

Fine Tuning: Evidence for (but not proof of) the Existence of God?

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Why is “Fine Tuning” so Popular Today?

- It addresses one of the great mysteries of the universe....
- It may have significant meta-physical implications.
- Even atheists like Stephen Hawking note that “It is difficult to discuss the beginning of the universe without mentioning the concept of God. My work on the origin of the universe is on the borderline between science and religion.....”

TIME

What Does
Science
Tell Us About
God?

Examples of many recent books on the fine tuning question

- *The Accidental Universe* (2013), Lightman
- *The Cosmic Jackpot* (2006), Davies
- *Just Six Numbers* (2000), Rees
- *The Constants of Nature* (2002), Barrow
- *A Fine Tuned Universe* (2007), McGrath
- *Lucky Planet* (2014), Waltham
- *Rare Earth* (2000), Ward and Brownlee

What does science explain?

What does religion explain?

- Aquinas in 1300s postulated
 - Religion/Christianity explores/explains first or ultimate cause or **Agent**
 - Science explores/explains the web of secondary causes created by the Causal **Agent**.
- Science investigates natural, repeatable observable phenomena to determine “**Mechanisms**”.
- Newton discovered the “**Mechanism**” of gravity and attributed it to God (the **Agent**).
-

Napoleon and Laplace

- Napoleon asked the wrong question. He was asking Laplace “where is God in your mechanism/model.” Laplace said that God was not in the “mechanism”.
- God was the creator of the “mechanism”, one that did not require further “tinkering” by God. Napoleon asked the wrong question. He confused **Mechanism and Agency.**

Limits of Science

- Science explains how but not why. Boiling water illustration with Catherine.
- Francis Collin notes that “Science is powerless to answer questions such as
 - “Why did the universe come into being?”
 - “What is the meaning of human existence?”
 - “What happens when we die?”

Scientism in Scientific Research

- The scientific method has no biases. Great way to understand the patterns in nature.
- However, scientists sometimes do have biases!
- Scientism is “torturing” the data to confess things that it does not or can not really say, usually metaphysical things.”
- In *The Accidental Universe*, Alan Lightman does a masterful job of letting the data do the talking and sharing his metaphysical preferences. Rees and others do as well. Some like Dawkins, not so well in my opinion.

Abduction – a distinctive form of logical inference (Hanson/Peirce)

- Observation of some “surprising”, even “astonishing phenomena” which is anomalous to existing ways of thinking.
- Realization that these phenomena would not seem to be astonishing if a certain hypothesis H pertained.
- There is therefore good reason for proposing that H be considered to be correct.

Inference to Best Explanation

- When induction-hypothesis-deduction isn't possible, “inference to the best explanation” (abduction) is an alternative way to propose a **possible** explanation.
- Note that “inference to the best explanation” gives answers that are not as authoritative as predictive science but is the only option when a unique event are being investigated.

Four Kinds of Fine Tuning

- Mathematical form that nature takes
- Values of the universal constants
- Initial conditions
- Rare Lucky Earth

Fine Tuning 1. Mathematical form that nature takes

- Copernicus, Galileo, Kepler and Newton all believed that the universe was orderly and described by mathematics because God fashioned it that way.
- Albert Einstein famously said, “The most incomprehensible thing about the universe is its comprehensibility (its mathematical form).”

1. Mathematical form that nature takes

“You may find it strange that I consider the comprehensibility of the world as a miracle or as an eternal mystery. Well, a priori, one should expect a chaotic world, which cannot be grasped by the mind in any way...the kind of order created by Newton’s theory of gravitation, for example, is wholly different. Even if man proposes the axioms of the theory, the success of such a project presupposes a high degree of ordering of the objective world, and this could not be expected a priori. That is the miracle which is being constantly reinforced as our knowledge expands. “ Albert Einstein

TABLE 1
Fundamental Laws of Nature

- Mechanics (Hamilton's Equations)

$$\dot{p} = -\frac{\partial H}{\partial q} \quad \dot{q} = \frac{\partial H}{\partial p}$$

- Electro

TABLE 1
Fundamental Laws of Nature

- Mechanics (Hamilton's Equations)

- Statist

$$\dot{p} = -\frac{\partial H}{\partial q} \quad \dot{q} = \frac{\partial H}{\partial p}$$

