

---

# On the Possibility of a Deutsch-Marletto Constructor Theory Based Pythagorean-Plato Number System

M.S. Elnaschie

Distinguished Professor, Department of Physics, Faculty of Science, University of Alexandria, Alexandria,  
Egypt.

Corresponding author email id: [chaossf@aol.com](mailto:chaossf@aol.com)

Date of publication (dd/mm/yyyy): 15/03/2022

---

**Abstract** – The present work outlines a rather deep and vital connection between D. Deutsch and C. Marletto's constructor theory and the Pythagorean-Plato number system. In doing that, a powerful yet simple realistic alternative to the rather complex quantum computer is proposed which nevertheless combines and benefits from both related roads i.e., constructor theory and quantum computers.

**Keywords** – Constructor Theory, David Deutsch, C Marletto, Quantum Computation, Scale Invariance, Einstein Spacetime, Platonic Number System.

---

## I. INTRODUCTION

It may be appropriate and truthful to start this introduction by apologizing to the reader about the very large number of references which are needed in order to be able to cover the essence of the present paper [1-45].

The present paper stems from the realization that since constructor theory is an extension of David Deutsch's quantum Turing machine [1-4] while E-Infinity Cantorian space time is essentially a transfinite golden mean computer which is nearest to Alan Turing's work [5-14], therefore it follows inevitably that merging the deep ideas of Deutsch-Marletto with the computational power of E-Infinity theory would mean that the Pythagorean Platonic golden mean number system lies at the very root of physical science, art, philosophy and even consciousness [20-24]. The aforementioned realization has led to a truly great synthetic a priori as anticipated by the remarkable relatively latest recent constructor theory as well as the centuries old teachings of the acclaimed school of Alexandria [20]. All these momentous conclusions were experimentally confirmed by the recent astounding discovery that gravity is of a quantum origin [4].

The present work was initially motivated by two remarkable scientific revelations. The first is essentially mathematical and philosophical namely, constructor theory which was recently advanced by some of the most influential figures in theoretical and mathematical physics [1-3]. The second is an experimental and truly earth shattering finding namely that gravity is basically quantum mechanical by its very nature [4]. Putting these two novel discoveries together we are led to the unsuspected yet unavoidable conclusions that we may have overlooked something simple but fundamental for almost half a century. This obvious and almost trivial oversight means simply that at the root of all the deep questions of physics there lies the number system we use [5-16]. That way the difference between classical and quantum physics disappears or at a minimum is blurred and all what is left is the centuries old Platonic golden mean number system developed long ago in the famous shrine of science and philosophy of the Greek-Italian-Egyptian city of Alexandria [8-11] which was established by the legendary Macedonian Alexander the Great.

It is inescapable to conclude joyfully that all what we need is the golden mean quasi Turing Computer which

---

is fully realized by the said golden mean number system of Alexandria as we hope to show shortly in the rest of the present mini paper [1-5].

In fact, even a fleeting look at Refs. [1] to [7] it becomes obvious that we have been missing a very obvious fact which is far deeper and far simpler than what we could have ever imagined.

Let us start by a quick analysis of the content of the above said references in the light of our own voluminous publications cited in Ref [5-11].

This task is best performed and easiest achieved if the reader studies this introduction as well as the attached notes attentively. Thus, we reiterate and stress the following points:

- (a) In [3] the question was posed : Will the constructor theory rewrite physics? This theory was developed by David Deutsch and Chiara Marletto. It basically examines if a task is possible or not and relates information to quantum computation. Von Neumann's contra factual is among many other related facts and subjects [1-8]. The best and simplest example for that is Newton's falling apple i.e., classical gravity.
- (b) In [4] and as mentioned earlier an unexpected experiment posed an immensely important question namely: Has a new experiment just proved the quantum nature of gravity [Big Think]. (see the journal "Science" 2022) [4].
- (c) In addition to the above we must highlight the rule of nonlinear dynamics, chaos and fractals (see the work of the school of Cantorian spacetime theory) [6-18] as well as the relation to a new Kantian synthetic a priori leading to a fundamental unification at the root of theoretical physics (see the work of Emanuel Kant. Wikipedia. <https://en.wikipedia>).

