

On the Missing Link between Cosmology and Biology

Mohamed S. El Naschie¹, Scott Olsen², M.A. Helal³, L. Marek-Crnjac⁴ and S. Nada

¹Distinguished Professor, Dept. of Physics, Faculty of Science, University of Alexandria, Alexandria, Egypt, Email ID: msnaschie10@gmail.com

²Emeritus Professor, Philosophy and Religion, College of Central Florida, Ocala, Florida, USA, Email ID: olsens@cf.edu.

³Department of Mathematics, Faculty of Science, Cairo University, Cairo, Egypt, Email ID: mahelal@yahoo.com.

⁴Department of Mathematics, Technical School Center of Maribor, Maribor, Slovenia, Email ID: leila.marek@guest.arnes.si.

⁵S.I. Nada, Department of Mathematics, Faculty of Science, Minofiya University, Egypt, Email ID: shokrynada@yahoo.com.

Abstract – The present short letter provides some rational speculative arguments based on mathematical facts linking cosmology with biology in a relevant new way, shedding light on the beginnings of life.

Keywords – Cosmological biology, Fractal universe, Cellular automata, Golden mean universal computer, Origin of life on earth, The cosmos as a living organism, E-infinity Cantorian spacetime.

There are several motivations for the present work but the most immediate is the current scientific evidence that a sponge organism is the most likely origin of all forms of life on earth [1-4]. This involves recurrent and vividly debated themes spanning cosmology and biology, namely whether the cosmos is also basically a gigantic living organism [4-6]. We think we can offer some arguments in support of this admittedly speculative idea. Our evidence and arguments for this rather daring hypothesis is by no means conclusive. All the same, the subject is of such immense importance, that it would be wrong not to air our thoughts on this important matter. In this respect, we are clearly taking the view of Lord Bertrand Russell [7] that philosophical speculation encompasses all the important things which are not yet proven scientifically. However, they are important in so far as we must continue thinking and speculating because this road leads to the advancement of science and a healthy human spirit. This rational speculation is the first natural step towards exact science.

The present chain of thoughts leading to the idea that the cosmos is ‘a living’ form of mega-dimensions suggesting the possibility of immense consequences, could be summarized as follows:

There is a robust model that serves well for material science as well as cosmology, namely the effective quasicrystal of Sir Roger Penrose’s fractal tiling [8]. This model was discussed extensively by Alain Connes in his *Noncommutative Geometry*, Academic Press; 1 edition (December 6, 1994), [8-16] as well as by Leila Marek-Crnjac and Ji-Huan He in the context of E-infinity Cantorian-fractal spacetime theory [10-25] [31-37]. This work brings together, at a minimum, the large scale structure of the universe and the micro-quantum aspects of the cosmos and ties them together with the most irrational number of all, namely the golden mean. It necessarily brings to the forefront the central role of the golden mean number system as an infinite capacity transfinite Turing-like computer or cellular automata [26] at the very foundation of Nature, whether quantum, relativistic or classical [14-26].

Furthermore we could approximate the very essence of the topology and geometry of the spongy organism declared here to be the origin of life [1-3] with the well-known Menger sponge [16] which is a three-dimensional version of the Sierpinski triangle which in turn is deeply linked to the Penrose fractal tiling universe. It is well known that the Hausdorff dimension of the Menger sponge is given by $\ln 20 / \ln 3$ [3, 16, 22] which is not expressed in terms of the golden mean since it is deterministic. However, it is interesting at least mathematically to see how randomness would change the value. For instance, a deterministic Sierpinski gasket has a Hausdorff dimension equal to the inverse of the deterministic triadic Cantor set $\ln 20 / \ln 3$, which means $\ln 3 / \ln 2 \cong 1.584962501$ [13, 21, 22]. By analogy the random case is the inverse of the Mauldin-Williams famous Cantor set $\phi = (\sqrt{5} - 1) / 2$ which means the Hausdorff dimension is the inverse of the golden mean, i.e. $1 / \phi = 1 + \phi = 1.618033989$ [21, 22]. Now we recall what Wolfgang Pauli once said and what is well known to all applied physics researchers, namely that “God made the bulk; surfaces were invented by the devil.” Leaving this provocative but deep thought aside, the surface of the Cantor set ϕ would be given by its complement, namely $1 - \phi = \phi^2$ which is the empty set modelling the Maxwell-Einstein Aether and similarly the “surface” of the Menger sponge would be its complement [13, 16, 22], namely

$$D(CMS) = D^{(3)} - (\ln 20 / \ln 3) = 3 - 2.726833028 = 0.273166971 \quad (1)$$

