

**A proposed set of relatively new conjectures and hypotheses in modern physics, mainly the concept of subquantum movement (SQM), the finite “elasticity” of spacetime hypothesis (FESTH), the self-repulsiveness of electromagnetic charge (SR-EMC) and the plausible gravitational significance of the fine structure constant (GS-FSC)**

DOI: [10.13140/RG.2.2.36382.69441](https://doi.org/10.13140/RG.2.2.36382.69441)

Article version: **1.0** (2.02.2020) (no matter this current paper version, its latest variant can be always downloaded from this [URL](#); version 1.0 released on 2.02.2020)

Andrei-Lucian Drăgoi<sup>1,2</sup>  
(independent researcher)

For motivation of this Wikipedia-based paper format see [URL](#)

**Motto:** “The greatest secret of our universe may be hidden in some of its tiniest elementary particles: the electron and the neutrino.” (dr. Andrei-Lucian Drăgoi)

**0. Abstract (with main abbreviations used in this paper)**

This paper proposes a set of relatively new conjectures and hypotheses in modern physics, mainly concept of subquantum movement (SQM), the finite “elasticity” of (charged/neutral) spacetime hypothesis (FESTH) (a unifying concept which may bring under the “same umbrella” both Einstein’s General relativity [EGR] and Quantum Field Theory [QFT]), the self-repulsiveness of electromagnetic charge (SR-EMC) and the gravitational significance (GS) of the fine structure constant (GS-FSC): each conjecture (or hypothesis) in part is based on at least one observation and generates some interesting predictions. This paper continues (from alternative angles of view!) the work of other past articles/preprints of the same author [1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23]

\*\*\*

**1. Observations and conjectures**

**Observation no. “0” (Obs0) (indexed as “0” to emphasize its central role and importance in this paper!) [3].** It is well known/demonstrated that ~99% of a nucleon (proton [p] or neutron

[n]) rest mass ( $m_{p/n}$ ) (which  $m_{p/n}$  is actually the inertial mass of a nucleon measured by an observer which is “at rest” in respect to that nucleon) IS IN FACT produced by BOTH, primarily, the kinetic energy of their subcomponent gluons (the quanta of the strong nuclear field [SNF], which gluons bind “nucleonic” up and

down quarks together, by the so called quantum chromodynamics binding energy which is actually the SNF energy) and, secondarily, the kinetic energy of quarks: tertiary, only the rest of ~1% of  $m_{p/n}$  is due to the rest masses of all its subcomponent quarks,

HOWEVER all  $(99\% + 1\%)m_{p/n}$  *couples gravitationally* (because the gravitational mass [URL2] and inertial mass of a nucleon were experimentally proved to be equal, at least in the error limit of the experiments).

**Conjecture no. “0”a (Conj0a) (based on Obs0) (indexed as “0” to emphasize its central role and importance in this paper!).**

Starting from Obs0, Conj0a “inductively” pushes Obs0 to its extreme possibilities by stating that: a **non-zero (NZ) rest mass (RM) (NZRM) of any known elementary particle (EP) indicates subquantum movement (SQM) of “something” inside that NZRM-EP, which SQM “sine-qua-non”-ly needs a non-zero volume (to ...logically take place!), which implies that all NZRM-EPs have non-zero (3D) (finite and non-infinitesimal) volumes (NZVs) (which NZVs are a fable solution to avoid the infinite self-energy paradox of any NZRM-EP); Conj0a additionally (and ambitiously!) states that all NZRMs of all EPs can ONLY be FULLY explained by the kinetic energy of other “ultimately” (“more”) fundamental (UF) ZRM-EPs moving inside those NZVs of those NZRM-EPs: these UF-ZRM-EPs are stated to have zero-RMs [ZRMs] and ONLY relativistic masses limited by the speed of light in vacuum  $c (= v_{\max})$  (like the photons and the gluons for example), which  $c$  is considered equal to the maximum speed allowed in OU ( $v_{\max}$ ) for any movement of any EP from OU (including UF-ZRM-EPs): this  $v_{\max} (= c)$ -rule/law/principle is stated by both Einstein’s Special relativity (ESR) and General relativity (EGR) SO THAT Conj0a assumes both ESR and EGR to be at least partially true, at least in this essential aspect (the existence of a finite  $v_{\max} = c$ ).**

**The main argument of Conj0a.** The main argument of Conj0 (which is the strongest of all!) would be that the quantum angular momentum (QAM/ spin) of any point-like EP (because all EPs are currently treated by quantum field theory [QFT] as 0D [mathematical/geometrical/abstract] points) has NO logical sense if the object is 0D (zero-length, zero-thickness, zero-depth etc): a 0D point is an abstract mathematical/virtual point which CANNOT “rotate” AND actually CANNOT have any physical properties at all (from which spin would be really an obvious “crass” logical paradox for any 0D EP!) AND that is why all EPs (including the electrons/positrons for example) are surely 3D entities with very small but finite and non-infinitesimal NZVs; the fact that QFT treats EPs as 0D points doesn’t literally mean that EPs are truly such 0D points, but ONLY means that, for QFT (and physics in general), it’s convenient to treat EPs as 0D points for many types of estimations and predictions which can be greatly simplified this way (however, convenience should NOT be confused with quantum and/or possibly subquantum reality!)

**Conjecture no. “0”b (Conj0b) (also based on Obs0).** Conj0b completes Conj0a by mainly stating that: **movement of anything CANNOT be infinitely compressed and limited in our universe (OU), because the act of progressively limiting the movement of**

[1] Email: [dr.dragoi@yahoo.com](mailto:dr.dragoi@yahoo.com)

[2] Main pages: [dragooi.com](http://dragooi.com) (CV: [cvrg.dragooi.com](http://cvrg.dragooi.com)); [rg.dragooi.com](http://rg.dragooi.com); [academia.dragooi.com](http://academia.dragooi.com); [vixra.dragooi.com](http://vixra.dragooi.com); [gsj.dragooi.com](http://gsj.dragooi.com); [smp.dragooi.com](http://smp.dragooi.com); [se.dragooi.com](http://se.dragooi.com)

any quantum/subquantum EP would progressively increase its kinetic energy inside that finite (and non-infinitesimal) NZV (volume of compression) and thus would progressively (and exponentially!) increase its rest-mass (RM) (generated by that SQM). This may be called the “*exponential asymptotic self-repulsiveness of movement/SQM*” which limits the compression of any NZRM-EP down to a maximum density  $\rho_{EP(\max)}$ , similarly to  $c(=v_{\max})$ : Conk0b co-states that this finite (non-infinite)  $\rho_{EP(\max)}$  is ACTUALLY caused by  $v_{\max}(=c)$ -rule/law/principle (stated by both ESR and EGR), which  $c(=v_{\max})$  is ALSO stated to be a speed limit for any UF-ZRM-EP from inside those finitely compressible NZRM-EPs (as previously/already stated/conjectured by Conj1a). **Prediction.** Conj0b predicts that OU doesn’t allow true gravitational singularities with infinite massic/energetic densities (as wrongly predicted by Einstein’s general relativity [EGR]), BUT ONLY (gravitational) quasi-singularities with very large but finite densities which cannot surpass  $\rho_{EP(\max)}$ : the pre-Big Bang Singularity (pBBS) is thus predicted to have been actually a **gravitational quasi-singularity with density**  $\rho_{pBBS} = \rho_{EP(\max)}$ .