- Electrodynamics(Maxwell's Equations)

$$F^{\mu\nu} = \partial^\mu A^\nu - \partial^\nu A^\mu$$

$$\partial_\mu F^{\mu\nu} = j^\nu$$

- Quant

- Statistical Mechanics (Boltzmann equations)

$$S = -k \int f \log f dv$$

- Genera

$$\frac{dS}{dt} \geq 0$$

- Quantum Mechanics (Schrodinger's Equations)

$$I \hbar |\psi\rangle = H |\psi\rangle$$

$$\Delta X \Delta P \geq \frac{\hbar}{2}$$

- General Relativity (Einstein's Equation)

$$G_{\mu\nu} = -8\pi G T_{\mu\nu}$$

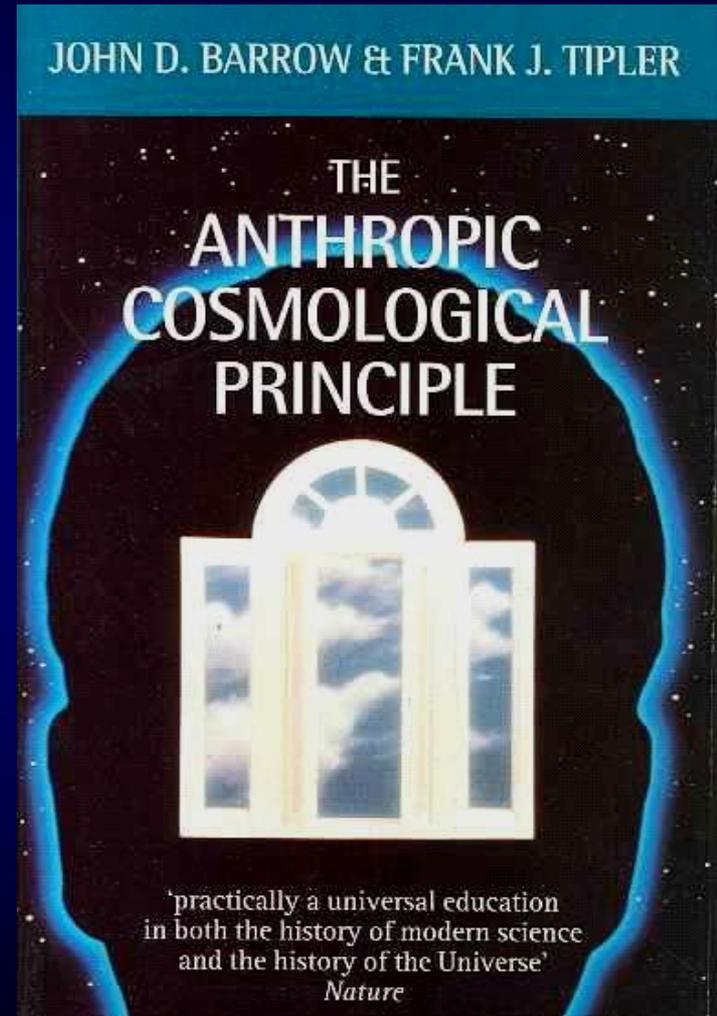
1. Fundamental laws of nature are exactly what then need to be!

All the evidence so far indicates that many complex structures depend most delicately on the existing forms of these laws. It is tempting to believe, therefore, that a complex universe will emerge only if the laws of physics are close to what they are...The laws seem to be the product of exceedingly ingenious design.

Dr. Paul Davies,
cosmologist

2) The Design of the Universe

- Many of the parameters in the universe seem to be precisely tuned to allow humans to exist.
- *The Anthropic Cosmological Principle* (1986) by Frank Tipler and John Barrow lists over 100 such parameters

