^2 g_0)^{1/3} \rightleftharpoons (g_0 g_{th})^{1/4}, \tag{4'}$$

associated with the displacement law of thermal wave front or thermo-gravitational resonance for a Fourier-like heat conduction

$$\frac{g_{th}}{g_0^2} = \left(\frac{T}{T_c}\right)^{4/3} \frac{T_c + C}{T + C}, C = 2e^4 = 110 K, T_3 = T_c = e g_0^2 = 272 K, \text{ the (ice-liquid-vapor) triple point of water} \quad (17)$$

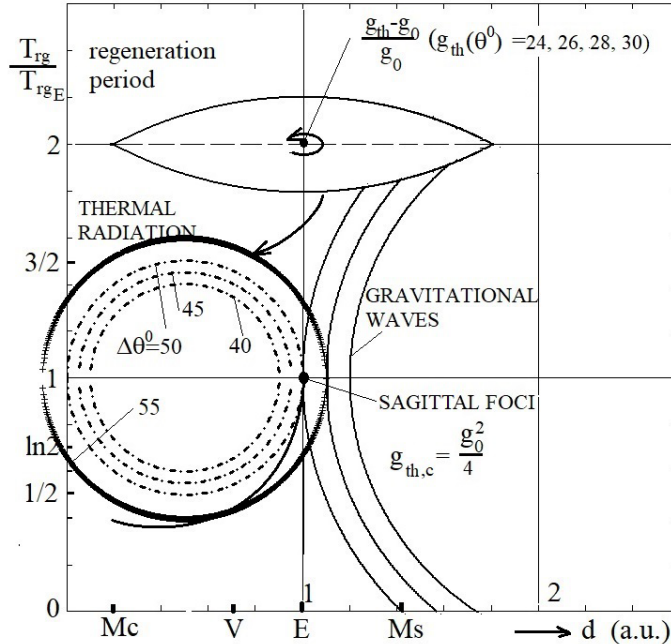


Fig. 9 The displacement law of thermal radiation from blue ($g_{th} = 24$) towards critical red ($g_{th} = 28$) (the thermal-gravity resonance/thermal tidal waves)

where for $\Delta\theta_{cr} = 50^\circ$ it is obtained the global temperature limit $\Delta\theta_{lim} = 55^\circ$ (Fig.9). The thermal radiation back-luminous gravitational waves (lightning) is accompanied by acoustic waves (thunders, $\frac{m_J}{m_E} \equiv a$, sound velocity) at equinox periods, restoring yearly the satellitary equilibrium.

4. THE UNIFIED QUANTUM THEORY OF PHYSICS AS A HOLISTIC THEORY OF NATURAL LIGHT

It is called the unitary theory such a hypothetical theory which succeeds to unify and to conciliate the multitude of the previous partial theories about a question. It seems that the fundamental thinking on this enterprise is to be put on two different planes:

- 1) A thinking of philosophic nature, on the notion itself of mathematical model (partially corresponding to the reality), its success (Newtonian mechanical theory, Einsteinian restricted relativity theory) becoming tacit axiom (accepted as true) for physicists to express the physical reality (with the error margin admitted by measured facts/experience;
- 2) and if there is a question of a unitary theory or at least an optimal model is clearly posed, then, beyond such thinking, the only problem, that remains is a technical one of devising a more satisfactory model than that of the precursors.

- 3) The automorphic quantum theory of endless light self-ignition (or re-ignition) is a such unitary theory able to bond Plank's quantum theory (splitting elementary particles, bonded in atomic structures) and the Einstein's restricted relativity theory of the space-time (uncoupled space and time, different of Newtonian model, $s(t)$) into a topological quantum global form (non-splitting thermomolecular structures) of the Einsteinian space-time type.

The non-splitting quanta are a dual automorphic structure bounded by gravity engendered by natural light at the self-ignition velocity viewed as thermomolecular structures (molecules) of a morphosynthesis reaction/process.