**Conjecture no. “0”c (Conj0c) (also based on Obs0 and Conj0b).** Conj0c states that: (1) the **electron neutrino** (en) with

NZRM estimated as  $m_{en} \cong 1eV/c^2$  is, very plausibly, the lightest neutral (zero electromagnetic charge [EMC]) NZRM-EP conceivable and allowed in OU; (2) the **Planck length**

$l_{Pl} = \sqrt{\hbar G/c^3} (\cong 1.6 \times 10^{-35} m)$  is, very plausibly, the

smallest conceivable length with physical meaning in OU (and ALSO the minimum diameter of any spherical NZV of movement of any UF-ZRM-EP). Based on its first two sub-statements (1 and 2), Conj0c mainly states that en has a spherical NZV with diameter

$d_{en} = l_{Pl} = \sqrt{\hbar G/c^3} (\cong 1.6 \times 10^{-35} m)$  (that spatially

bounds/limits the subquantum movement [SQM] of any conceivable UF-ZRM-EP vibrating inside en/its NZV and generating its NZRM when observed from a larger scale), implying a finite maximum density of en

$$\rho_{en} = \frac{m_{en}}{(4\pi/3)(d_{en}/2)^3} \cong 8.1 \times 10^{68} kg/m^3. \quad \text{Conj0c}$$

additionally states that  $\rho_{en}$  is actually the maximum massic/energetic density allowed in OU so that

$$\rho_{EP(\max)} = \rho_{en} (\cong 10^{69} kg/m^3), \text{ which implies (as}$$

combined with the prediction of Conj0b)

$$\rho_{pBBS} = \rho_{EP(\max)} = \rho_{en} (\cong 10^{69} kg/m^3). \quad \text{Conj0c}$$

further (co-)states that NOT ONLY pBBS, BUT ALL neutral (n) (zero-EMC)-NZRM-EPs (briefly abbreviated “nEPs”) share this same (constant) maximum density (allowed in OU)

$$\rho_{EP(\max)} (\cong 10^{69} kg/m^3), \quad \text{so that}$$

$$\rho_{nEPs} = \rho_{EP(\max)} (\cong 10^{69} kg/m^3).$$

**Conjecture no. “0”d (Conj0d).** Conj0d states that electromagnetic charge (EMC) is even more rigid (less compressible) than “simple/neutral” SQM (the SQM of neutral UF-ZRM-EPs) due to an additionally conjectured “*self-repulsiveness of EMC*”: in other words, EMC is stated to oppose even more strongly to limiting (by compression) the NZV circumscribing that SQM (associated with a non-zero EMC) SO THAT EM-charged-EPs (briefly abbreviated “cEPs”) are conjectured to actually have a maximum allowed density  $\rho_{cEP(\max)}$  significantly smaller than

$$\rho_{nEPs} = \rho_{EP(\max)} (\cong 10^{69} kg/m^3), \quad \text{so that}$$

$$\rho_{cEPs(\max)} \ll \rho_{EP(\max)}. \quad \text{Estimation/prediction of the}$$

**electron(/positron) non-zero diameter.** If the electron(/positron) would share the same density

$$\rho_{EP(\max)} = \rho_{en} (\cong 10^{69} kg/m^3) \text{ with the electron}$$

neutrino (en), the diameter of the electron/positron ( $d_e$ ) would be

equal to  $d_{en} \sqrt[3]{m_e/m_{en}} = 80l_{Pl}$ : HOWEVER, the density of

the electron(/positron) is predicted (by Conj0d) to be much smaller than  $\rho_{EP(\max)} (= \rho_{en} = \rho_{nEPs})$ , implying a predicted

$d_e \gg 80l_{Pl}$ ; on the other hand, **the upper limit of the electron**

**size** (as determined by observing the electron in a **Penning trap**) is

$d_{e(ul)} (\cong 10^{-22} m)$ , so that  $d_e$  may be actually close to the

geometric average of these two extremes, such as

$$d_e \stackrel{estim.}{\cong} \sqrt{(80l_{Pl}) \cdot 10^{-22} m} \cong 10^7 l_{Pl} \cong 10^{-28} m: \text{ the density}$$

of the electron (/positron) is thus predicted to be

$$\rho_e \stackrel{estim.}{\cong} \frac{m_e}{(4\pi/3)(d_e/2)^3} \cong 10^{52} kg/m^3.$$

**Conjecture no. “0”e (Conj0e).** Conj0e states that all EM-charged EPs (cEPs) actually share the same density with the electron (/positron) so that

$$\rho_e = \rho_{cEPs} \left( = \rho_e \stackrel{estim.}{\cong} 10^{52} kg/m^3 \right). \quad \text{Important note.}$$

Both the estimated densities

$$\rho_{nEPs} \left( \begin{array}{l} \text{Conj0c} \\ = \rho_{EP(\max)} \end{array} \stackrel{\text{estim.}}{\cong} 10^{69} \text{ kg} / \text{m}^3 \right)$$

and

$$\rho_{cEPs} \left( \begin{array}{l} \text{Conj0d} \\ = \rho_e \end{array} \stackrel{\text{estim.}}{\cong} 10^{52} \text{ kg} / \text{m}^3 \right)$$
 are much larger

than any density of any conceivable macro black hole, BUT are considerably lower than the Planck density  $\rho_{Pl} = m_{Pl} / l_{Pl}^3 \cong 10^{97} \text{ kg} / \text{m}^3$  (which is approximately the density of a quantum/micro black hole defined by the equality between its Compton wavelength and its Schwarzschild radius).

Conj0e additionally states that  $\rho_{nEPs} \left( \stackrel{\text{estim.}}{\cong} 10^{69} \text{ kg} / \text{m}^3 \right)$  and

$\rho_{cEPs} \left( \stackrel{\text{estim.}}{\cong} 10^{52} \text{ kg} / \text{m}^3 \right)$  are sufficiently large to disrupt the

4D spacetime (4DST) of OU AND to create closed “bubble”-like hyperspherical spacetime circularities (aka [closed timelike curves](#)) in which a local patch of local 3D space (3DS) is wrapped around a 4<sup>th</sup> dimensional (4thD) “core” with compact topology: that is why Conj0e additionally states that all NZRM-nEPs and all NZRM-cEPs are actually two distinct types of 4D “bubble”-like quantum/micro black holes (mbhs) (which nEPs being with aprox. 17 orders of magnitude more compact than cEPs). **Important note.** Such a 4D-mbh (used as a generic model for any NZRM-EP) CANNOT be further compressed from our 3DS, because it is partially isolated from our 3DS (by its own closed circularity) AND because it has a finite elasticity (which may be explained by an infinitely rigid 4thD-core which may oppose to any further compression).

