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The Data of Cosmology Say the Universe Had a Beginning and Is Finely Tuned for Life

By Dan W Reynolds

The facts and laws of physics, especially in cosmology, are best explained by intelligent design. The available evidence and best theories suggest the universe had a beginning and therefore a cause. The laws of physics and chemistry are finely tuned for life as we know it. There are no known natural laws that account for the creation of the universe from nothing with all the required properties for the existence of intelligent beings. Indeed, the idea that nature created itself is self-contradictory. Speculative naturalistic explanations involving a multiverse have no empirical support. The one known cause that can account for the origin of the universe from nothing and the fine tuning of physics is a powerful intelligence.

The origin of the universe is a scientific mystery. Throughout history there have been those who believed the universe has always existed and those who believed it had a beginning. An eternal universe of some sort is required by naturalism or materialism, the philosophy that nature is all there is or ever has been. However, the available evidence and known laws of science strongly suggest the universe had a beginning.¹

First, the Second Law of Thermodynamics requires a beginning. The Second Law of Thermodynamics—also known as the Law of Entropy—says that the total amount of energy available to do work in the universe is irreversibly decreasing with time. Hence a universe that had existed for an infinite amount of time would no longer contain any useful energy. Since our universe still has useful energy (the stars shine, plants use light to manufacture molecules for life, etc.), it must have been in existence for a finite period or, in other words, had a beginning.

Edwin Hubble discovered that most galaxies are moving away from us, and the farther away, the faster the recession; the universe is expanding. Run the expansion in reverse (back in time) and eventually all matter converges on a single point where there is infinite temperature, infinite gravity, infinite density, and an infinitesimal

volume. It is at this “singularity” that our best theories break down; our current science can’t describe the singularity. Time itself stops at the singularity or in other words, the universe and time had a beginning.

As it turns out, many of the laws and constants of physics are just what they must be within narrow tolerances to permit our existence. This fact has been referred to as the *fine tuning of physics* and is widely acknowledged by Christians and atheists alike. Change any of these laws or constants just a little and our universe becomes uninhabitable.² One of the amazing things about fine tuning is that there is no known physical law or principle that accounts for it.³ We just happen to have won the cosmic lottery! For example, there are four fundamental forces: gravity, the strong force, the weak force, and electromagnetism. If gravity were much stronger, stars would burn faster and hotter,⁴ too hot for liquid water to exist on earth given its current position. If gravity were much weaker, nuclear fusion in stars would be too slow and would fail to produce many chemical elements. The strong force holds quarks together in protons and neutrons (there are three quarks in each), and protons and neutrons together in the atomic nucleus. If the strong force were much stronger, hydrogen would convert into helium much faster during nuclear fusion, and stars would be short lived.⁵ There would also be little hydrogen left in the universe. If the electromagnetic force were much stronger, atomic nuclei would become unstable due to charge repulsion (protons are positively charged) and only the smallest atoms would exist.

Atheist physicist Stephen Hawking has recently reviewed some evidences of the “fine tuning” of physics in

² Lennox JC (2009) 70

³ Berlinski D (2008) *The Devil's Delusion: Atheism and Its Scientific Pretensions*, Crown Forum New York, 115

⁴ Deem R (2011May17) Evidence for the fine tuning of the universe, <<http://www.godandscience.org/apologetics/designun.html>> Accessed 2014 Feb 22

⁵ Bai TA, The universe fine-tuned for life, <<http://quake.stanford.edu/~bai/finetuning.pdf>> Access 2014Feb22

¹ Lennox JC (2009) *God's Undertaker: Has Science Buried God?* Lion Hudson, Oxford, 66-67

our universe.⁶ For example, we don't have a binary star (most stars are binary),⁷ the eccentricity of earth's orbit is near zero (close to a circle), the sun's mass and our distance from it put us in the "habitable zone" (not too hot or cold), the sun emits the right spectrum of light for life as we know it, and our temperature allows liquid water. The fundamental forces had to be able to create elements in stars, make stable elements, and allow for star/galaxy/solar system formation. Forces had to allow for the expansion rate of the universe to be fast enough to avoid gravitational collapse but slow enough to allow star and galaxy formation.⁸

Carbon is formed in stars by the "triple alpha" reaction ($2\text{He} \rightarrow \text{Be}$; $\text{Be} + \text{He} \rightarrow \text{C}$). If the strong force was different by 0.5% or the electric force by 4%, carbon and oxygen would not form in stars. If the weak force was a little weaker, all hydrogen in the early universe would have become helium, if much stronger, supernovas would not spread the heavier elements. If protons were 0.2% heavier, they would decay into neutrons thereby destabilizing atoms. If the sum of the masses of the quarks that make up the proton changed by 10%, there would be few stable elements. It appears that the summed quark mass is optimized to allow for the largest number of stable elements.