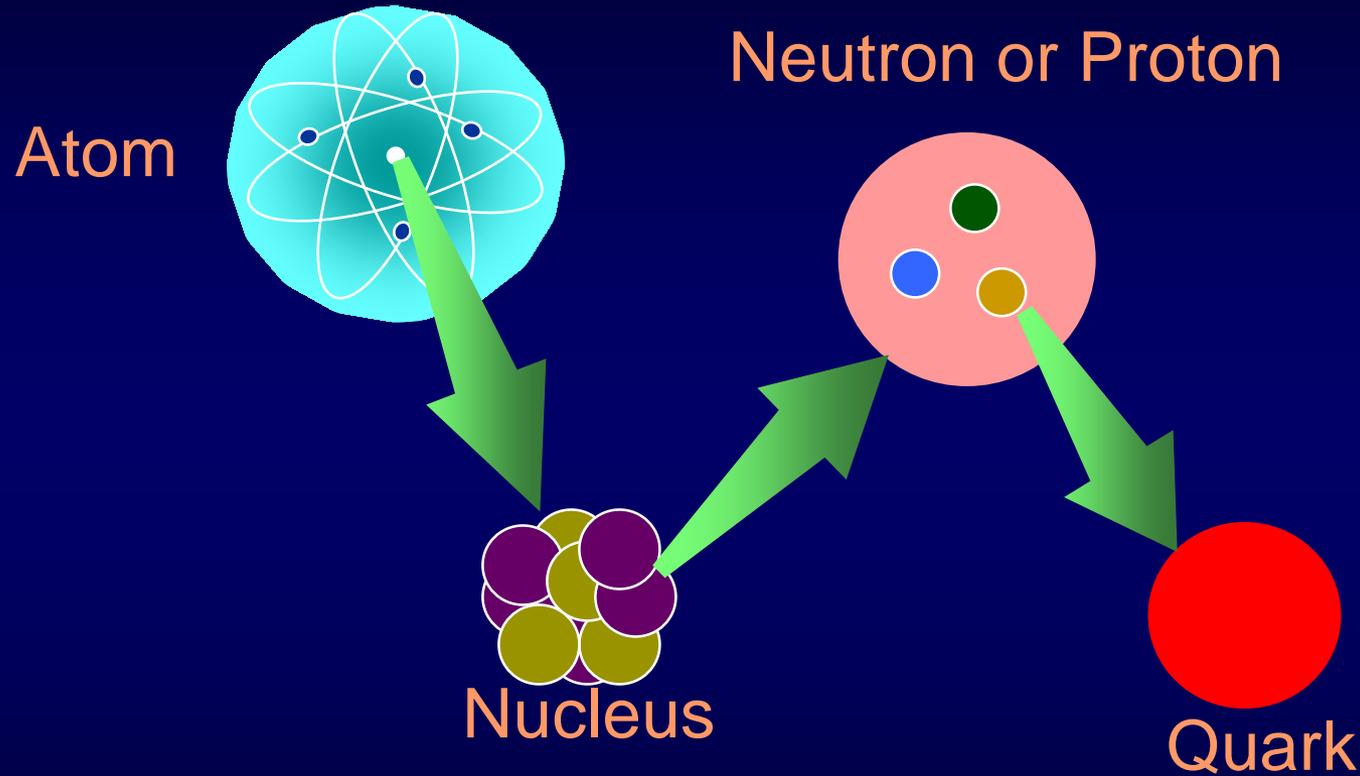


What about universal scaling constants? What do they imply about our universe?

- Speed of light $c = 3.0 \times 10^8$ m/s
- Planck's constant $h = 6.63 \times 10^{-34}$ J-s
- Boltzmann's constant $k = 1.38 \times 10^{-23}$ J/°K
- Unit charge $e = 1.6 \times 10^{-19}$ coulombs
- Gravity force constant $G = 6.67 \times 10^{-11}$ N-m/kg²
- Rest masses (in kg)
 - Neutron – 1.69×10^{-27}
 - Electron – 9.11×10^{-31}
 - Proton – 1.67×10^{-27}

**Partial list of ~ 30
universal constants**

The Strength of the Strong Nuclear Force

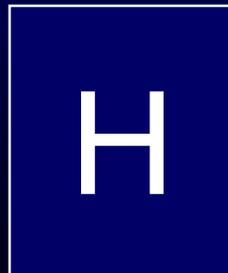


The strong nuclear force binds quarks together in neutrons and protons and holds the nucleus together

Periodic Table

H																		He
Li	Be											B	C	N	O	F	Ne	
Na	Mg											Al	Si	P	S	Cl	Ar	
K	Ca	Sc	Ti	V	Cr	Mn	Fe	Co	Ni	Cu	Zn	Ga	Ge	As	Se	Br	Kr	
Rb	Sr	Y	Zr	Nb	Mo	Tc	Ru	Rh	Pd	Ag	Cd	In	Sn	Sb	Te	I	Xe	
Cs	Ba		Hf	Ta	W	Re	Os	Ir	Pt	Au	Hg	Tl	Pb	Bi	Po	At	Rn	
Fr	Ra		Rf	Db	Sg	Bh	Hs	Mt	Uun	Uuu	Uub							
		La	Ce	Pr	Nd	Pm	Sm	Eu	Gd	Tb	Dy	Ho	Er	Tm	Yb	Lu		
		Ac	Th	Pa	U	Np	Pu	Am	Cm	Bk	Cf	Es	Fm	Md	No	Lr		