**The Finite Elasticity Spacetime Hypothesis (FESTH).** Based on all previous conjectures (Conj0a/b/c/d/e) we propose a **Finite “Elasticity” of Spacetime Hypothesis (FESTH)** which states that **neutral 4DST disrupts at (compression-)densities equal or larger than**  $\rho_{nEPs} \left( \stackrel{\text{estim.}}{\cong} 10^{69} \text{ kg} / \text{m}^3 \right)$  generating neutral 4D

“bubble”-like mbhs (which oppose to any further compression, with estimated density  $\rho_{nEPs}$  and identified with nEPs) AND EM-charged 4DST disrupts at (compression-)densities equal or larger than  $\rho_{cEPs} \left( \stackrel{\text{estim.}}{\cong} 10^{52} \text{ kg} / \text{m}^3 \right)$  generating EM-charged 4D

“bubble”-like mbhs (which oppose to any further compression, with estimated density  $\rho_{cEPs}$  and identified with cEPs). **Important note on FESTH (1).** FESTH (predicting a very large but finite spacetime “elasticity”) naturally explains how our 4D spacetime (4DST) may have “very smooth” geodesics at macroscopic scales (describable by EGR) BUT “jagged” quantized deformations/geodesics at subatomic scales close to Planck length scale (describable by QFT/quantum mechanics [QM] at those very small scales) so that FESTH can be regarded as a unifying concept accommodating both EGR and QFT/QM under the same “umbrella” of a future [theory of everything](#) (TOE). FEST also prevents gravitational singularities and allows ONLY gravitational quasi-singularities (with possibly very large but finite densities).

**Important note on FESTH (2).** FEST also predicts that our 4DST CANNOT be infinitely stretched (by accelerated inflation of OU), BUT ONLY stretched up to some predicted maximum size: at this maximum size (/level of stretch) our 4DST is predicted to be come infinitely rigid and bounce back in a global deflation (Big Bounce model of OU produced by a kind of global confinement).

**Important co-statement of FESTH.** FESTH also states that, similarly to EMC (which is associated with extreme disruptive 4DST circular curvature), color charge (CC) may be explained by alternative OR additional torsional 4DST curvature (“alternative” in the case of EPs with non-zero CC, but zero-EMC; “additional” in the case of EPs with both non-zero CC and non-zero EMC).

\*

**Observation no. 1a (Obs1a).** When analyzing all known [elementary particles](#) (EPs) from the [Standard model](#) (SM) of [particle physics](#), one may easily observe that [electromagnetic charge](#) (EMC) is ONLY associated with EPs possessing non-zero [rest masses/energies](#) (NZRM-EPs): a part of [leptons](#) (the [electron](#), the [muon](#), the [taunon](#) and their [antiparticles](#)), all known [quarks](#) (and their antiparticles: antiquarks) and a part of [bosons](#) (the [W<sup>+</sup> boson](#) and its antiparticle: the [W<sup>-</sup> boson](#)).

**Conjecture no. 1a (Conj1a) (“no electromagnetic charge without a rest mass” [NoEMCWithoutRM] conjecture/principle).** Based on Obs1a, we conjecture that EMC can only be “stored” on a non-zero rest mass so that the [EMC-to-mass ratio](#) ( $q_{EP} / m_{EP}$ ) is conjectured to be always a finite non-zero dimensional ratio for any conceivable EM-charged EP: the  $q_{EP} / m_{EP}$  ratio has also a correspondent dimensionless ratio

$$x_{EP} = q_{EP} \sqrt{k_e} / (m_{EP} \sqrt{G})$$
 so that Conj1 also implies  $x_{EP}$

to be always a finite non-zero dimensional ratio for any conceivable EM-charged EP (with  $k_e \cong 8.99 \times 10^9 \text{ Nm}^2 / \text{C}^2$  being the [Coulomb constant](#) in vacuum and  $G \cong 6.674 \times 10^{-11} \text{ m}^3 \text{ kg}^{-1} \text{ s}^{-2}$  being the universal gravitational constant). **Prediction.** Conj1 thus predicts that no EM-charged EP with zero-rest mass will ever be found in our universe (OU).

\*

**Observation no. 1b (Obs1b).** The [electron](#) (e) and its antiparticle (the [positron](#)) are the EPs with the largest known redefined dimensional ratio  $|q_e| / m_e \cong 1.76 \times 10^{11} \text{ C} / \text{kg}$  and

$$\text{dimensionless ratio } x_e = |q_e| \sqrt{k_e} / (m_e \sqrt{G}) \cong 2.04 \times 10^{21}$$

(with  $|q_e| \cong 1.6 \times 10^{-19} \text{ C}$  being the [absolute value](#) of the [elementary EMC](#) assigned to both the electron and the positron).

**Conjecture no. 1b (Conj1b).** Based on Obs1b, we conjecture that  $x_e$  is the largest  $x_{EP}$  allowed in OU so that Conj1b essentially states that  $x_{EP(\max)} = x_e$ .

\*

**Observation no. 1c (Obs1c).** Note that the electron and the positron also posses the smallest known [specific EMC](#) from OU

$$m_e / |q_e| \cong 5.686 \times 10^{-12} \text{ kg} / \text{C}$$
 so that the correspondent

$$x_e^{-1} = m_e \sqrt{G} / (|q_e| \sqrt{k_e}) \cong 10^{-21}$$

is also minimum known from OU, because there isn't any known EM-charged EP lighter than the electron and the positron.

**Conjecture no. 1c (Conj1c).** Based on Obs1c, we conjecture that there isn't any EM-charged EP in OU lighter than the electron (or the positron) so that there is a finite dimensionless "ambitus" in nature associated with the electron

$$N_e = x_e / x_e^{-1} = x_e^2 = k_e q_e^2 / (G m_e^2) \cong 4.166 \times 10^{42}$$

**Important note.**  $N_e$  can be considered a fundamental scaling factor of OU and spacetime (ST) itself, not only a finite ambitus of the electron and positron: furthermore,  $N_e$  can be used as a measure-unit of all the other dimensionless ratios of OU, helping understanding even more profoundly those ratios (as explained next).

**Explanation no. 1c (Expl1c).** If we define the ambitus between the strength of the gravitational field (GF) (the weakest known force/field of OU with a [gravitational coupling constant](#)

$$\alpha_G = G m_e^2 / (\hbar c) \cong 1.75 \times 10^{-45}$$

and the strength of the [strong nuclear field](#) (SNF) (the strongest known force/field of OU with a [SNF coupling constant](#)  $\alpha_S \cong 1$ ), then

$$\alpha_S / \alpha_G \cong 1 / \alpha_G \cong a N_e$$

being the inverse of the [fine structure constant](#) ( $\alpha$ ), which  $\alpha$  is the [EM field](#) (EMF) [coupling constant](#) (at rest).