The actual crise of physics is the result of the ill-defined notions of light, gravity and matter as relative mass or temporary gravitized matter (with half-life period), the entities inferred from cosmology: the false postulate of constant light velocity, the incomplete model of Newtonian gravity (diathermal model) and the solar mass (M_{\odot}), wrongly defined as a distinct star (SUN).

The dual quantum automorphism of natural light, embedded into matter as relative thermomolecular mass is the origin of all electrodynamic and thermodynamic phenomena met in any temporary/relative mass, but timeless regenerated, like light does, provided their metastable equilibrium is held down. What remains to do now, is that in anything phenomenon you recognize its morphic origin and to gauge its behavior using both reciprocity or equivalence theorems and measure units ($1 \text{ GeV} = \frac{g_0}{2\pi} c_s^{-1} J$, the electronic-thermal energy equivalence). This is the grand unified theory of physics (GUT) i.e. the quantum theory of natural light, which completes Plank energy scale ($E_{kP} = 10^{18} \text{ GeV}$ [15, 16]) with the gravity/energy precessional scale ($E_{kG} = 10^{22} \text{ GeV}$) and removes the previous misconceptions.

REFERENCES

- [1] L. Euler, *On transcending quantities arising from the circle*, Chapter 8, 1748 (<http://www/fcentury.com/contents/euler>).
- [2] A. Einstein, On the Eletrodynamics of Moving Bodies, *Annalen der Physik*, Vol. 176, pp. 981, 1905.
- [3] A. Grothendick, *Récoltes et Semailles*, vol. 1, Editions Gallimard, 2021.
- [4] H. Dumitrescu, V. Cardos, R. Bogateanu, The Truth on Gravity and Terrestrial Global Warming. Part II: The Regenerative Mass, *INCAS BULLETIN*, (print) ISSN 2066–8201, (online) ISSN 2247–4528, ISSN–L 2066–8201, vol 14, Issue 2, pp. 27-42, <https://doi.org/10.13111/2066-8201.2022.14.2.3>, 2022.
- [5] R. Penrose, Topological QFT and twistors: holomorphic linking, *Twistors Newsletter*, vol. 27, 1-4, 1988.
- [6] R. Penrose, *Newton, quantum theory and reality*, in 300 years of Gravity (ed. S.W. Hawking and W. Israel), pp. 17-49, Cambridge University Press, Cambridge, 1987.
- [7] R. Penrose, *The road to reality*, Vintage Books, New York, 2004.
- [8] I. N. Bronstein, K. A. Semydyayev, *Handbook of Mathematics*, D.Van Nostrand company, New York, 1985.
- [9] V. I. Arnold, B. A. Kesm, *Topological methods in hydrodynamics*, Springer Verlag, New York, 1998.
- [10] P. G. Drazin, R. S. Johnson, *Solitons: an introduction*, Cambridge University Press, 1989.
- [11] * * * *The international dictionary of applied mathematics*, D. Van Nostrand Company, New York, 1960.
- [12] H. Dumitrescu, V. Cardos, R. Bogateanu, The Euler's harmonic holomorphic regenerative universe, *INCAS BULLETIN*, vol 16, Issue 1, 2024, pp. 45-58, <https://doi.org/10.13111/2066-8201.2024.16.1.5>.
- [13] N. J. Zabusky, M. D. Kruskal, Interactions of solitons in a collision less plasma and recurrence of initial states, *Phys. Rev. Lett.* 15, 240-243, 1965.
- [14] R. B. Bird, W. E. Stewart, E. N. Lightfoot, *Transport phenomena*, John Wiley and Sons, New York, 1965.
- [15] S. Hossenfelder, *Lost in Math: how beauty loads physics Astray*, HUMANITAS, Bucharest, 2018.
- [16] L. Smolin, *Einstein's unfinished revolution*, Penguin Books, UK, 2020.