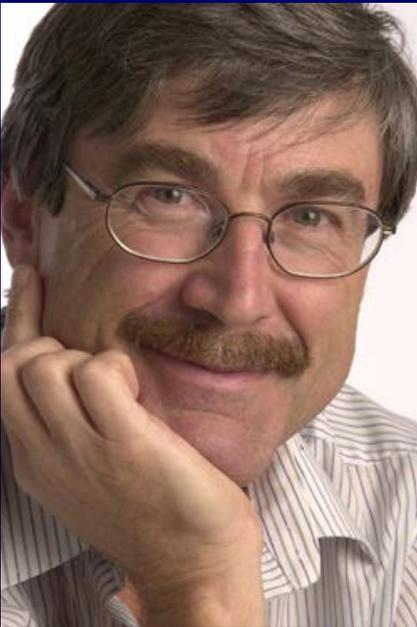
Periodic Table if the strong nuclear force were 5% weaker



Universal Constants: Requirements for universal constants to match photon (light) energy from sun to chemical bonding energies for organic chemistry.

- $6.3 m_p^2 G/[h c]_{>} \sim [6.3e^2/\{hc\}]^{12}[m_e/m_p]^4$
- Substituting for h, c, G, m_e , m_p , e
- $5.9 \times 10^{-39} > 2.0 \times 10^{-39}$

“[There] is for me powerful evidence that there is something going on behind it all.... It seems as though somebody has fine-tuned nature's numbers to make the Universe.... The impression of design is overwhelming.”

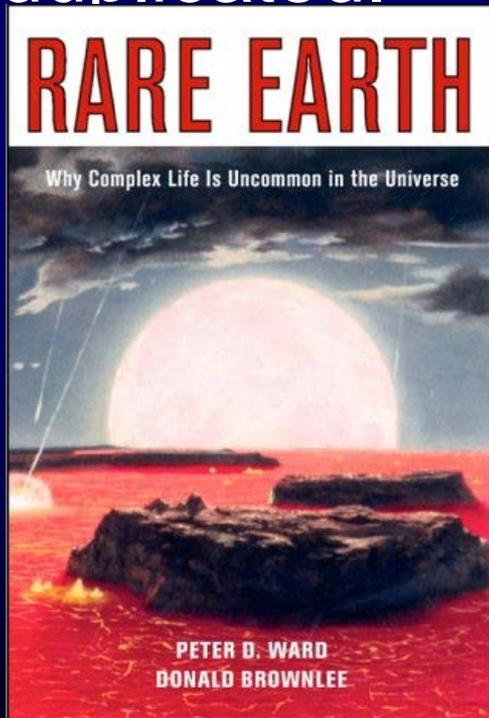


- Paul Davies, Physicist,
The Cosmic Blueprint, (1988)

3. Initial Conditions at Big Bang

- Hawking has indicated that the energy or velocity of the big bang shortly after it occurred is critical to have our universe. If different by 1 part in 10 trillion, universe would have collapsed on itself or never condensed into stars and planets.

If some god-like being could be given the opportunity to plan a sequence of events with the express purpose of duplicating our “Garden of Eden,” that power would face a formidable task. ...it is unlikely that Earth could ever be truly duplicated.”