**Observation no. 1d (Obs1d).** Interestingly, the maximum known mass ambitus between the [top quark](#) (tq) (the heaviest known EP with non-zero rest mass  $m_{tq} \cong 173 \text{ GeV} / c^2$ ) and the [electron neutrino](#) (en) (the lightest known EP with non-zero rest mass [estimated as](#)  $m_{en} \cong 1 \text{ eV} / c^2$ ) is

$$n_{\max} = m_{tq} / m_{en} \cong 1.7 \times 10^{11} \cong (2a N_e)^{1/4}$$

**Conjecture no. 1d (Conj1d).** Based on Obs1d, we conjecture that  $n_{\max}$  ( $= m_{tq} / m_{en}$ ) is truly the maximum EP mass ambitus of OU and that OU can be assigned an exact equality

$$n_{\max} = m_{tq} / m_{en} = (2a N_e)^{1/4}$$

**Prediction.** Based on the previous equality (stated by Conj1d), we predict  $m_{en}$  to be exactly

$$m_{en} = [m_{tq}^4 / (2a N_e)]^{1/4} \cong 0.947 \text{ eV} / c^2$$

**Important co-statement of Conj1d.** The ratio between the (non-zero) rest mass of the heaviest known EM-charged EP (the [top quark](#) and its antiparticle: the top [antiquark](#)) and the (non-zero) rest mass of lightest known EM-charged EP (the [electron](#) and the [positron](#))  $m_{tq} / m_e \cong 3.4 \times 10^5$  has also a special significance in

physics, as it represents the finite mass ambitus of any EMC: Conj2 also emphasizes that

$$m_{tq} / m_e \cong \sqrt[81.4\%]{n_m} \cong (2a N_e)^{1/8} \cong x_e^{1/4} \quad \text{and even more}$$

$$\text{exact } m_{tq} / m_e \cong \sqrt[99.7\%]{(q_{tq} / q_e) n_{\max}} \left( = \sqrt{(2/3) n_{\max}} \right)$$

\*\*

**Conjecture no. 2a (Conj2a).** Also based on Obs0 (like Conj0 is) and assuming Einstein's [General Relativity](#) (EGR), we conjecture that gluons and the quarks (from inside any nucleon) actually "stress" and deform with their movement (thus kinetic energy) the local [spacetime](#) (ST) of each nucleon in part from any mass (in OU) so that they effectively produce *ST-micro-deformation* (micro-ST-curvature [[micSTC](#)] definable by a set of micro-[geodesics](#)) AND it is that mSTC which generates (micro-)gravity which SHOULD NOT be treated as a real force, but only the consequence of STC, as it is treated by the successful EGR: in other words, EGR and [quantum chromodynamics](#) (QCD) (the quark-gluon model of [hadrons](#)) are compatible and EGR somehow anticipated QCD by also predicting STCs not only at large macrocosmic scales (macro-STCs [[macSTC](#)]), but also micSTCs (at microcosmic scales). In the case of [Newtonian gravitational](#)

[force](#)  $F_g = G \frac{m_1 m_2}{r^2}$  for example, although both  $m_1$  and

$m_2$  are considered point-like (in respect to the distance  $r$  between

those two masses), each mass ( $m_1, m_2$ ) is approximately the sum ( $\sum m_{p/n}$ ) of all its subcomponent nucleons (because the

[electrons](#), with rest mass  $m_e \cong m_{p/n} / 1837$ , have a very small

contribution  $< 1/1000$  of the total rest energy-mass of [atoms](#) with nucleons at rest): Conj2 also states that any macSTC generated by a macrocosmic mass may be modeled as the resultant of all micSTCs generated by all moving gluons and quarks of each nucleon (subcomponent of that mass) in part: in a flat Euclidean ST (as our ST was demonstrated to be) the macSTC geodesics created by

$m_1$  ( $= \sum m_{p/n(1)}$ ) spread in all the 3 directions of our 3D space so that they dissipate on a 3D spherical surface with progressively

growing area of emission (em)  $A_{em(1)} = 4\pi r^2$  until reaching a

target mass  $m_2$  (located at distance  $r$  of  $m_1$ , which  $m_2$  ALSO "emits" geodesics towards  $m_1$  with the same area of emission

$$A_{em(2)} = A_{em(1)} = 4\pi r^2 = A_{em}$$

), explaining the [inverse square law](#) (ISL) of gravity in a [flat](#) 3D Euclidean space, such as

$$F_g = 8\pi G \frac{m_1 m_2}{A_{em(1)} + A_{em(2)}} = 8\pi G \frac{m_1 m_2}{2A_{em}} = 8\pi G \frac{m_1 m_2}{8\pi r^2} = G \frac{m_1 m_2}{r^2}$$

The  $8\pi G$  factor/constant also appears in [Einstein's field equations](#)

(EFE) of EGR  $\left( R_{\mu\nu} - \frac{1}{2} R g_{\mu\nu} + \Lambda g_{\mu\nu} = \frac{8\pi G}{c^4} T_{\mu\nu} \right)$ , as part

of [Einstein's constant](#)  $\kappa = \frac{8\pi G}{c^4}$  (with  $c \cong 2.99 \times 10^8 \text{ m/s}$ )

being the [speed of light in vacuum](#)). Conj2a also proposes this redefined (r) big G  $G_r = 8\pi G$  as an alternative to the “standard” big G: based on this  $G_r$ , Conj2a also proposes an alternative redefinitions of  $x_e$  and  $N_e$  such as

$$x_{e(r)} = |q_e| \sqrt{k_e} / (m_e \sqrt{G_r}) \cong 4.07 \times 10^{20} \quad \text{and}$$

$$N_{e(r)} = x_{e(r)}^2 = k_e q_e^2 / (G_r m_e^2) \cong 1.657 \times 10^{41}.$$

**Important note.** Interestingly, the  $m_W / m_e (\cong 1.6 \times 10^5)$  ratio (the ratio between the mass of W boson [the heaviest known EP possessing an elementary charge {EC}  $|q_e|$ ] AND the rest mass of the electron [the lightest known EP possessing an EC]: the maximum massic “ambitus” of the EC) has a value very close to  $x_{e(r)}^{1/4} \cong 1.4 \times 10^5$  which may have a profound significance related to the number of 4 dimensions of spacetime.

\*\*

**Observation no. 2b (Obs2b).** The electron’s cloud (EC) of [virtual particles](#) (VPs) (virtual electron-positron pairs dragged by the point-like electron in its spin movement and/or other types of movements) was recently demonstrated to be [perfectly spherical](#) (with no experimentally detected [electric quadrupole](#) moment [URL] and no detected [gravitational quadrupole](#) moment [and thus not emitting any gravitational waves]) and NOT slightly bulgy (along the electron’s axis of spin) as predicted by some extensions to the Standard model (SM) of particle physics.

