

Fine-Tuning in an Emergent XYZT Universe

Terry Bollinger

2023-06-30.15:35 EDT Fri

https://youtu.be/C_eAfTsyVz8&lc=Ugw8n7hYQaj2CTF3VyF4AaABAq

A Comment on the [Closer To Truth](#) YouTube post:
David Albert - The Physics of Fine-Tuning (Jun 30, 2023)
https://youtu.be/C_eAfTsyVz8

Heavy metal fans love slicing the tops and bottoms off sine waves because the resulting sharp-edged waves produce a seeming infinity of screeching harmonics. A question, though: Are these harmonics real? What actually happens is you get a rattier wave that dissipates quicker and *sounds* like a screeching infinity of noise when analyzed by a highly structured instrument, such as our inner ears, that splits that noise into a vast number of smaller, simpler, weaker waves. The original distorted wave remains what it always was: A single, messy wave.

In physics, we similarly use carefully constructed material instruments — local xyzt coordinates composed of rulers and clocks — to make local sense of a wide range of decidedly odd matter and energy waves that always obey the rules of special relativity. These xyzt perception instruments work well if you keep everything local, medium-scale, and moving slowly, but guess what? If you presume to make one of these local-only xyzt interpreters more real than reality, such as by assuming it applies out to infinity, you end with the cosmic equivalent of heavy-metal screeching noises.

Some folks like to call such collections of xyzt-created interpretation noises multiverses. Alas, as with heavy-metal screeches, these are illusions created by overextending one local beholder's actual reach and importance. Einstein warned us about that in special relativity. Reality remains a single, messy wave whose full dynamics are never fully expressible using the xyzt instruments of one observer or some Hilbert-space infinity of similar observers. That's all just noise. At the information level, for example, such waves interact using only the squares (e.g., year-lightyears) of what we think of as distances. That simple squaring maintains the Poincare symmetries while preventing causality violations within a fully *singular* universe.

Fine. So what does any of this have to do with fine-tuning?

Quite a bit. In a universe where our usual metrics of distance, time, energy, and even that squared metric I just mentioned emerge *only* in the presence of massive levels of causal information — history — the scary underlying metric is that everything happens *at once in one place*, that is, with maximum space-time entanglement. What we think of as history emerges only as a consequence of interactions that create information and thus make distance and quantity metrics meaningful.

It's not some infinity of universes vying with each other for existence. It's universe struggling with itself to convert boring, eternal self-erasure into a structure with limits, barriers, and *history*. That emergence implies hierarchies of existence, such as the absolute universality of Standard Model particles across the visible universe, that could care less about our local xyzt perceptions of space and time.

Fine-tuning occurs in the middle range between the universality of Standard Model particles and the piece-by-piece, local-only emergence of the xyzt stability needed for life and consciousness to survive in narrow situations such as moderate planetary surfaces. While powerfully constrained by its emergence, this fine-tuning has never stopped.

However, until we get out of heavy-metal mode and stop too-casually postulating infinities of this and proliferation of that, we'll never understand these far more interesting regions of quite real and — you can bet — experimentally accessible physics. That middle ground is also the domain of answers to annoying questions such as why every time you wake up, you find yourself the same person you were the day before. In a universe where you, as an inertial-frame observer, are the main instrument for creating a local definition of space and time, you are necessarily more than just a bunch of atoms.