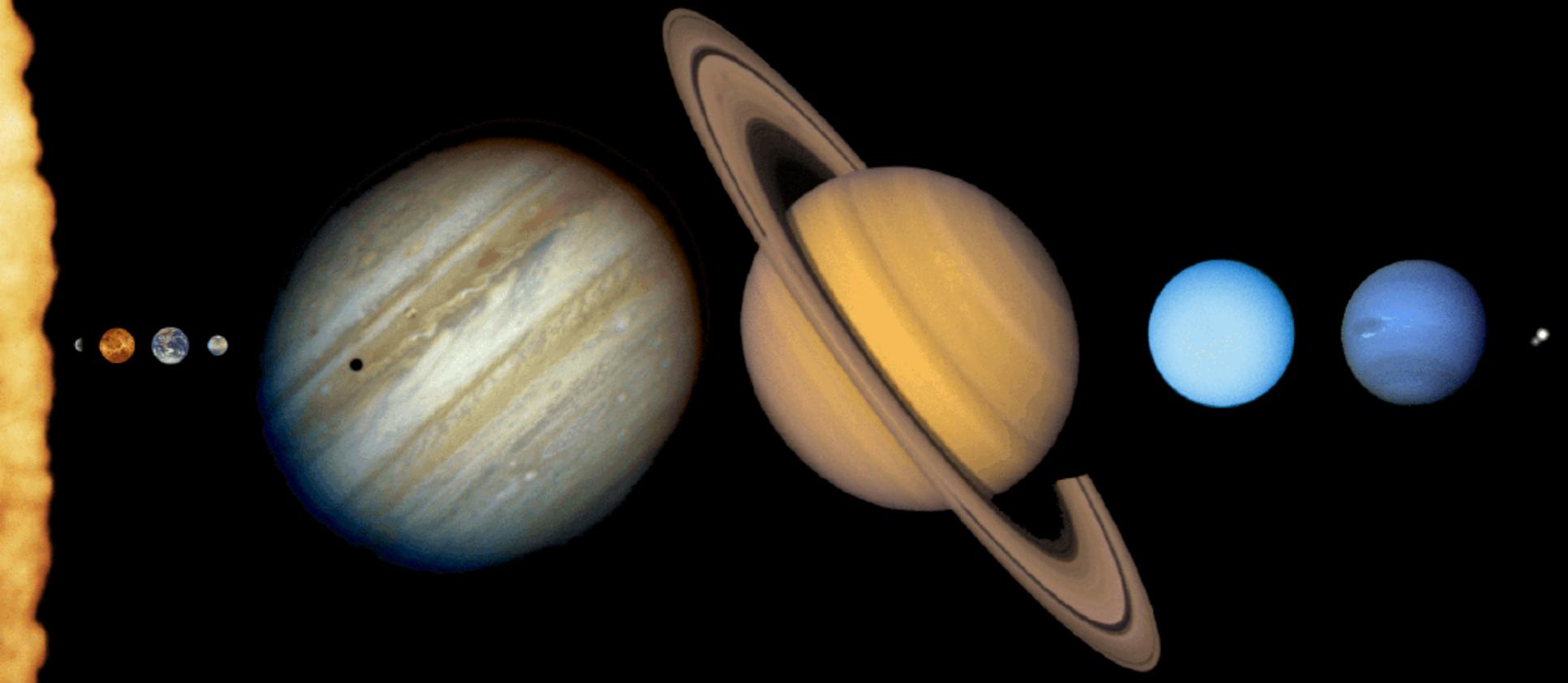


- Peter Ward, Geologist
- Donald Brownlee, Astronomer
Rare Earth, (2000)

4. Earth: special place in this special universe

Rare Earth (2000)

Lucky Planet (2013)



How do we explain these four kinds of observations?

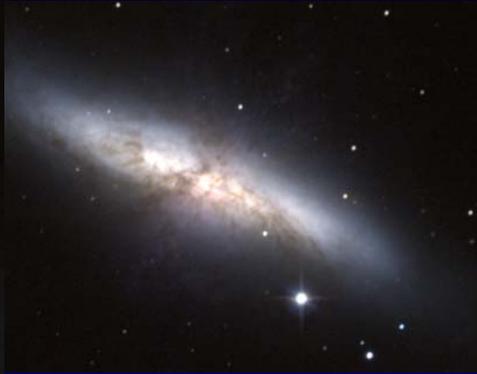
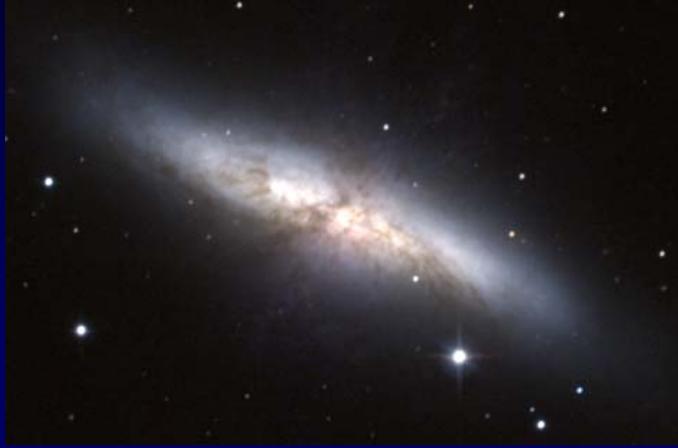
Abduction—Inference to the best explanation is appropriate.