**Conjecture no. 2b (Conj2b).** Based on Obs2b and related to Conj2a, we also conjecture the electron to be actually a closed and perfectly spherical deformation of a very small patch of local 3D space (3DS) around a 4<sup>th</sup> dimensional (4thD) relatively empty “core” with compact topology: the 4thD-core of the electron (or positron) is practically trapped inside that spherical closed 3D hypersurface (represented by that small patch of local 3DS closed/twisted/”curled” around that 4thD-core). Conj2b essentially redefines the electron (and positron) as a (closed) 4D hyperspherical “bubble” (synonymous to a [closed timelike curve](#)) composed by a 4thD-core (with a finite non-zero 4D hypervolume) trapped inside a 3D hypersurface (the local 3DS of that electron/positron with finite non-zero 3D circular volume): the diameter of this 4thD-core  $d_e$  is stated to be smaller than [the upper limit of the electron size](#) (as determined by observing the electron in a [Penning trap](#))

$d_{e(ul)} (\cong 10^{-22} m)$  [URL]: Conj2b thus explains the perfect [sphericity](#) of the electron cloud (EC) by the perfect sphericity of the 3D hypersurface of this hyperspherical electron, so that the VPs (from the EC) pop out in this perfectly spherical 3D hypersurface of the electron/positron (which 3D hypersurface is hugely “rigid” and practically non-deformable even at high relativistic speeds).

\*

**Observation no. 2c (Obs2c).** The sphere is known to have a maximum volume for a given area (enclosing that volume) so that the generic r-radius sphere has a maximum ratio

$$V_{sph}(r) / A_{sph}(r) = (4\pi/3)r^3 / (4\pi r^2) = r/3 \quad (\text{depending}$$

on radius r) when compared to any other 3D non-spherical volume with average radius r (including any other [regular polyhedron](#) with the same radius of inn-sphere r [URL]). The  $V_{sph}(r) / A_{sph}(r)$

remains a maximum for any [n-sphere \(ns\)](#) [URL] (with an integer number n of Euclidean dimensions [EDs]) (when compared to any other n-polyhedron with the same number n of EDs and the same radius r of its inn-sphere) and has a general form

$$V_{ns}(r) / A_{ns}(r) = r/n \quad [\text{URL}].$$

**Conjecture no. 2c (Conj2c).** Conj2c proposes a double equivalence principle (EqP): (1) the EMC-hypervolume EqP and (2) the mass-hypersurface EqP. More specifically Conj2c “translates” the [NoEMCWithoutRM principle \(Conj1a\)](#) into a [NoFiniteEmpty4DHypervolumeWithoutAnEnclosing3DHypersurface principle](#). Based on Obs2c but also on the redefined

$$x_{e(r)} = |q_e| \sqrt{k_e} / (m_e \sqrt{G_r}) \cong 4.07 \times 10^{20},$$

Conj2c actually proposes(conjectures) the following bijective equivalences (equiv.): (1) the equiv. between the numerator  $|q_e| \sqrt{k_e}$  (of  $x_{e(r)}$ ) and the 4D (hyperspherical) hypervolume of the electron/positron

$$V_{e(4D)} = (\pi^2/2)r_e^4 \quad (\text{so that}$$

$|q_e| \sqrt{k_e} = k \cdot V_{e(4D)}$ ) AND (2) the equiv. between the denominator  $m_e \sqrt{G_r}$  (of the same  $x_{e(r)}$ ) and the 3D (spherical)

hyper-area of the electron/positron  $A_{e(3D)} = 2\pi^2 r_e^3$  (so that

$$m_e \sqrt{G_r} = k \cdot l_{pl} A_{e(3D)})$$

(with  $r_e = d_e/2$  being the radius of electron/positron,  $l_{pl}$  being the non-zero thickness of  $A_{e(3D)}$  in the 4thD and  $k$  being an arbitrary common constant of direct-proportionality) SO THAT  $x_{e(r)} = V_{e(4D)} / (l_{pl} A_{e(3D)})$ ; in this

way, Conj2c redefines: (1) the elementary electromagnetic charge (EMC) ( $q_e$ ) as a (minimal finite and non-zero) fixed unit/quanta of 4D (hyperspherical) volume ENCLOSED by (2) a non-zero rest mass redefined as (identified with) a (minimal finite and non-zero) unit/quanta of 3D hypersurface (with minimal finite and non-zero [3D] hyperspherical hyper-area allowed by an EM-charged EP); in other words, Conj2c redefines non-zero EMC as being “storable” in (and equivalent to!) a 4D hypervolume (enclosed by a 3D boundary) and redefines non-zero mass as being “storable” on and equivalent to a 3D hypersurface (enclosing that 4D hypervolume identified with EMC): (**explanation**) that is how Conj2c actually explains why EMC doesn’t appear in nature other than associated with non-zero rest mass EPs, because you cannot have a defined non-zero EMC without a (3D) massic boundary (enclosing that EMC equivalent to that enclosed 4D hypervolume).

Conj2c states the electron/positron to be actually a 4D quantum [micro black hole \(mbh\)](#) (with all its mass actually stored on a possible “ultra-thin” 3D hypersurface boundary), with  $x_{e(r)} (\cong 4.07 \times 10^{20})$  being redefined as the maximum number of the inner possible *subquantum* states of one electron/positron at

rest: in other words, Conj2 invokes and assumes the [black hole electron](#) hypothesis (**BHEH**) in another form.

Let us now define an electron-associated FSC based on the quantum angular momentum  $h_e = \hbar / 2$  of an electron/positron

such as  $\alpha_e = k_e q_e^2 / (h_e c)$  and its inverse  $a_e = h_e c / (k_e q_e^2) \left( = \frac{a}{2} \right)$ .

When expressing  $x_{e(r)} \left( \cong 4.07 \times 10^{20} \right)$  in [binary logarithmic](#)

[units](#), we get  $\log_2 \left( x_{e(r)} \right) \stackrel{99.92\%}{\cong} a_e$  so that,

$\alpha_e \cong 1 / \log_2 \left( x_{e(r)} \right)$ . Conj2c considers this numerical

closeness to be *too elegant and logical for just a coincidence and offers a more profound gravitational interpretation of FSC (also using this alternative interpretation as an additional new argument for BHEH)*: that is why Conj2c redefines both  $x_{e(r)}$  and

$a_e \left[ \cong \log_2 \left( x_{e(r)} \right) \right]$  as actually being the direct measure (and

binary logarithmic measure respectively) of the **maximum curvature achievable by any EM-charged 3D hypersurface** (identified with our 3D space) around an EM-charged 4thD-core (with compact topology and possessing an EMC equal to  $q_e$ ): this finite maximum achievable curvature conjectured by Conj2c actually completes the [Finite Elasticity of Spacetime Hypothesis \(FESTH\)](#) (launched in the 1<sup>st</sup> part of this paper): in this new

interpretation, the diameter of the electron  $d_e \left( \stackrel{\text{Conj0d}}{\cong} 10^{-28} \text{ m} \right)$

measures the smallest size achievable by any EM-charged hyperspherical 4hD(-core) with compact topology. Given the previous arguments, Conj2c offers an alternative definition of  $\alpha_e$  such as:

$$\begin{aligned} \alpha_e &= 1 / \log_2 \left( x_{e(r)} \right) = \\ &= 1 / \log_2 \left[ |q_e| \sqrt{k_e} / \left( m_e \sqrt{G_r} \right) \right] = \\ &= 1 / \log_2 \left[ V_{e(4D)} / \left( l_{Pl} A_{e(3D)} \right) \right] \\ &= -1 / \log_2 \left[ l_{Pl} A_{e(3D)} / V_{e(4D)} \right] \end{aligned} \quad (1a)$$

In other words, Conj2c (essentially) redefines  $\alpha_e$  as being probability for an electron to emit a photon **which probability is defined as being directly-proportional to the  $A_{e(3D)} / V_{e(4D)}$**

ratio (as shown by the last variant of equation 1a): this is a natural/intuitive concept, because the probability for a real electron to emit a real photon may plausibly be directly-proportional to the area of emission  $A_{e(3D)}$  (which measures

the interface between that electron and our 3D space: the larger the interface, the higher the probability of photonic emission/reception and thus the interaction between that electron and our 3D space and its content).

