Creation, Evolution, and Scientific Facts
Session 2: Origin of Mass and Energy

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Review of First Session

- Science is the search for truth
- Intelligent Design is science, not religion
- Creationism, evolution, and atheism are religious
- Faith in a rational God enhances science
- Many of the greatest scientists were Bible-believers
- There is excellent Biblical basis for science study
- Resistance to acknowledging a Creator isn't scientific
- Christianity is “fact-based,” not blind
- Science can't “prove” God (or faith unnecessary)
- Science facts can support Bible narratives

Origin of Mass and Energy

LAW of conservation of mass and energy: $\Delta E + c^2\Delta M = 0$
A Law is the strongest possible science (no exceptions)
Before Einstein's $E=Mc^2$, net energy change, ΔE, and net mass change, ΔM, were both zero (2 separate laws)

Science is tentative: new findings cause revision
Mass can be converted to energy, and vise-versa
(For ΔM = -1 gram, ΔE = 90,000 Gjoules = 2700 MWHrs)
Hiroshima A-bomb converted 6.4 mg of nuclear mass
4,400,000 bombs would convert 1 ounce
All yearly US residential power from a bowling ball's mass

Science has no explanation for the origin of mass/energy
(Universe's 3 X 10^{55} g requires 3 X 10^{68} joules)

Naturalistic Origin of Mass/Energy

Naturalism requires "matter from nothing", or "eternal existence" (Infinitely old violates entropy's 2nd LAW)

Entropy: measure of the disorder (randomness) of a system

Equivalent to the unavailability of useful energy

2nd LAW of thermodynamics says entropy always increases in a closed system (including the universe's fixed mass/energy)

(known science has never observed a violation of this law)

"All changes are in the direction of increasing entropy, of increasing disorder, of increasing randomness, of running down. Yet the universe was once in a position from which it could run down for trillions of years. How did it get into that position?" Isaac Asimov, "Can Decreasing Entropy Exist in the Universe?," Science Digest, 5/73, p76-77.

Oscillating Universe Scenario

Big bang eventually slows, then recedes to big crunch, repeating infinitely

Scientific problems with scenario

- Insufficient mass to overcome escape velocity
- Rate of expansion is increasing: What "is driving this apparently anti-gravitational behavior on the part of the Universe, nobody claims to understand why it is happening, or its implications." **Dennis Overbye, "Dark Energy is Still Puzzle to Scientists," NY Times News Service, 6/4/08**
- Entropy always increases, and is not yet maximum (no energy is available after infinite time, since randomness would be maximized via 2nd LAW)

Quantum Fluctuation of Vacuum Scenario

- "Nothing" exploded spontaneously to form universe
- Undetectable "vacuum energy" eliminates creation of matter/energy from "nothing"
- There is no such thing as "nothing" since GTR allows for "empty" space to have "vacuum energy," which could spontaneously produce (without cause, via quantum tunneling) the mass/energy and the negative gravitational energy of the universe via spontaneous symmetry breaking.
- 3 X 10^{55} g mass of the universe was spontaneous
- Not even an electron-sized equivalent has been detected from a vacuum (universe is 10^{74} larger)

Multi-"Universes" with "Strings" Scenario

- Building blocks of the universes are strings of vibrating energy in at least 10 unseeable dimensions
- Collisions of universes create a new universe
- Laws and features are result of collision
- Collapse of 10+ made our 3 space + time dimensions
- >10^{500} universes needed to make our fine-tuning
- "No part of it has been proven, and no one knows how to prove it." **Lee Smolin, The Trouble with Physics, 2007**
- "Without any explanations of nature's fine-tunings we will be hard pressed to answer the ID critics." **Amanda Gefter, "Is String Theory in Trouble?," New Scientist, 12/17/05**

Supernatural Creation Scenario

- "Infinite" energy being(s) convert energy to mass or otherwise supernaturally create universe's mass/ energy
- Like ALL scenarios, this is outside known science
- All are based on scientifically unknowable assumptions
- All are philosophical or theological beliefs
- It is no more scientific to believe a natural scenario than to believe a supernatural one since known science cannot account for the origin. Each philosophical or theological belief about the origin involves unprovable assumptions that are not verifiable or falsifiable, and would not be bound by known science.

Amazing Biblical Conservation Insights

"His work has been finished since the creation of the world." Heb. 4:4

"The Son is...sustaining all things by this powerful word." Heb. 1:3

"In him all things hold together." Col 1:17

"By the same word the present heavens and earth are reserved for fire … the elements will be destroyed by fire." 2 Pet 3:7-10

The repulsive forces in a nucleus "should" make it explode ("gluons" are proposed as a solution)

Amazing Biblical Mass/Energy Insight

LAW of conservation of mass and energy: $\Delta E + c^2 \Delta M = 0$

"In the beginning God created the heavens and the earth." Gen 1:1

"By faith we understand that the universe was formed at God's command, so that what is seen was not made out of what was visible." Heb 11:3

"All things were created by him and for him." Col 1:16

God is omnipotent, "easily" converting His power

(Conversion: 931 MeV/amu = 9×10^{13} j/g = 2.6×10^{7} kwh/g)

Can of soda yields 1 million homes' energy for 1 year

"The voice of the Lord is powerful" Ps 29:4

"And God said, 'Let there be ...' and there was." Gen 1

God's creative word in Hiroshima bomb energy equivalents:

520,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000,000

Second LAW and the Bible

- **Entropy always increases (things become more disorganized)**
- **Directed energy required for isolated entropy decrease**
- **Living organisms are energy rich (by 0.27 eV/atom)**
- **Evolution requires decrease in entropy**
- **"Creation itself will be liberated from its bondage to decay." Rom. 8:21**
- **"In the beginning you laid the foundations … they will perish … they will all wear out like a garment." Ps. 102:25-26**
- **"They will all wear out like a garment" Heb 1:11**

Most scientists believe that the universe had a beginning.

