

The Science and Fiction of the Multiverse

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Abstract

Science fiction is often viewed as a way to escape reality and enter into a realm where any idea, no matter how farfetched it may seem, is possible. However, little do many people realize that some of these seemingly farfetched ideas are actual scientific theories. Among these lies the theory of the multiverse. Stemming from the big bang theory, the multiverse is a scientific theory created to explain the properties of the universe that are finely tuned for the existence of life. While the multiverse has many different theories within itself, the main idea is that the universe we observe to be finely tuned for life is only one of infinite possible universes, which can include both finely tuned ones and disastrous ones. For many scientists, this theory is an option to explain fine-tuning without intelligent design. However, this theory sits on shaky evidence and underlying assumptions. Even if true, when considering the scientific, philosophical, and theological perspectives on the multiverse, a divine creator can still fit in a multiverse theory. Contrary to common belief, Christianity and science can be complementary, even with topics as controversial and intricate as the multiverse. As the multiverse becomes an increasingly popular idea within both the scientific community and in popular culture, critical thinking about these ideas is vital. Introducing these ideas through science fiction works is one way to spark interest and critical thought.

The Fine-Tuning of the Big Bang

Big Bang Theory

- Introduced in 1927 by Georges Lemaitre
- Theory for the origin of the universe
 - The universe began as a singularity of infinite density.
 - A massive explosion caused the singularity to expand exponentially.
 - As expansion occurred, temperatures cooled and atoms, such as protons and neutrons, were able to form.
 - As time went on, the universe cooled and began to form elements, stars, planets, and galaxies.
 - Eventually, the universe became suitable for life and has evolved into the universe we observe today.

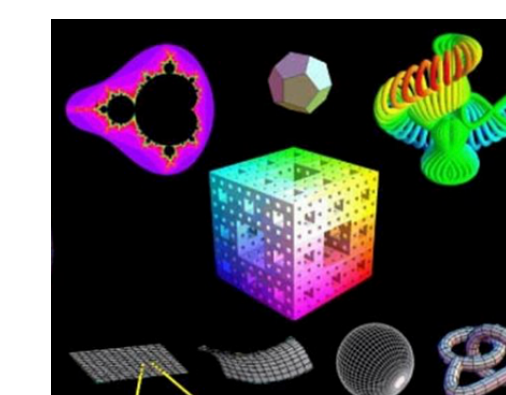
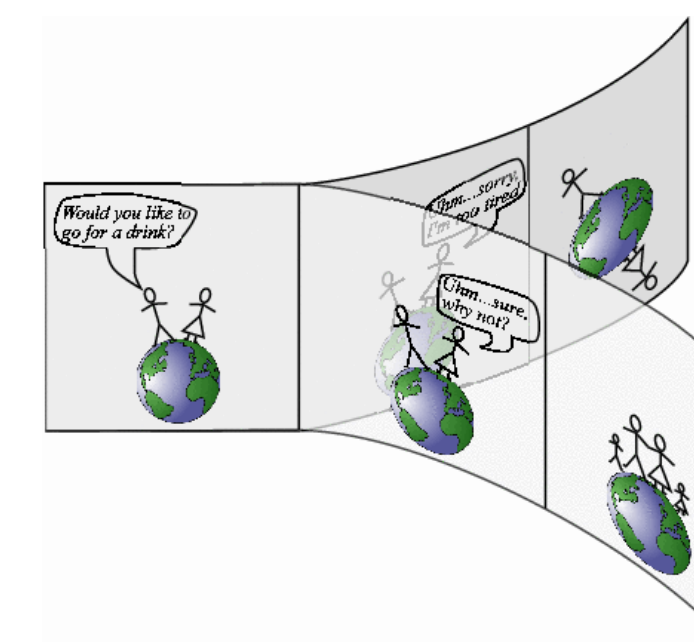
Fine-Tuning

- For the Big Bang to occur and create a life sustaining universe, specific conditions are needed. This phenomenon of the near perfect conditions we observe in our universe to sustain life is known as fine-tuning.
- Any slight deviation from certain physical constants would disrupt the formation of the universe and produce catastrophic results.
- A few examples of fine-tuning:
 - Initial universe density
 - Cosmological constant
 - Velocity of light
 - Strong nuclear force
 - Strength of gravitational force
 - Ratio of neutrons to protons
- The probability that all these conditions just happen to be finely tuned for life are slim to none. Therefore, many will present fine-tuning as evidence for intelligent design to account for this randomness.
- Alvin Plantinga: "It does not seem at all improbable that God would want to create life, both human life and life of other sorts; and if he wanted to create human life in a universe at all like ours, he would have been obliged to fine-tune the constants." (Plantinga, 2011, p. 199)
- To find alternative explanations for fine-tuning within the Big Bang, scientists have postulated multiple theories – among these is the theory of the multiverse.