Equation #1a also implies the following conjectured equations #1b, #1c and #1d:

$$k_e q_e^2 / (h_e c) = 1 / \log_2 \left[ |q_e| \sqrt{k_e} / \left( m_e \sqrt{G_r} \right) \right] \quad (1b)$$

$$h_e c / \left( k_e q_e^2 \right) = \log_2 \left[ |q_e| \sqrt{k_e} / \left( m_e \sqrt{G_r} \right) \right] \quad (1c)$$

$$|q_e| \sqrt{k_e} / \left( m_e \sqrt{G_r} \right) = 2^{h_e c / \left( k_e q_e^2 \right)} \quad (1d)$$

**More ambitiously (and continuing the previous statement of Conj2c), Conj2c also states that EACH EM-charged EP has its own electromagnetic coupling constant at rest**

$\alpha_{EP(r)} = 1 / \log_2 \left( x_{EP(r)} \right) = 1 / \log_2 \left[ k_e q_e^2 / \left( G_{q(r)} m_{EP}^2 \right) \right]$ : all

the other non-electron/non-positron EM-charged have  $x_{EP(r)} < x_{e(r)}$  and thus have  $\alpha_{EP}$  slightly larger than FSC

$\alpha \cong 1 / 137.036$  (and closer to  $\alpha_S \cong 1$  implicitly): the larger

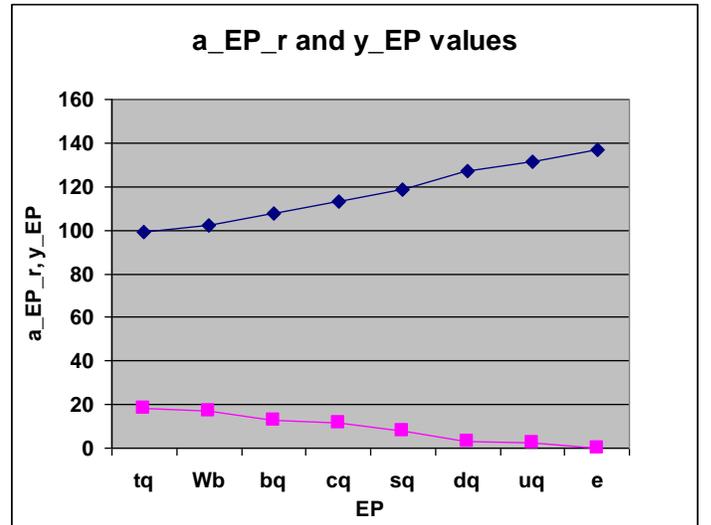
the  $A_{e(3D)} / V_{e(4D)}$  ratio (of that EM-charged EP), the smaller

its assigned  $x_{EP(r)}$  resulting a larger probability of those EPs

to emit virtual or real photons (and thus to more strongly couple electromagnetically). The  $a_{EP(r)} \left( = 1 / \alpha_{EP(r)} \right)$  values

for all known EM-charged EPs are graphed next and clearly show a linear pattern trend in this binary logarithmic scale when sorted in ascending order: furthermore, this linear growing pattern is inverse to the linear decreasing pattern of the ratio

$y_{EP} = \log_2 \left( m_{EP} / m_e \right)$ .



**Figure 1.** The  $a_{EP(r)}$  and  $y_{EP}$  values for all known EM-charged EPs. Abbreviations: tq ([top quark](#)), Wb ([W boson](#)), bq ([bottom quark](#)), cq ([charm quark](#)), sq ([strange quark](#)), dq ([down quark](#)), uq ([up quark](#)) and e ([electron](#)).

**Prediction (and explanation).** For example, the [muon](#) ( $\mu^-$ ) and the [tauon](#) ( $\tau^-$ ) (which may be considered two distinct excited

states of the electron) are predicted to have electromagnetic coupling constants at rest

$$\alpha_{\mu(r)} = 1/\log_2(x_{\mu(r)}) \cong 1/122$$

and  $\alpha_{\tau(r)} = 1/\log_2(x_{\tau(r)}) \cong 1/114$  which are with aprox.

13% and 21% larger than FSC at rest ( $\alpha \cong 1/137$ ) (associated with the electron at rest): these larger-than-FSC predicted  $\alpha_{\mu(r)}$

and  $\alpha_{\tau(r)}$  may distort the results of some proton scattering experiments using muons (also used for determining proton's charge radius) and that is how Conj2c tries to explain the [proton radius "puzzle"](#). **Prediction.** Furthermore, Conj2c predicts that, if ever accomplished in the future, proton scattering experiments using tauons will generate even larger deviations from the pre-2010 standard measurements of the proton radius (by using electron for proton scatterings).

\*

**Observation no. 2d (Obs2d).** The [muon](#) ( $\mu^-$ ) and the [tauon](#) ( $\tau^-$ ) (which may be considered two distinct excited states of the electron) have associated dimensionless ratios

$$x_{\mu(r)} = \left[ |q_e| \sqrt{k_e} / \left( m_{\mu} \sqrt{G_{q(r)}} \right) \right] (\cong 2 \times 10^{18}) \quad \text{and}$$

$$x_{\tau(r)} = \left[ |q_e| \sqrt{k_e} / \left( m_{\tau} \sqrt{G_{q(r)}} \right) \right] (\cong 1.2 \times 10^{17}) \quad \text{which are}$$

both lower than

$$x_{e(r)} = |q_e| \sqrt{k_e} / \left( m_e \sqrt{G_{q(r)}} \right) \cong 4.23 \times 10^{20} \quad (\text{which } x_{e(r)})$$

corresponds to a perfect ST 3D sphere or a 4D hypersphere or a perfect n-sphere).