The number of spatial dimensions determines the nature of gravity. Stable elliptical orbits are only possible with three large space dimensions. If the earth's distance from the sun were changed by as little as 2%, life would cease.⁹ With more than three large spatial dimensions, electrical forces would vary such that electrons would either escape from or spiral into the nucleus. In three-dimensional space, gravity varies by $1/r^2$. For a four-dimensional space, gravity would vary with $1/r^3$ in which case stars would fall apart or collapse into a black hole. Hawking summarizes:

The emergence of the complex structures capable of supporting intelligent observers seems to be very fragile. The laws of nature form a system that is extremely fine-tuned, and very little in physical law can be altered without destroying the possibility of the development of life as we know it. Were it not for a series of startling coincidences in the precise details of physical law, it seems, humans and similar life forms would never have come into being¹⁰

So what is a materialist to do about the beginning of the universe and the fine tuning of physics? Current thinking among materialists says that although the universe had a beginning in time, there were other types of time dimensions existing prior to the time in our universe. For instance, Stephen Hawking has said that before time was *imaginary time*.¹¹ He has said that time doesn't stop at the singularity but only changes direction or changes into another dimension.

Our best theory of gravity is Einstein's theory of Relativity. It is the equations of relativity that break down at the singularity.¹² The state of matter/energy at the beginning is thought to have been a plasma consisting of quarks, electrons, photons, and other basic particles of the quantum world. To understand the physics of the singularity therefore requires insight from both quantum mechanics and relativity or a *quantum theory of gravity*. However, currently there is no confirmed quantum theory of gravity.

One attempt to combine quantum mechanics and relativity is String Theory. String Theory says the most basic fundamental particles are strings of energy of various shapes that vibrate at various frequencies; the frequency determines what particles and forces there are. One prediction made by 10-dimensional string theory (there are versions with more dimensions) is the existence of 10^{500} universes¹³, each with four large and six "compactified" dimensions. Each universe has its own particular set of physical laws, dimensions and particles. In other words, each universe has a unique set of dimensions and laws of chemistry and physics. The ensemble of universes or multiverse has been referred to as the "landscape"¹⁴ and dovetails with the "many worlds" interpretation of quantum mechanics.¹⁵ And this is how the materialist explains fine tuning. If there are 10^{500} universes with every conceivable set of dimensions, particles, and laws, at least one of those universes had to be like ours; we did indeed win the cosmic lottery!

The major problem with this view of reality is lack of evidence for its existence. There is no direct evidence for other universes or their spontaneous generation, the hidden compactified dimensions suggested by string theory, or imaginary time. There is not even a theory

¹¹ Hawking S (1988) *A Brief History of Time: From the Big Bang to Black Holes*, Bantam Books New York, 134

¹² *Ibid.*, 133

¹³ Kraus L (2012) *A Universe from Nothing: Why There is Something Rather Than Nothing*, Free Press New York, 134

¹⁴ Berlinski D (2008) 120

¹⁵ The many-worlds interpretation of quantum mechanics was inspired by the double slit experiment. See an online video clip, Dr. Quantum – Double-slit experiment, <<http://www.youtube.com/watch?v=DfPeprQ7oGc>> Accessed 2014Feb22, Clip from Lord of the Wind Films, (2004) What the bleep do we know.

⁶ Hawking S.(2010) *The Grand Design*, Bantam Books, New York, 49-166

⁷ Most stars have a companion star and are hence called binary. Our sun is an exception.

⁸ Lennox JC (2009) 71

⁹ Lennox JC (2009) 72

¹⁰ Hawking (2010) 166

that allows an eternal past, even among theories that predict multiple universes.¹⁶ The spontaneous generation of universes from nothing may work in some theoretical models, but without evidence it is mere speculation and metaphysics. The origin of the physical laws that would permit the generation of a multiverse is not explained. Indeed, materialists *assume* the existence of quantum mechanics, gravity, and empty space and then claim a universe can be created from nothing, yet physical law is something! The mechanism whereby quantum mechanics and gravity could generate a universe is likewise not explained. Empirically our universe is all we know of, so the problem of fine tuning remains. Hawking claims the many worlds interpretation of quantum mechanics is correct, but there are many other interpretations. For example, the Copenhagen interpretation, which does not invoke other universes, was favored by Niels Bohr,¹⁷ one of the fathers of modern atomic theory. Many atheists assume Darwinism or one of its variants can answer all the questions in evolutionary biology, but this simply is not so; macroevolution is still looking for a credible mechanism. So far, the only known source of complex specified information such as found in books and DNA is an intelligent agent.¹⁸ Hence, *even if* the many worlds interpretation is correct (this is dubious in my view), the origin of information in biology would still need to be explained. Just as the “just so” stories of biological evolution have failed to explain the origin and diversity of life on earth, the “just so” many worlds hypothesis and multiverse theories fail to explain the origin of the universe, natural law, and the fine tuning of physics. So far there is no mechanism to start and stop inflation,¹⁹ a critical part of the Big Bang scenario. In fact, the recent discovery of the Higgs Boson has suggested that current inflation theories may not work.²⁰ So

far there is no evidence for microscopic black holes and curled up compactified extra dimensions predicted by M-theory²¹ and related theories.²² There is still no complete explanation for why there is no antimatter in the universe. M-theory, string theory, and related theories have not been confirmed, so perhaps it is premature to say everything has been explained without God. Hawking’s explanation for the universe is more philosophy than science.