Now let us keep this result in our minds for the moment and proceed to another aspect of our argument, namely the fundamental role of the theoretical value of the inverse electromagnetic fine structure constant in relation to the standard model of elementary particles [23] at the ordinary room temperature and energy scales [13, 21], i.e.

$$\bar{\alpha}_o = (20)(1/\phi)^4 = 137 + k_o \quad (2)$$

where $\phi = (\sqrt{5} - 1) / 2$, $k_o = \phi^5 (1 - \phi^5)$ and ϕ^5 is Hardy’s probability of quantum entanglement of two quantum particles which was verified experimentally using highly accurate measurements on the quantum scale. One should note that the reconstruction of $\bar{\alpha}_o$ is an exact transfinite renormalization equation [14, 18] given by

$$\begin{aligned}\bar{\alpha}_o &= (\bar{\alpha}_1)(1/\phi) + (\bar{\alpha}_2 = \bar{\alpha}_1/2) + \bar{\alpha}_3 + \bar{\alpha}_4 \\ &= (60)(1/\phi) + 30 + (8+1) + 1\end{aligned}\quad (3)$$

where $\bar{\alpha}_3 = 9$ is the ideal inverse coupling constant of the strong force, $\bar{\alpha}_2 = 30$ is the ideal inverse coupling of the weak force, and $\bar{\alpha}_4 = 1$ is the quantum gravity maximal inverse coupling constant. The sum of $\bar{\alpha}_i$ was proven elsewhere to be the normed and limiting value of the dimensions of the universe (for $1/\phi \rightarrow 1$) [10-22], namely

$$\begin{aligned}\sum_{i=1}^4 \bar{\alpha}_i &= 60 + 30 + 9 + 1 \\ &= 100\end{aligned}\quad (4)$$

and gives the percentage of the three types of cosmic energy densities of the cosmos relative to our scale of measurements [12-22], namely

$$\begin{aligned}\gamma &= 4 + 22 + 74 \\ &= \text{ordinary energy} + \text{dark matter energy} + \text{pure dark energy}\end{aligned}\quad (5)$$

Again these results were verified beyond a reasonable doubt by accurate cosmic measurements and observations [27]. In particular, for the ordinary measurable cosmic energy density, the exact transfinite value approximated to 4% was found to be $(\phi^5/2) \square 4.5\%$ which is half of Hardy's probability [17] which as we said, was also found experimentally so that all the preceding results are not only anchored in a fundamental theory but also in a deeply verified "reality".

Now let us dwell more on $\bar{\alpha}_o$ which was found to be equal to the degrees of freedom of a complete standard model [23] and therefore $2\bar{\alpha}_o$ is the corresponding super symmetric value. Even more profound is the cancellation of all anomalies in the fundamental super string theory [18-23] depending on the condition

$$2\bar{\alpha}_o - 1 = 273.1640787 \quad (6)$$

Relative to a three dimensional intersection of a superstring space time with $D = 10$, we find

$$(2\bar{\alpha}_o - 1)/1000 = 0.2731640787 \quad (7)$$

The first five digits of equation (1), modelling our pre-modal organism, agree with the first five digits of equation (6), modelling the de facto "surface" of the "Aether." This appears to be more real than any ordinary speculation, though it is a less than proven scientific fact. In any event, it is worth communicating this to the-vanguard of scientific research who are willing to risk error. How else can we know anything at the end of the day without sticking our necks out for it [34, 37].

For a very informative reading in the spirit of the present work about how biology, mathematics, physics, cosmology and philosophy are infused with the golden mean, the reader may look at the eminent work of Alexey Stakhov and Scott Olsen [24, 25] [34]. In fact the result or modern science shows in general an intricate relationship between the physical universe and computation in a way that never ceases to intrigue and amaze as reflected in the pioneering work of S. Wolfram [28] and some earl work of the present first author [29, 30]. For an in depth study of the present

subject for future research, we recommend the reader gets some familiarity with Refs. [1] to [7] and [28] to [37].

ACKNOWLEDGEMENT

The first Author is deeply indebted to Prof. Hans Herman Otto for the many discussions that were very illuminating and which sharpened his understanding of the subject.