**Conjecture no. 2d (Conj2d).** Based on Obs2d, we conjecture that  $x_{\mu} (< x_{e(r)})$  and  $x_{\tau} (< x_{\mu} < x_{e(r)})$  actually indicate that both  $V_{\mu} / A_{\mu}$  and  $V_{\tau} / A_{\tau}$  are smaller than the nature's maximum  $V_{ns} / A_{ns}$  (which corresponds to the perfectly spherical electron, the electron cloud [EC] of virtual particles [VPs] and its associated  $V_e / A_e$ ) SO THAT the muon and tauon (and their clouds of VPs) are conjectured and **predicted!** to have *imperfect spherical-like/spheroidal shapes* (deviated from the perfect sphericity of EC) and thus retrodicted to be much more unstable than the electron (an **explanation** proposed by Conj2d): furthermore, the tauon's cloud (of VPs) is predicted to have a shape even more deviated from the perfect sphere than muon has AND THUS the tauon is retrodicted to be more unstable than the muon (an **explanation** proposed by Conj2d). **Generally (as shown in the graph attached to Conj2c), Conj2d states that, the larger the mass deviation of any EM-charged EP (relatively to the rest mass of the electron ( $m_e$ )), the lower the sphericity of the local surrounding ST of that EP, the larger the  $A_e$  associated with that EP AND the larger the EM coupling constant (at rest) associated with that EP (explained by a larger probability of that EP to emit a virtual or a real photon).**

\*\*\*

## 2. References (partially integrated as Wikipedia URLs in the text of this paper)

- [1] [Andrei-Lucian Drăgoi \(January 2020\)](#). (QGR - v1.0 - 30.01.2020 - 11 A4 pages [without References]) (toy-model) **Sketching a new Quantum General Relativity (QGR) variant mainly based on the redefinition of leptons (as quantum micro black holes composed from highly compressed single triquarks under a very strong quantum gravitational field [QGF]), a dual electro-gravitational interpretation of the fine structure constant (FSC), Planck wormholes ("Planck tubes") and a reinterpretation of Planck units in the "spirit" of Einstein's GR.** Research Gate preprint with DOI: [10.13140/RG.2.2.15522.58567](#). [URL1a](#) (Research Gate main source), [URL1b](#) (Academia secondary source), [URL1c](#) (Vixra secondary source), [URL1d](#) (GSJ secondary source), [URL1e](#) (dragooi.com latest variant source).
- [2] [Andrei-Lucian Drăgoi \(December 2019\)](#). (GTM - long variant 1.0 - 19.12.2019 - 8.5 A4 pages without references section) **A simple Gravitational toy-model (GTM) mainly based on a new reinterpretation of the Newtonian/ universal gravitational constant (big G) which solves from "one-shot" the cosmological constant problem, the hierarchy problem, the dark energy problem and the singularity problem (GTMa, GTMb and GTMc).** Research Gate preprint with DOI: [10.13140/RG.2.2.14361.77926](#). [URL1a](#) (Research Gate main source), [URL1b](#) (Academia secondary source), [URL1e](#) (dragooi.com latest variant source).
- a. (GTM - short variant 1.0 - 19.12.2019 - 7 A4 pages without references section). Research Gate preprint with DOI: [10.13140/RG.2.2.31138.99525](#). [URL1a](#) (Research Gate main source), [URL1b](#) (Academia secondary source), [URL1e](#) (dragooi.com latest variant source)
- b. (GTM - very short variant 1.0 - 19.12.2019 - 4.5 A4 pages without references section). Research Gate preprint with DOI: [10.13140/RG.2.2.25738.82885](#). [URL1a](#) (Research Gate main source), [URL1b](#) (Academia secondary source), [URL1e](#) (dragooi.com latest variant source). 1 recommendation from: [Stanley Wilkin](#).
- [3] [Andrei-Lucian Drăgoi \(July 2019\)](#). (SGUM - version 1.0 - 9.07.2019 - 10 pages) **A "Simply...Gravitonic" Universe (toy-)Model (SGUM).** Wiki-like Research Gate preprint. DOI: [10.13140/RG.2.2.28671.36003](#). [URL1a](#) (Research Gate source), [URL1b](#) (Academia source), [URL1c](#) (Vixra source), [URL1d](#) (GSJournal source).
- [4] [Andrei-Lucian Drăgoi \(October 2019\)](#). (MUM - short version 1.0 - 22.10.2019 - 4 A4 pages without references) **A "Mirrored" Universe (toy-)Model (MUM) based on a relative big G, a variable quantum big G and a finite mass ambitus of our universe (short variant of the original full preprint).** Research Gate preprint with DOI: [10.13140/RG.2.2.11788.05763](#). [URL1a](#) (Research Gate main source), [URL1b](#) (Academia secondary source), [URL1c](#) (Vixra secondary source), [URL1d](#) (GSJ secondary source), [URL1e](#) (dragooi.com latest variant source).
- [5] [Andrei-Lucian Drăgoi \(October 2019\)](#). (MUM - [long] version 1.0 - 21.10.2019 - 7 A4 pages) **A "Mirrored" Universe (toy-)Model (MUM) based on a relative big G, a variable quantum big G and a finite mass ambitus of our universe.** Research Gate preprint with DOI: [10.13140/RG.2.2.35738.18885](#). [URL1a](#) (Research Gate main source), [URL1b](#) (Academia secondary source), [URL1c](#) (Vixra secondary source), [URL1d](#) (GSJ secondary source), [URL1e](#) (dragooi.com latest variant source).
- [6] [Andrei-Lucian Drăgoi \(August 2019\)](#). (DRH - v 1.0 - 28.08.2019 - 4 pages A4) **A Dimensional Relativity Hypothesis (DRH)**, Research Gate preprint with DOI: [10.13140/RG.2.2.30254.87368](#). [URL1a](#) (Research Gate main source), [URL1b](#) (Academia secondary source), [URL1c](#) (Vixra secondary source), [URL1d](#) (dragooi.com latest variant source), [URL1e](#) (GSJ secondary source).
- [7] [Andrei-Lucian Drăgoi \(August 2019\)](#). (ACUM - version 1.0 - 25.08.2019 - 7 pages) **An elegant Adimensional Cyclic Universe (toy-) Model (ACUM) mainly based on the electrograviton hypothesis (EGH), the quantized gravitational waves hypothesis (QGW-Hyp) and the dimensional relativity hypothesis (DRH).** Research Gate preprint with DOI: [10.13140/RG.2.2.13834.82881](#). [URL1a](#) (Research Gate main source), [URL1b](#) (Academia secondary source), [URL1c](#) (Vixra secondary source), [URL1d](#) (dragooi.com latest variant source), [URL1e](#) (GSJ secondary source).
- [8] [Andrei-Lucian Drăgoi \(June 2019\)](#). (LifeAsEmergent - version 1.0 - 6 pages - 20.06.2019) **On the very low probability of complex life forms to be just emergent phenomena and about the "continuous" versus "intermittent" free will.** Wiki-like Research Gate preprint. DOI: [10.13140/RG.2.2.22592.58887](#). [URL1a](#) (Research Gate source), [URL1b](#) (Academia source), [URL1c](#) (Vixra source), [URL1d](#) (GSJournal source).
- [9] [Andrei-Lucian Drăgoi \(April 2019\)](#). (LFs and gravity - working paper - variant 1.0 - 7 pages - 13.04.2019) **Life forms, "hybrid" causality, gravity and hierarchical parallel universes.** Research Gate preprint. DOI: [10.13140/RG.2.2.19089.28009](#). URLs: [URL1a](#) (Research Gate source), [URL1b](#) (Academia source), [URL1c](#) (Vixra source), [URL1d](#) (GSJournal source).
- [10] [Andrei-Lucian Drăgoi \(January 2019\)](#). (eSR - short version - 4 pages - 3.01.2018) **An extended Special relativity (eSR) containing a set of universal equivalence principles and**

**predicting a quantized spacetime.** Research Gate preprint. DOI: [10.13140/RG.2.2.29665.35686](https://doi.org/10.13140/RG.2.2.29665.35686). URL (Research Gate source).