## II. IMPORTANT NOTES

- 2.1. David Deutsch is a physicist who became a pioneer in the field of quantum computation by formulating a quantum Turing machine and giving an algorithm design to run a quantum computer. Born to a Jewish family in Haifa, Israel on 18 May 1953 (ten years younger than the Author). He is a student of Dennis Sciama and a fellow of the Royal Society. His acclaimed book is: The fabric of relativity. He is nearest to E-Infinity via Alan Turing's machine [1-3].
- 2.2. Constructor theory is Deutsch's Theory of Everything and may be replacing A. Turing's machine. Our transfinite golden Turing machine can in turn replace Cantorian spacetime theory and consequently we have the fastest computer in the universe, namely the golden mean number system quasi computer [1-3], [5-8].
- 2.3. Dr. Chiara Marletto. Theoretical physicist at Wolfson College, Oxford. She is a pioneer in the field of constructor theory which is a generalization of the quantum theory. She is the co-author of the great David Deutsch [1-3].
- 2.4. Relation between geometry and numbers is discussed in an important paper by Kevin Hartnett [9].
- 2.5. The quest to build space time out of quantum particles is outlined in an article published in Quanta Magazine by Adam Becker [2021].
- 2.6. The Author could not stress more the importance of the following question: Has a new experiment just proved the quantum nature of gravity? Starts with a Bang. January 18 (2022). <https://jgthjn.com> [4].

- 2.7. How infinite series reveal the unity of Mathematics. (see this highly interesting article in Quantum Magazine [2022] by Steven Strogatt).
- 2.8. It goes without saying that we strongly recommend a careful reading of the work of Garnet Ord, Laurent Nottale and M.S. Elnaschie, Prof. Ji Huan He and L. Marek-Crnjac [5-11] where almost everything discussed here was initiated.
- 2.9. The books and papers of Prof. Scott Olsen [8], [19, 20], [23] are particularly important for appreciating the present work.
- 2.10. E-Infinity communications [see for instance Google. <https://e-infinity-energy.blogspot.com> [24]] may be found to be a valuable addition for a simple explanation of some complex aspects of the present paper.
- 2.11. The work of G. 'tHooft, D. Gross, M. Feigenbaum, I. Prigogine, Prof. M. Habeeb, Prof. P. Auffrey, Prof. Herman Otto, and the great Prof. Otto Rössler are discussed in [9-21] and is valuable for in depth further reading.
- 2.12. Non linear dynamics and Fractals which play a vital role in our research are discussed in the following papers [5-21].

We conclude this section by saying that if we could summarize it all in a few sentences, then we could say that the golden mean number system is the only number system which includes all integers, rational and irrational numbers in addition to zero and countable as well as uncountable infinities in a natural way and does not break down anywhere. It is the mathematics of the constructor theory and the lingua franca of nature and consequently it is the foundation and unification of rational existence [1-21]. To put it succinctly, the golden mean number system is the perfect mathematic required by the perfect philosophical constructor theory of David Deutsch [1-3] which unified the ununifiable and this may be shown via the topology of Mauldin-William's golden mean Cantor set [5-23].

### III. DISCUSSION

In the present unconventional and rather uncompromising paper, we feel that we could not do anything better than concentrate on the following various vital points:

- (a) It is a well known fact that David Deutsch is one of the leading not only physicists and mathematicians of our time but is also a deep thinker and serious philosopher and it is abundantly clear that one has to spend quality time to understand the depth and breadth of his theory as elaborated in his work and the work of Prof. C. Marletto [31-35].
- (b) The Constructor E-Infinity probability is one of the best illustrations of the connection between Constructor theory and Number theory. Thus the probability is given here indirectly by the Hausdorff dimension part of the non-commutative theory of Connes-Elnaschie namely  $P = \phi$  for the zero set quantum particle  $D_p = [0, \phi]$  and  $P = \phi^2$  for the empty set quantum wave  $D_w [-1, \phi^2]$  where  $\phi = (\sqrt{5} - 1) / 2 = 0.618033989$ .
- (c). The second illustration may be called: Constructor-E-Infinity quantum fluctuation. In this case quantum fluctuation is given here with the inverse scale invariant spacetime Hausdorff dimension namely  $\phi^3 = 1 / 4(4 + \phi^3)$ . Note also that this is equal to the topological Casimir pressure  $\phi$  of the zero set and  $\phi^2$  of

the empty set for which we have  $\phi - \phi^2 = \phi^3$ . With that we rest our case at least for the time being.