Atheist Lawrence Krauss says that the difference between speculative physics and spiritual realities is that the former can be measured in principle.²³ However, this ignores personal spiritual experience, the fulfillment of prophecies, the empirical detection of design in nature, the historical accuracy of the scriptures, the over 500 eyewitnesses to the resurrection of Christ, etc. These spiritual realities have been measured *in fact*.

Krauss, similar to Hawking, says you can get a universe from nothing if you can start with empty space with nonzero energy and the laws of gravity and quantum mechanics. He then admits empty space with nonzero energy is something!²⁴ This is a clear violation of the law of noncontradiction.

In summary, the second law of thermodynamics, the expansion of the universe, and the most recent scholarship on major cosmological theories all require a beginning to the universe. No current theory allows an eternity past! Hence all current theories say there still had to be a beginning.¹⁷ Since there is no evidence so far for hidden dimensions, other universes, string theory, etc., fine tuning is still a problem for materialists. The matter/antimatter problem is still unsolved. Even if the landscape of a multiverse is correct (there is no evidence it is), one still has to explain origin of life and evolution. However, there is still no evidence for hidden dimensions and other universes. The theoretical scenarios advanced by Hawking and Krauss are speculative and

spell-trouble-for-leading-big-bang-theory-1.12804> Accessed on 2014Feb22

²¹ M-theory is favored by Stephen Hawking. It is actually a collection of theories in physics that agree where they overlap.

²² These are being sought now with the Large Hadron Collider (LHC) in Europe. See:

Search for microscopic black hole signatures at the large Hadron collider (2011) *Phys. Lett. B* **697**: 434. Available at: <<http://cms.web.cern.ch/news/search-microscopic-black-hole-signatures-large-hadron-collider>> Accessed on 2014Feb22;

Siegfried T (2013Oct17) It’s too soon to declare supersymmetry a tragedy. *Science News* <<https://www.sciencenews.org/blog/context/it%E2%80%99s-too-soon-declare-supersymmetry-tragedy>> Accessed 2014Feb22

²³ Kraus L (2012) 133

²⁴ Kraus L (2012) 149-150

¹⁶ Grossman L (2012) Why physicists can’t avoid a creation event. *New Scientist* **2847**:6-7, Available at: <<http://www.newscientist.com/article/mg21328474.400-why-physicists-cant-avoid-a-creation-event.html>> Accessed 2014Feb22

¹⁷ Berlinski D (2008) 94

¹⁸ Reynolds DW(2013May) The origin of information in biology, TASC Newsletter, <http://tasc-creationscience.org/sites/default/files/newsletter_pdf/may2013.pdf> Accessed 2014Feb22

¹⁹ Inflation refers to rapid expansion of the universe fractions of a second after the Big Bang. Inflation is thought to explain the horizon problem and the homogeneity of matter in the universe. Recent news that evidence for inflation has been found could be premature. However, if inflation is confirmed, its starting, stopping, rate, and duration will merely add to the fine tuning argument. See Herbert J <<http://www.icr.org/article/8031/>> Accessed 12014Apr12

²⁰ Merali Z (2013) Higgs data could spell trouble for leading Big Bang theory: Universe’s latest baby picture combines with LHC findings to raise new questions about cosmic ‘inflation’. *Nature*, Available at: <<http://www.nature.com/news/higgs-data-could->

depend on a quantum theory of gravity, which is not currently available. The best answer to the beginning and fine tuning of our universe is found in Genesis 1:1 - *In the beginning God created the heaven and the earth.* ❧

The video contains over 130 breathtaking photographs, videos, and graphics from NASA and other sources that reveal some of the most beautiful objects on the universe.

COMING EVENTS

Thursday, May 8, 7:00 pm, Providence Baptist Church, 6339 Glenwood Ave., Raleigh, Room 631

Everett Coates will present the video "What You Aren't Being Told About Astronomy—Our Created Stars and Galaxies" by Spike Psarris. Spike was formerly an engineer in the U.S. military space program. He entered the program an atheist and an evolutionist. He left as a creationist and Christian. This video presents evidence that, according to the secular model of star and galaxy formation, stars and galaxies should not exist. The video shows how recent discoveries contradict the naturalistic view of history.