Multiverse Theories

Max Tegmark's Four Levels of the Multiverse

- **Level I**
 - This level proposes the most simplistic view of the multiverse
 - Also called the quilted multiverse, there are infinite universes differing only in initial conditions, keeping the same laws of physics as our universe exhibits.
 - According to this theory, there are multiple versions of yourself living across various universes.
 - Theoretically, it could be possible to travel to these multiverses.
- **Level II**
 - Also known as the chaotic theory of inflation, this theory proposes "bubble universes."
 - Each universe is modeled as a bubble that is infinitely large and infinitely inflating. Due to this inflation, the individual bubbles are being pushed away from each other faster than the speed of light.
 - While level I multiverses exhibited the same laws of physics, this theory proposes a more diverse view. Quantum fluctuations can allow different universes to exhibit different physical constants.
 - Traveling to these multiverses would not be possible.
- **Level III**
 - This theory is very similar to level II.
 - Every possible quantum event creates a new universe. These universes are created at the moment the two possibilities occur, branching off from each other.
 - This multiverse creates more of a split branching multiverse rather than separate universes like in level I and II.
 - Quantum events can be explained by the thought experiment of Schrödinger's cat.
- **Level IV**
 - This theory is much more theoretical than the previous three.
 - Each universe in this theory can exhibit different physical equations.
 - If there is a valid mathematical equation that can explain that universe, then that universe theoretically exists.



Pop Culture and the Multiverse

The Multiverse Portrayed in Pop Culture

- The multiverse is becoming an increasingly popular idea within works of science fiction. Here's just a few examples:
 - *Spiderman: Into the Spiderverse* (2018)
 - *The Chronicles of Narnia* (1950)
 - *Avengers Endgame* (2019)
- Pop culture can have a large influence on how the general population understands scientific ideas.
 - As works of science fiction usually display scientific inaccuracies, this can create false ideas about scientific theories, like the multiverse.
 - Studies have shown that after consuming works of science fiction, participants displayed false understandings of the science that was presented in the movie (Barnett et al.).
 - However, science fiction can also be used as a method to spark interest of scientific ideas in the general population and encourage further thought and study about those topics.
 - As multiverse plotlines become more prevalent in science fiction, especially in popular movie franchises like Marvel and DC, interest in the science behind the multiverse may increase as well.
- Before the multiverse was popular within the scientific community and in pop culture, one of the most famed Christian authors and philosophers was writing about it in 1950: C.S. Lewis in *The Chronicles of Narnia*.
 - *The Chronicles of Narnia* is a compelling story that intertwines Christianity and the multiverse.
 - Lewis later explains the methodologies of his multiverse in more depth in the 1955 prequel, *The Magician's Nephew*.
 - Later adapted into three movies, Lewis' story of a multiverse has stood the test of time, especially as multiverse plots become more popular.
 - Following his series, Lewis has spoken about the scientific theory of the multiverse. He argued that the one thing connecting all the universes was an intelligent being – God.



The Multiverse and God

- The multiverse theory acts as a theory to explain fine-tuning while also eliminating the prospect of intelligent design.
- At first glance, it may seem as though the multiverse is incompatible with God. However, when looking at the attributes of God, the multiverse can fit quite well with the idea of intelligent design.
 - Robin Collins discusses that it makes sense for an infinitely creative God to be able to create multiple universes.
 - In his book, *Where the Conflict Really Lies*, Plantinga discusses topics like the multiverse and fine-tuning through a lens of Christianity.
 - Plantinga argues that if God created the universe to be teeming with life, it is plausible to assume that life exists elsewhere whether that is in the universe or across multiple universes.
 - Even with topics like the multiverse, Plantinga finds there is a deep concord between science and religion.
- While some atheist scientists may argue that intelligent design is a scientifically lazy theory, philosopher William Lane Craig argues that it actually invites other questions about function, meaning, and design that would otherwise not be explored in a more naturalistic theories.
- These arguments do not necessarily provide evidence for proving the existence of the multiverse or even assume that they agree with the multiverse theory, but rather they are arguing that saying God cannot create a multiverse diminishes his power, imagination, and creativity.

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