Note this is not proof and it is very **provisional**. It does not claim that a more predictive explanation will not be discovered later such as a “Theory of Everything” that will reduce universe to a simple equation(s) and constants that are necessary, not accidental.

Arno Penzias, Nobel Laureate

- “Astronomy leads us to a unique event, a universe which was created out of nothing, one with the very delicate balance needed to provide exactly the right conditions required to permit life, and one which has an underlying (one might say) supernatural plan.”

Other options for explaining this improbable universe



- An infinite number of universes (or multiverse)

- A transcendent, intelligent designer and creator



Two problems with resolving fine tuning with multiverse

- New York Times editorial page....
- “A Crisis at the Edge of Physics”
- June 5, 2015
- Science without experiment confirmation
- However one creates a multi-verse model, it involves mathematical equations and specially chosen constants to get the desired result. This looks like fine tuning at the next level to solve fine tuning at our level.

The choices are

- Intentional universe creator with a purpose.
- Multi-universe which make accidental universe, solar system and planet earth in that solar system statistically plausible.
- Grand Theory of Everything that has been to date very illusive.

Alister McGrath - *A Fine Tuned Universe: The Quest for God in Science and Theology*

- “The facts are known but they are insulated and unconnected. The “pearls” are there but they will not hang together until some one provides the string.” William Whewell

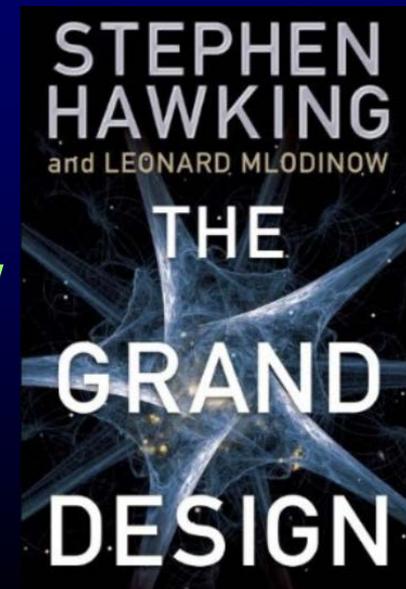
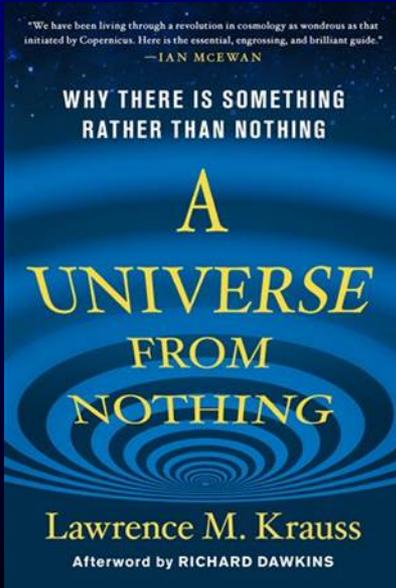
Alister McGrath

- Pp. 221
- Romans 1:18-20

Modern Science and God

1. **The Big Bang Origin (1930's – present)**
The Universe had a transcendent origin
2. **The Anthropic Principle (1960's – present)**
The Universe appears designed for humans
3. **The Rare Earth (1990's – present)**
The habitable Earth seems rare, if not unique

Any more recent scientific findings regarding science and God? Has anything new been developed to challenge this evidence for God?