REFERENCES

- [1] Doug Bolton: Sea sponges were the first animals on earth scientists discover. The Independent, Tuesday 23 February, 2016. (<http://www.independent.co.uk/news/science/sea-sponge-oldest-animal-on-earth-a6891511.html>).
- [2] Jennifer Chu: Title for earth's first animal likely goes to simple sea creature. MIT News, 22 February, 2016. (<http://news.mit.edu/2016/earth-first-animal-simple-sea-sponge-0222>).
- [3] David Chandle: Signs point to sponges as earliest animal life. Physics Organization, 4 February, 2016. (<https://phys.org/news/2009-02-sponges-earliest-animal-life.html>).
- [4] G. West, J. Brown and B. Enquist: G. West, J. Brown and B. Enquist: The fourth dimension of life: Fractal geometry and allometric scaling of organism. Science, 284(5420), 1999, pp. 1677-1679. Science, 284(5420), 1999, pp. 1677-1679.
- [5] Ancient code: Is the universe a giant living organism? (<https://www.ancient-code.com/is-the-universe-a-giant-living-organism/>).
- [6] Ervin Laszlo: The Connectivity Hypothesis. Forward by Ralph H. Abraham. State University of New York Press, Albany, USA, 2003.
- [7] J.R. Lenz: Bertrand Russell on the value of philosophy for life. Philosophy Now, Issue 120, 2017. (https://philosophynow.org/issues/120/Bertrand_Russell_on_The_Value_of_Philosophy_for_Life).
- [8] M.S. El Naschie: Penrose universe and Cantorian spacetime as a model for noncommutative quantum geometry. Chaos, Solitons & Fractals, 9(6), 1998, p. 931-933.
- [9] G. Iovane: Mohamed El Naschie E-infinity Cantorian spacetime and its consequences in cosmology. Chaos, Solitons & Fractals, 25(4), 2006, pp. 775-779.
- [10] Mohamed S. El Naschie: Elements of a new set theory based quantum mechanics with applications in high energy quantum physics and cosmology. International Journal of High Energy Physics, 4(6), 2017, pp. 65-74.
- [11] Mohamed S. El Naschie and Ji-Huan He: Tesla's dream from a modern quantum spacetime view point. Nonlinear Science Letters A, 9(1), 2018, pp. 36-43.
- [12] Mohamed S. El Naschie: The gap labelling integrated density of states for a quasi crystal universe is identical to the observed 4.5 percent ordinary energy density of the cosmos. Natural Science, 6, 2014, pp. 1259-1265.
- [13] Mohamed S El Naschie: The self similarity equivalence relation connecting Newton's energy with Einstein's energy and dark energy. International Journal of Innovation in Science and Mathematics, 4(1), 2016, pp. 42-57.
- [14] Mohamed S. El Naschie: The Aether of spacetime physics is the empty set of pure mathematics. Natural Science, 9(9), 2017, pp. 289-292.
- [15] Mohamed S El Naschie: From a dual Einstein-Kaluza spacetime to 'tHooft renormalon and the reality of accelerated cosmic expansion. Journal of Modern Physics, 8(8), 2017, pp. 1319-1329.
- [16] Mohamed S. El Naschie: A fractal Menger sponge space-time proposal to reconcile measurements and theoretical predictions of cosmic dark energy. International Journal of Modern Nonlinear Theory and Application, 2(2), 2013, pp. 107-121.
- [17] Mohamed S. El Naschie: Electromagnetic—pure gravity connection via Hardy's quantum entanglement. Journal of Electromagnetic Analysis and Applications, 6(9), 2014, pp. 233-237.