- (d) There are so many similarities between the constructor theory and E-Infinity theory with regards to philosophy [31, 37, 40] as well as life [35, 36, 55], thermodynamics [30, 33] and in addition to many other aspects [32-45] which may require many papers to outline. In fact, many books may be needed to elaborate this amazing relationship and we will have to stop here for the time being.

#### IV. CONCLUSION

Constructor theory and E-Infinity golden mean number system of Plato may be just two sides of the same coin. This very short conclusion speaks volumes.

#### V. OVERDUE WORDS OF THANKS AND ACKNOWLEDGEMENT

The Author is deeply and truly indebted to Professors Ji Huan He and L. Marek-Crnjac without their hard and dedicated work, he would not have been able to achieve much. On a very broad and "grass root" level, the discussions and support which the Author received from H.E. Prof. S. Al Athel could not be overestimated.

Similar impulses and encouragement through numerous ways came to the Author from his dearest friends: Otto Rössler and A.M. Helal who have also contributed many fundamental ideas to the Author's work. Last but not least, the Author has benefited greatly from the work of imminent and great scientists such as G. 'tHooft, R. Penrose, D. Gross, M. Feigenbaum, I. Procaccia, Herman Otto and Shokri Nada. The Author would like to apologize for unintentionally omitted names of many colleagues, friends and students due to space limitation and the usual fading memory of the unavoidable old age.

#### REFERENCES

- [1] David Deutsch. Constructor theory. Synthese, Springer. 19, 2013, pp. 4311-4359.
- [2] D. Deutsch and C. Marletto. Constructor theory of Information proceedings of the Royal Society 4. Mathematical, Physical and Engineering Sciences, 471(2174), 2015], pp 2014054 (18 pages).
- [3] YouTube video. <http://www.youtube.com/watch?v=hyc97J2MZlo>. Will Constructor theory rewrite physics?
- [4] Key Takeaways. Has a new experiment just proven the quantum nature of gravity? <https://bigthink.com/starts-with-a-bang/quantum-gravity>. January 18, 2022.
- [5] Mohamed S. El Naschie. High energy physics and cosmology as computation. American Journal of Computational Mathematics. 6(3), 2016, pp. 165-199 (See also the reference therein).
- [6] L. Marek-Crnjac and J. Huan He. An invitation to El Naschie's theory of Cantorian spacetime and dark energy. International Journal of Astronomy and Astrophysics, 3(4), 2013, pp. 464-471.
- [7] M.A. Helal, L. Marek-Crnjac and J.H. He. The three page guide to the most important results of M.S. El Naschie's research in E-Infinity quantum physics and cosmology. Open Journal of Microphysics 3(4), 2013, pp. 141-145.
- [8] Scott Olsen, Leila Marek-Crnjac, Ji-Huan He and M.S. El Naschie. A Grand Unification of Sciences, Arts and Consciousness: Rediscovering the Pythagorean Plato's Golden mean number system. Published by Scott Olsen. P.O. Box 3612. Ocala, Florida 34478. First published 2021. ISBN: 978-1-7923-7683-7.
- [9] Kevin Harnett. Mathematicians explore Mirror Link between two geometric worlds. [www.quantamagazine.org](http://www.quantamagazine.org). Quanta Magazine, 2018.
- [10] M. S. El Naschie. Fuzzy Dodecahedron topology and E-Infinity spacetime as a model for quantum physics. Chaos, Solitons & Fractals. 30(5), 2006, pp. 1025-1033.
- [11] M.S. El Naschie. Fuzzy Platonic spaces as a model for quantum physics, mathematical methods and simulation science and technology. 2, 2018, pp. 23-33.
- [12] M.S. El Naschie. Hilbert space, Poincare dodecahedron and golden mean transfiniteness. Chaos, Solitons & Fractals. 31(4), 2007, pp. 787-793.
- [13] Ji Huan He and M. S. El Naschie. Transfinite Physics. A collection of publications on E-Infinity Cantorian spacetime theory. Shanghai-China [2005]. ISSN 988-98846-5-8.
- [14] Edward Witten (Editor). Einstein in Alexandria. Publisher Bibliotheca Alexandrina. Alexandria - Egypt [2006]. 179 pages.
- [15] Peter Weibel, Garnet Ord, Otto E. Rössler (Editors). Spacetime physics and Fractality. Festschrift in honor of Mohamed El Naschie on the occasion of his 60th birthday. Springer - Vienna - New York [2005].
- [16] M.S. El Naschie. On a class of general theories for high energy particle physics. Chaos, Solitons & Fractals, 14, 2005, pp. 649-668.
- [17] M.S. El Naschie. On a Fuzzy Kahler-like Manifold which is consistent with the two slit experiment. Invited article for World year of Physics in 2005. International Journal of Nonlinear Science and Numerical Simulations. 6 (2), 2005, pp. 94-97.
- [18] M.S. El Naschie. Ji-Huan He's ten dimensional polytope and high energy particle physics. International Journal of Nonlinear Sciences and Numerical simulations. 8 (4), 2007, pp. 475-476.
- [19] M.S. El Naschie. Towards a quantum golden field theory. International Journal of Nonlinear Sciences and Numerical Simulation. 8(4),