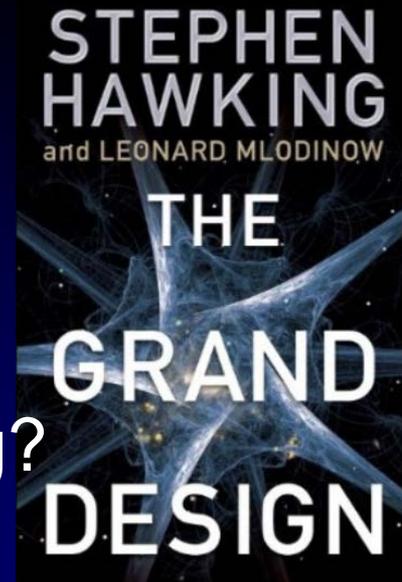


The Grand Design (2010)

Three questions posed by Hawking and Mlodinow in the first chapter:

- Why is there something rather than nothing?
The origin of the universe
- Why do we exist?
The rare earth
- Why this particular set of laws and not some other?
The anthropic principle

The fact that the authors feel compelled to write a book addressing these issues shows that the evidence for God from scientific discoveries is relevant, prevalent, and compelling



The Rare Earth

- The *Grand Design* proposal...
 - There are lots of planets so one must be suitable for life
 - We have found over 1000 extrasolar planets and the Kepler telescope has found a few thousand more candidates.
- Why this proposal is poor science:
 - What is an “earth-like” planet?
 - What conditions are necessary for an earth like planet to exist?

The Anthropic Principle

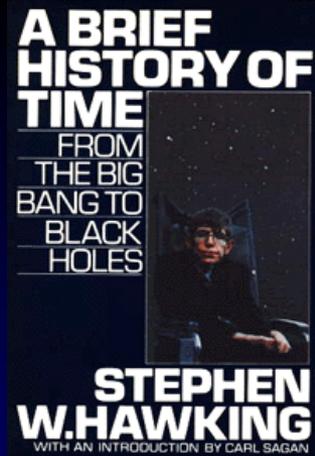
- The *Grand Design* proposal
 - A proposed theory called “M-theory” allows for the creation of a near infinite number of universes (10^{500} or more)
- Why this proposal is poor science:
 - There is no evidence that M-theory is true and there may never be
 - A belief in M-theory is not science based, but naturalism based.
 - Even if shown to be true, we don't know the actual implications of M theory. For instance, the universes of M-theory aren't necessarily realized...and other problems.

“M-theory, theorists now realize, comes in an almost infinite number of versions, which ‘predict’ an almost infinite number of possible universes. ...Of course, a theory that predicts everything really doesn't predict anything.”

- John Horgan, *Scientific American* (2010)

It is unfortunate that a scientist of Hawking's caliber would call M-theory “science” and invoke some of its possible predictions as evidence for or against anything. Real science is based on experimental results, not on speculation and conjecture.

The Origin of the Universe



- The *Grand Design* proposal
 - The no-boundary condition
 - First proposed in *A Brief History of Time*
 - The universe may not have a real beginning.
- Why this proposal is poor science:
 - The no-boundary condition requires the laws of physics to operate. Where did they come from?
 - The no boundary condition still requires a beginning of this universe.
 - Like M-theory, there is no evidence for this, so it is not scientifically based.
 - All of the real scientific observations point to the universe having a beginning

In a logic class, a science class, a philosophy class, or a religion class, this book would get a failing grade.

For example, the question is posed:

Are there any exceptions to the laws i.e. miracles?

Hawking says:

“...the modern scientist’s answer...is...a scientific law is not a scientific law if it holds only when some supernatural being decides not to intervene.”

This “answer,” is a classic example of the logical fallacy of “begging the question,” and deserves an “F.”

“The real news about *The Grand Design* is how disappointingly tinny and inelegant it is.”

- Dwight Garner, *New York Times* (2010)

How strong is the scientific evidence for God?

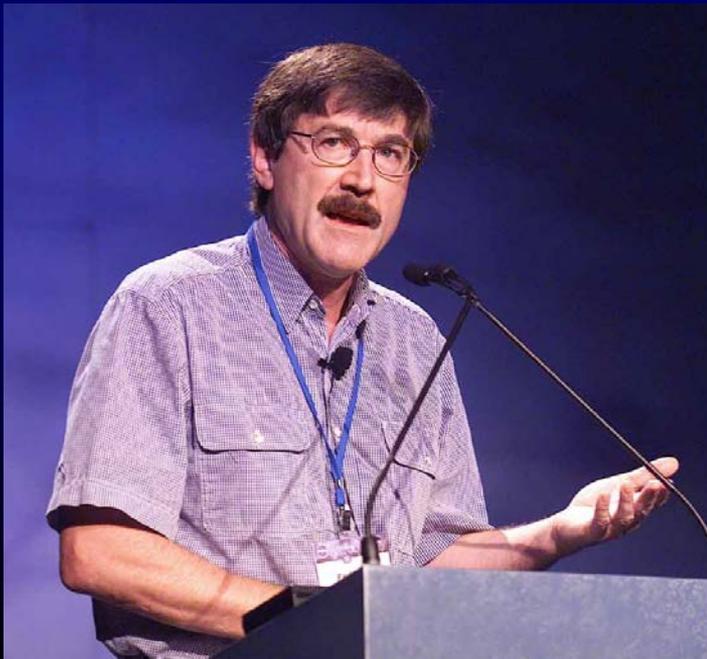
Those who best understand the evidence but choose not to believe in God, instead postulate ideas like

