

## *Topological monoverse*

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Abstract -

This rebuttal of the multiverse hypothesis, the idea that other universes exist alongside ours, draws on mathematics' topology, or rubber-sheet geometry. The topology takes the form of electronics' binary digits (1's and 0's) composing 2 Möbius strips which are united into a figure-8 Klein bottle constituting a "sub"universe. The encoding of infinitely-long irrational and transcendental numbers like pi, e,  $\sqrt{2}$  by the digits produces an infinite series of sub-universes (an infinite universe). And other subs can naturally affect our own 13.8 billion-year-old subcosmos. ("Our Mathematical Universe" by cosmologist Max Tegmark – Random House/Knopf, January 2014 believes the universe has a mathematical foundation).

Article -

Binary digits are proposed to be the Hidden Variables which are "an interpretation of quantum mechanics based on the belief that the theory is incomplete and that there is an underlying layer of reality that contains additional information about the quantum world. This extra information is in the form of the hidden variables, unseen but real quantities. The identification of these hidden variables would lead to exact predictions for the outcomes of measurements and not just probabilities of obtaining certain results." ("Quantum" by Manjit Kumar - Icon Books, 2008)

String theory says everything's composed of tiny, one-dimensional strings that vibrate as clockwise, standing, and counterclockwise currents. We can visualize so-called virtual particles generating tiny, one dimensional binary digits of 1 and 0 (base 2 mathematics) that form currents in a two-dimensional program called a Mobius loop – or in 2 Mobius loops, clockwise currents in one loop combining with counterclockwise currents in the other to form a standing current. (The curving of what we call space-time sounds very strange, but I think it can actually be explained by modelling space-time's construction on the Mobius strip that can be represented by giving a strip of paper a half-twist of 180 degrees before joining its ends.)

Joining two Mobius strips (or Mobius bands) forms a four-dimensional Klein bottle (<http://plus.maths.org/content/os/issue26/features/mathart/index>)

And each Klein bottle can become an observable (or "sub") universe (figure-8 Klein bottles resemble spiral galaxies, and appear to have the most suitable shape to form subuniverses). This connection of the 2 Mobius strips can be made with the infinitely-long irrational and transcendental numbers. Such an infinite connection translates into an infinite number of TANGIBLE figure-8 Klein bottles which are, in fact, "subuniverses". The infinite numbers make the cosmos as a whole\* physically infinite,

the union of space and time makes it eternal, and it's in a static or steady state because it's already infinite.

\* (i.e. the cosmos beyond our 13.8-billion-year-old subuniverse, which is expanding from the energy of virtual particles/binary digits being converted into matter and displacing parts of the universe beyond). In space, the energy of weak gravitational waves combines with the  $10^{36}$ -times-stronger energy of electromagnetic waves to make mass.<sup>^</sup> Translation into matter could be via photons of electromagnetic waves and gravitons of gravitational waves being disturbances in electromagnetic and gravitational fields. These disturbances are known as virtual particles and are equivalent to energy pulses that produce the binary digits of 1 and 0 encoding  $\pi$ ,  $e$ ,  $\sqrt{2}$  etc. Matter particles [and even bosons like the Higgs, W and Z particles] are given mass by the energy of photons and gravitons interacting in "wave packets" (interaction within this term from quantum mechanics results in wave-particle duality).

<sup>^</sup> A. Einstein, "Speilen Gravitationfelder in Aufbau der Elementarteilchen eine Wesentliche Rolle?" (**Do gravitational fields play an essential role in the structure of elementary particles?**), Sitzungsberichte der Preussischen Akademie der Wissenschaften, (Math. Phys.), 349-356 (1919) Berlin.

For the note below on the figure-8 Klein bottle, I refer to –

- a) Bourbaki, Nicolas (2005). Lie Groups and Lie Algebras. Springer
- b) Conway, John (1986). Functions of One Complex Variable I. Springer
- c) Gamelin, Theodore (January 2001). Complex Analysis. Springer
- d) Joshi, Kapli (August 1983). Introduction to General Topology. New Age Publishers
- e) Spanier, Edwin (December 1994). Algebraic Topology. Springer

Informally - if an object in space consists of one piece and does not have any "holes" that pass all the way through it, it is called simply-connected. A doughnut (and the figure-8 Klein bottle it resembles) is "holey" and not simply connected (it's multiply connected). The universe appears to be infinite ("Infinite Universe" by Bob Berman - "Astronomy", Nov. 2012), being flat on the largest scales and curved on local scales (from far away, a scene on Earth can appear flat, yet the curves of hills become apparent up close). A flat universe that is also simply connected implies an infinite universe [Luminet, Jean-Pierre; Lachi`eze-Rey, Marc - "Cosmic Topology" - Physics Reports 254 (3): 135–214 (1995) [arXiv:gr-qc/9605010](https://arxiv.org/abs/gr-qc/9605010)]. So it seems the infinite universe cannot be composed of subunits called figure-8 Klein bottles (flat universes that are finite in extent include the torus and Klein bottle).

But gaps in, or irregularities between, subuniverses shaped like figure-8 Klein bottles are "filled in" by binary digits in the same way that computer drawings can extrapolate a small patch of blue sky to make a sky that's blue from horizon to horizon. This makes space-time relatively smooth and continuous - and gets rid of holes, making these types of Klein subunits feasible. The Klein bottle is a closed surface with no distinction

between inside and outside. There cannot be other universes outside ours – there's only one universe).