- 2007, pp. 477-482.
- [20] Scott Olsen. A Grand unification of the Sciences, Art and Consciousness: Rediscovering the Pythagorean Plato's Golden Mean Number system. Kindle Edition. <https://www.amazon.com/Grand-unification-Sciences-Arts-Consciousness-ebook/dp/Bogcck888F>. (195 pages) (August 10, 2021).
- [21] Scott Olsen, L. Marek-Crnjac, Ji-Huan He and M. S. El Naschie. A Grand Unification of Sciences, Arts and Consciousness. Rediscovering the Pythagorean Plato's Golden Mean number system. *Journal of Progressive Research in Mathematics*. 16(2), 2020, pp. 2888-2931.
- [22] M.S. El Naschie. Symmetria Massima of the fractal M-Theory via the golden mean number system. A new language for a deep dialogue between man and Nature. *International Journal of Artificial Intelligence and Mechatronics*. 7(3), 2018, pp. 11-14.
- [23] M.S. El Naschie and Scott A. Olsen. When zero is equal to one: A set theoretical resolution of quantum paradoxes. *Fractal spacetime, non-commutative geometry and quantum high energy physics*. 1(1), [2011]. pp. 25-38.
- [24] E-Infinity group. E-Infinity-High energy communication Quantum mechanics and the golden mean in Theoretical physics communication 1 to 90. <http://e-infinity-energy.blogspot.com> [2011] to [2012].
- [25] M.S. El Naschie. M. Helal, Ji Huan He, L. Marek-Crnjac. Super unification of physics and mathematics. *Journal of Progressive Research in mathematics*. 18(4) 2021, pp. 22-27.
- [26] M.S. El Naschie. L. da Vinci's Turbulence, multi-dimensional golden spinors, Prandtl's Boundary layer and quantum Mechanical spin are all implied by the golden number. *European Journal of Applied System Science*. 9(6), 20221, pp. 134-136.
- [27] M.S. El Naschie. Fuzzy Wilson loops, Witten's topological field theory and the golden mean number system theory at the deep root of Hardy's quantum entanglement. *International Journal of Innovation in Science and Mathematics*. 9(4), 2021, pp. 70-77.
- [28] M.S. El Naschie. Theodor Kaluza's five dimensional space and its mathematical and engineering ramifications. *IQSR Journal of Applied Physics*. 13(5), series 3, 2021.
- [29] M.S. El Naschie. Superstrings and loop quantum gravity are two sides of the same golden coin. *European Journal of Applied Sciences*. *European Journal of Applied Sciences*, 10(1), 2022, pp. 387-392.
- [30] M.S. El Naschie. T(Hawking) go to Unruh topological temperature as  $K(\text{Bolzman})$  tend to a  $K(\text{topological})$  that is equal to the Immirzi parameter ( $\phi^6$ ) divided by  $D = 10$  of superstrings spacetime where  $\phi$  is the golden mean 0.6180339989. *IOSR Journal of Applied Physics*. 13(5). series III, 2021. pp. 11-13.
- [31] D. Deutsch. *Physics, Philosophy and Quantum Technology*. Proceedings of the Sixth International Conference on quantum communication, measurement and computing. pp.419-426. Rinton Press. Princeton, New Jersey, USA. 2003.
- [32] C. Marletto. *Constructor Theory of Information*. Information and Interaction. Springer, 2017, pp. 103-111.
- [33] C. Marletto. *Constructor Theory of Thermodynamics*, Arxiv preprint. Arxiv 160802625 2016]