- [18] L. Marek-Crnjac, M.S. El Naschie and Ji-Huan He: Chaotic fractals at the root of relativistic quantum physics and cosmology. *International Journal of Modern Nonlinear Theory & Application*, 2(1A), 2013, pp78-88.
- [19] M.S. El Naschie: P-Adic unification of the fundamental forces and the standard model. *Chaos, Solitons & Fractals*, 38, 2008, pp. 1011-1012.
- [20] Mohamed S. El Naschie: Spacetime as a new frontier advanced material with applications in physics, engineering, chemistry and cosmology. *Advanced Material Physics and Chemistry*, 7(9), 2017, pp. 347-352.
- [21] M.S. El Naschie: A review of E-infinity theory and the mass spectrum of high energy particle physics. *Chaos, Solitons & Fractals*, 19(1), 2004, pp. 209-236.
- [22] M.S. El Naschie: The theory of Cantorian spacetime and high energy particle physics (An informal review). *Chaos, Solitons & Fractals*, 41(5), 2009, pp. 2635-2646.
- [23] M.S. El Naschie: The standard model physical degrees of freedom interpretation of electromagnetic fine structure coupling $\bar{\alpha}_0 \cong 1/137$. *Chaos, Solitons & Fractals*, 38(3), 2008, pp. 609-611.
- [24] Alexey Stakhov (assisted by Scott Olsen): *The Mathematics of Harmony*. World Scientific, Singapore, 2009.
- [25] Scott Olsen: *The Golden Section*. Wooden Books, the Cromwell Press, Tunbridge, Wiltshire, UK, 2006.
- [26] G. 'tHooft: *The Cellular Automaton Interpretation of Quantum Mechanics*. Springer Open, London, UK, 2016.
- [27] Richard Panek: *The 4% Universe*. One World Publications, 2012.
- [28] Stephen Wolfram: *A New Kind of Science*. Wolfram Media Inc., Champaign, Illinois, USA, 2002.
- [29] M.S. El Naschie: Multi-dimensional Cantor-like sets and ergodic behaviour. *Speculations in Science & Technology*, 15(2), 1992, pp. 138-142.
- [30] Mohamed S. El Naschie: High energy physics and cosmology as computation. *American Journal of Computational Mathematics*, 6(3), 2016, pp. 185-199.
- [31] Mohamed S. El Naschie: The physics, mathematics and common sense of cosmic dark energy and spacetime extra dimensions. *International Journal of Innovations in Science and Mathematics*, 5(6), 2017, pp. 201-204.
- [32] Mohamed S. El Naschie: 'tHooft's renormalon: Experimental and number theoretical arguments for physical existence. *International Journal of Innovation in Science and Mathematics*, 5(6), 2017, pp. 205-210.
- [33] Wahyu Permatasari and Hamdi Aklsan: Tehah Koreksi Teori Relativitas Khusus (TRK) Einstein. *Research Gate-net*, 2014, pp. 1-14.
- [34] Scott Olsen: Golden ratio beauty as scientific function. *Lebenswelt Aesthetics and Philosophy of Experience*, No. 11, 2018, pp. 46-60. (<https://riviste.unimi.it/index.php/Lebenswelt/article/view/9457>).
- [35] Antonio Sciarretta: A local realistic model of quantum mechanics based on discrete spacetime. *Foundations of Physics*, December, 2017, pp. 1-32.
- [36] R.C. Alamino: Average symmetry and complexity of binary sequences. *arXiv: 1711.00426 [cond-mat.stat-mech]*, 2017, pp. 1-9.
- [37] Hans Hermann Otto: Mass Constituents of a Flat Lattice Multiverse: Conclusions from the Similarity between Two Universal Numbers, the Rocksalt 2D Madelung Constant and the Golden Mean. https://www.researchgate.net/publication/316990193_Mass_Constituents_of_a_Flat_Lattice_Multiverse_Conclusions_From_the_Similarity_Between_Two_Universal_Numbers_the_Rocksalt_2D_Madelung_Constant_and_the_Golden_Mean. May 2017.

moved to the UK where he enlisted as a post graduate student in the stability research group of the late Lord Henry Chilver and obtained his Ph.D. degree in structural mechanics under the supervision of Professor J.M.T. Thompson, FRS. After his promotions up to the rank of full professor, he held various positions in the UK, Saudi Arabia and USA and was a visiting professor, senior scholar or adjunct professor in Surrey University, UK, Cornell, USA, Cambridge University, UK, Cairo University, Egypt and is presently a Distinguished Professor at the Dept. of Physics, Faculty of Science of the University of Alexandria, Egypt.

Professor El Naschie is well known for his research in structural stability in engineering as well as for his work on high energy physics and more recently for his work is cosmology and elucidation of the secret of dark energy and dark matter as well as for proposing a dark energy Casimir nanoreactor.

Professor El Naschie is the single or joint author of about one thousand publications in engineering, physics, mathematics, cosmology and political science. His current h-index is 74 and his i-10 index is 754 according to Google Scholar Citation.

AUTHOR'S PROFILE



Professor **M.S. El Naschie** was born in Cairo, Egypt on 10th October 1943. He received his elementary education in Egypt. He then moved to Germany where he received his college education and then his undergraduate education at the Technical University of Hannover where he earned his (Dipl-Ing) diploma, equivalent to a Master's degree and Chartered Structural Engineer. After that he