- humans evolve to be god-like beings who reach back in time and create the universe for themselves.
- the laws of physics must be precede this universe and include M- theory which can predict anything and caused the creation of 10^{500} or more universes, despite the lack of any confirming experimental evidence.

None of these ideas are scientific in any way. They are “inelegant” naturalistic leaps of blind faith in order to avoid the conclusion that there is a God.

So what if the universe is designed?

“If physics is the product of design, the universe must have a purpose, and the evidence of modern physics suggests strongly to me that the purpose includes us.”



- Paul Davies,
Superforce, (1984)

Hoyle's "superintellect" and Davies' "purpose [that] includes us" perfectly describes the God of the Bible.

"When I consider the heavens, the work of your fingers, the moon and the stars which you have set in place, what is man that you are mindful of him, the son of man that you care for him?"

- King David, Psalm 8:4

"He [God] will take great delight in you, he will quiet you with his love, he will rejoice over you."

- Zephaniah 3:17

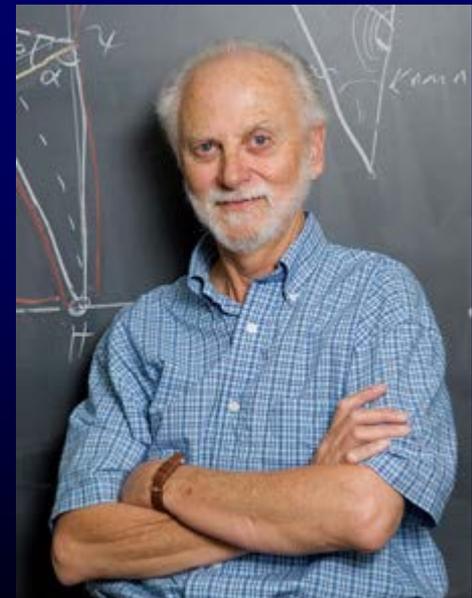
“It was my science that drove me to the conclusion that the world is much more complicated than science... It is only through the supernatural that I can understand the mystery of existence.”

-Alan Sandage, Astronomer
Newsweek, (1998)



“As we survey all the evidence, the thought insistently arises that some supernatural agency—or, rather Agency—must be involved. Is it possible that suddenly, without intending to, we have stumbled upon scientific proof of the existence of a Supreme Being?”

- George Greenstein, Astrophysicist,
The Symbiotic Universe, (1988)



The discoveries of modern science give abundant evidence for the existence of a transcendent, intelligent designer who created the universe and has a purpose for humanity.



“For, if the thermalization is actually doing anything [...] then it represents a definite increasing of the entropy. Thus, the universe would have been even more special before the thermalization than after.”
Penrose, Roger (2004). *The Road to Reality: A Complete Guide to the Laws of the Universe*. London: Vintage Books, p. 755. See also Penrose, Roger (1989). "Difficulties with Inflationary Cosmology". *Annals of the New York Academy of Sciences* **271**: 249–264

“Not only is bad inflation more likely than good inflation, but no inflation is more likely than either. ... Penrose’s shocking conclusion, though, was that obtaining a flat universe without inflation is much more likely than with inflation –by a factor of 10 to the googol (10 to the 100) power!” Steinhardt, Paul J. (2011). “The inflation debate: Is the theory at the heart of modern cosmology deeply flawed?” (*Scientific American*, April; pp. 18-25)

These discoveries of science reveal God's character

Anthony Flew is one of the leading intellectual proponents of atheism in the 20th century who became a deist in 2004 at age 81. This exchange is from an interview published in *Philosophia Christi*, Winter 2004

Flew: I think that the most impressive arguments for God's existence are those that are supported by recent scientific discoveries....

Interviewer: So you like arguments such as those that proceed from big bang cosmology and fine tuning arguments?

Flew: Yes