"before the beginning of time" 2Tim1:9

Fine-Tuned Nature of the Universe

- Physical constants for weak and strong nuclear forces, electromagnetic and gravitational forces, ratios of forces and electron/proton masses, and properties of neutrons are all critical, as are the expansion rate, mass, and density of the universe
- Earth's orbit, tilt, rotation, magnetic field, atmosphere, and composition are life-critical
- Concerning the constants of physics: **"The remarkable fact is that the values of these numbers seem to have been very finely adjusted to make possible the development of life." Stephen Hawking, A Brief History of Time, 1988**

Anthropic (toward people) Design

- Universe is "fine-tuned" to allow for life on earth
- "An accuracy of one part in $_{10}10^{123}$...the precision needed to set the universe on its course." Penrose in *The Emperor's New Mind*, p.344

Note: there are an estimated 10^{80} atoms in universe

10^{123} is a "1" followed by 123 "0"s

$_{10}10^{123}$ is a "1" followed by 10^{123} "0"s

- "He who created the heavens, He is God; He who fashioned and made the earth, He founded it; He did not create it to be empty, but formed it to be inhabited." Is. 45:18

Conclusions

- **There is no scientific explanation for mass/energy origin**
- **Fine-tuned nature of universe is empirically detectable**
- **The Bible is consistent with known science facts**
- **The Bible IS reliable and can be trusted – "All Scripture is God-breathed and is useful for teaching…" (2 Tim. 3:16).**
- **Christian faith is fact-based, not "blind" or "anti-logic" "You will know the truth, and the truth will set you free." (Jn. 8:32)**
- **Our knowledge on any subject is limited – "Now we see but a poor reflection as in a mirror." (1 Cor 13:12).**
- **Proven reliability increases confidence in predictions (Heaven, Hell, judgment, salvation, etc. are based on faith).**
- **The world is blind to many truths (Rom. 1:18-32, 1 Cor. 1:18-2:16) – "They exchanged the truth of God for a lie."**

Fine-Tuning Quotes

- "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, The Cosmic Blueprint: New Discoveries in Nature's Creative Ability To Order the Universe, 1988, p203**
- Nobel laureate Steven Weinberg reflects on "how surprising it is that the laws of nature and the initial conditions of the universe should allow for the existence of beings who could observe it. Life as we know it would be impossible if any one of several physical quantities had slightly different values." **Steven Weinberg, "Life in the Quantum Universe," Articles: Scient. American**

More Fine-Tuning Quotes

- **"If we nudge one of these constants just a few percent in one direction, stars burn out within a million years of their formation, and there is no time for evolution. If we nudge it a few percent in the other direction, then no elements heavier than helium form. No carbon, no life. Not even any chemistry. No complexity at all." David Deutsch, Interviewed on The Science Show: The Anthropic Universe, 2/18/06.**
- **"The really amazing thing is not that life on Earth is balanced on a knife-edge, but that the entire universe is balanced on a knife-edge, and would be total chaos if any of the natural 'constants' were off even slightly... even if you dismiss man as a chance happening, the fact remains that the universe seems unreasonably suited to the existence of life -- almost contrived -- you might say a 'put-up job.'" Paul Davies, Wiki-Quote, http://en.wikiquote.org/wiki/Darwinism**

More Quotes

- In an open system "entropy cannot decrease faster than it is exported through the [open] boundary, because the boundary integral there represents the rate that entropy is exported across the boundary." **Granville Sewell, "Can 'ANYTHING' Happen in an Open System?", in The Numerical Solution of Ordinary and Partial Differential Equations, 2005, Appen D**
- "The trouble is, proponents have not produced an iota of empirical evidence for strings. That's why University of Toronto physicist Amanda Peet – a proponent – recently called string theory a 'faith-based initiative'" **Reviews, Discover Magazine, 12/1/05**

Another Fine-Tuning Quote

- Nima Arkani-Hamed has attempted "to explain why things that appear to be finely, even heroically, tuned actually are not. One possibility, he said, is that our universe is not unique but is only part of a vast 'landscape' of universes. If there are huge numbers of universes, perhaps 10 to the 500th power by one estimate, then it is no great stretch to imagine that at least one of them—ours—wound up having extremely small amounts of observed vacuum energy and a weak force that operates on a scale much smaller than expected.." **AAAS-4/11/05, "Harvard's Nima Arkani-Hamed Ponders New Universes, Different Dimensions"**