- [34] C. Marletto. *Constructor theory of probability*. Proceedings of Royal Society A, 472(I192), 2016, pp. 20150883.
- [35] C. Marletto. *Constructor Theory of life*. *Journal of the Royal Society Interface* 12(104), 2015, pp. 20141226.
- [36] M.S. El Naschie. Cellular automata based on the golden mean number system as a foundation for artificial intelligence and artificial life. *International Journal of Artificial Intelligence and Mechatronic*. 8(6), 2020, pp. 53-58.
- [37] M.S. El Naschie. On the philosophy and nothingness in fundamental physics. *Nonlinear Science Letters*. B1, 2011, pp. 4-5.
- [38] M.S. El Naschie, S. Olsen, M. A. Helal, L. Marek-Crnjac and S. Nada. On the missing link between Cosmology and Biology. *International Journal of Innovation in Science and Mathematics*. 6(1), 2018, pp. 11-13.
- [39] A.S. Alnashai, L Di Samo, MD Carter. New light on an ancient illumination: The Pharaohs of Alexandria. *Journal of Nonlinear Science and Numeric NI Simulation*. 7(2), 2006, pp. 137-148.
- [40] M.S. El Naschie. The meta energy of dark energy. *Open Journal of Philosophy*. 4(2), 2014, pp. 157-158.
- [41] M.S. El Naschie. The fractal dimension of spacetime. Remarks on theoretical derivation and experimental verification. *Chaos, Solitons and Fractals*. 9(7), 1998, pp. 1211-1217 [1998].
- [42] M.S. El Naschie. Thomas Mann and Heinrich Mann, dual brothers and complimentary genius embraced by complex reality *Chaos, Solitons & Fractals*. 10(1), 1999, pp. 17-23.
- [43] M.S. El Naschie. Determinist quantum mechanics versus classical mechanical indeterminism and nonlinear dynamics. AIP Conference [007]. AIP Conference proceeding. American Institute of Physics. 905(1), 2007, pp. 56-66.
- [44] M.S. El Naschie. The Answer to life, the universe and everything is not the forty two of D. Adam's Hitchhikete's Guide to the Galaxy but it is the golden mean square root of five minus one derived by two of S. Hawking's micro black hole. *International Journal of Innovative in Science and Mathematics*. 9, 2021. pp. 14-17s
- [45] M.S. El Naschie. A tale of two Kleins unified in Strings and E-Infinity theory. *Chaos, Solitons & Fractals*. October. 26(1), 2005 pp. 247-254.

### 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 in Engineering plus being a professional chartered engineer. After that he 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 and Cairo University, Egypt. In 2012 he ran for the Presidency of Egypt but withdrew at the final stage and returned to academia and his beloved scientific research. He 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 in cosmology and elucidation of the secret of dark energy and dark matter as well as for proposing a dark energy Casimir nanoreactor and a fuelless interstellar spaceship. He is the creator of E-infinity theory, which is a physical theory based on random Cantor sets and can be applied to micro, macro and mesoscopic systems. 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 85 and his i-10 index is 807 and total citations are 39114 according to Google Scholar Citation.