[11] **Andrei-Lucian Drăgoi (December 2018).** (eSR – version 1.0 – 6 pages – 20.12.2018) **An extended Special relativity (eSR) containing a set of universal equivalence principles and predicting a quantized spacetime.** Research Gate preprint. DOI: [10.13140/RG.2.2.10208.53764](https://doi.org/10.13140/RG.2.2.10208.53764). URL (Research Gate source).

[12] **Andrei-Lucian Drăgoi (December 2018).** (eZEH article-like preprint – version 1.0 – 8 pages – 12.12.2018) **An extended zero-energy hypothesis predicting the existence of negative-energy gravitons and possibly explaining the accelerated expansion of our universe.** Research Gate preprint. DOI: [10.13140/RG.2.2.36245.99044](https://doi.org/10.13140/RG.2.2.36245.99044). URL (Research Gate source).

[13] **Andrei-Lucian Drăgoi (August 2018).** (IP-GP – version 1.0 – 15 pages – 14.08.2018) **On the intrinsic paradox of the geometric point definition (solved using the Included Middle Logic) as the main cause of Euclid's postulate "inaccuracy", allowing the existence not only of non-Euclidean geometries but also of a new "t-metamathematics" used to redefine the basics of General relativity, Quantum field theory, Superstring theories and M-theory.** Research Gate preprint. DOI: [10.13140/RG.2.2.32439.42405](https://doi.org/10.13140/RG.2.2.32439.42405). URL (Research Gate source).

[14] **Andrei-Lucian Drăgoi (August 2018).** (eZEH – version 1.0 – 10 pages – 2.08.2018) **An extended zero-energy hypothesis: on some possible quantum implications of a zero-energy universe, including the existence of negative-energy spin-1 gravitons (as the main spacetime "creators") and a (macrocosmic) black-hole (bh) Casimir effect (bhCE) which may explain the accelerated expansion of our universe.** Research Gate preprint. DOI: [10.13140/RG.2.2.31515.36642](https://doi.org/10.13140/RG.2.2.31515.36642). URL (Research Gate source).

[15] **Andrei-Lucian Drăgoi (September 2017).** (FSC-TS – preprint – version 7.2 – 28 pages – 15.09.2017) **On a plausible triple electro-gravito-informational significance of the fine structure constant and its implications in a plausible four fields unification pattern at Planck scale and the existence of life forms in our universe.** Research Gate preprint. DOI: [10.13140/RG.2.2.13114.39365](https://doi.org/10.13140/RG.2.2.13114.39365). URL (Research Gate source).

[16] **Andrei-Lucian Drăgoi (May 2017).** (version 1.1 – 12 pages – 5.06.2017) **A preonic toy model of all known elementary particles based on 1D and 2D branes.** Research Gate preprint. DOI: [10.13140/RG.2.2.26817.97123](https://doi.org/10.13140/RG.2.2.26817.97123). URL.

[17] **Andrei-Lucian Drăgoi (May 2017).** (version 2.3 – 12 pages – 6.06.2017) **A cyclic toy model of the universe based on a quantized spacetime predesigned for life (technical essay).** Research Gate preprint – Version: 2.3, In Progress. DOI: [10.13140/RG.2.2.22391.83369](https://doi.org/10.13140/RG.2.2.22391.83369). URL (Research Gate source).

[18] **Andrei-Lucian Drăgoi (April 2017).** (version 2.0 – 28 pages – 9.05.2017) **A cyclic toy model of the universe predesigned for life, based on preonic quantized branes and a very strong 2D gravitational field as a candidate for a unified primordial field.** Research Gate preprint – Version: 2.0, In Progress. DOI: [10.13140/RG.2.2.24084.30087](https://doi.org/10.13140/RG.2.2.24084.30087). URL (Research Gate source).

[19] **Andrei-Lucian Drăgoi (February 2017).** (BIDUM 3.2 full – Part A – 18 pages – last update on: 23.02.2017) **A Bio-Info-Digital Universe (toy-)Model – towards a transdisciplinary TOE centered on life phenomenon – Part A.** Research Gate preprint. DOI: [10.13140/RG.2.2.23869.26082](https://doi.org/10.13140/RG.2.2.23869.26082). URL (Research Gate source)

[20] **Andrei-Lucian Drăgoi (February 2017).** (BIDUM 3.2 full – Part B – 20 pages – last update on: 23.02.2017) **A Bio-Info-Digital Universe (toy-)Model – towards a transdisciplinary TOE centered on life phenomenon – Part B.** Research Gate preprint. DOI: [10.13140/RG.2.2.35013.65760/1](https://doi.org/10.13140/RG.2.2.35013.65760/1). URL (Research Gate source).

[21] **Andrei-Lucian Drăgoi (September 2016).** (BIDUM 3.1 beta version – 24 pages – data) **A toy model of the universe based on a large numbers hypothesis inspired by Edward Teller – towards a TOE centered on life phenomenon.** Research Gate preprint. DOI: (see other related DOIs [10.13140/RG.2.2.23869.26082](https://doi.org/10.13140/RG.2.2.23869.26082) <sup>[URL2]</sup> and [10.13140/RG.2.2.35013.65760/1](https://doi.org/10.13140/RG.2.2.35013.65760/1) <sup>[URL2]</sup>). URL (Research Gate source).

[22] **Andrei-Lucian Drăgoi (May 2018).** (DVTM – PSIJ – Short Research Article – 30.05.2018 – 19 pages) **(Toy-model) A Simple "Digital" Vacuum Composed of Space Voxels with Quantized Energetic States** (Physical Science International Journal, ISSN: 2348-0130, Vol.: 18, Issue.: 1). DOI: [10.9734/PSIJ/2018/41391](https://doi.org/10.9734/PSIJ/2018/41391). URL0 (original source); URL1 (Research Gate source);

[23] **Andrei-Lucian Drăgoi (July 2017).** (PSIJ – Short Research Article – 29.07.2017) **On a Plausible Triple Electro-gravito-informational Significance of the Fine Structure Constant** (Physical Science International Journal, ISSN: 2348-0130, Vol. 15, Issue 3). DOI: [10.9734/PSIJ/2017/34613](https://doi.org/10.9734/PSIJ/2017/34613) (URL-CrossRef.org). URL0 (original source); URL1 (Research Gate source);