Evidence for Fine-Tuning of the Universe

Hugh Ross, *The Creator & the Cosmos*
(Colorado Spring, CO, 1993), 111-114.

More than two dozen parameters for the universe must have values falling within narrowly defined ranges for life of any kind to exist.

Gravitational Force Constant
if larger: stars would be too hot and would burn up too quickly and too unevenly
if smaller: stars would remain so cool that nuclear fusion would never ignite, hence no heavy element production
Strong Nuclear Force Constant
if larger: no hydrogen; nuclei essential for life would be unstable
if smaller: no elements other than hydrogen
Weak Nuclear Force Constant
if larger: too much hydrogen converted to helium in big bang, hence too much heavy element material made by star burning; no expulsion of heavy elements from stars
if smaller: too little helium produced from big bang, hence too little heavy element material made by star burning; no expulsion of heavy elements from stars
Electromagnetic Force Constant
if larger: insufficient chemical bonding; elements more massive than boron would be too unstable for fission
if smaller: insufficient chemical bonding
Ratio of Electromagnetic Force Constant to Gravitational Force Constant
if larger: no stars less than 1.4 solar masses, hence short stellar life spans and uneven stellar luminosities
if smaller: no stars more than 0.8 solar masses, hence no heavy element production
Ratio of Electron to Proton Mass
if larger: insufficient chemical bonding
if smaller: insufficient chemical bonding
Ratio of Protons to Electrons
if larger: electromagnetism would dominate gravity, preventing galaxy, star, and planet formation
if smaller: electromagnetism would dominate gravity, preventing galaxy, star, and planet formation
Expansion Rate of the Universe
if larger: no galaxy formation
if smaller: universe would collapse prior to star formation
Entropy Level of the Universe
if smaller: no proto-galaxy formation
if larger: no star condensation within the proto-galaxies
Mass Density of the Universe
if larger: too much deuterium from big bang, hence stars burn too rapidly
if smaller: insufficient helium from big bang, hence too few heavy elements forming
Velocity of Light
if faster: stars would be too luminous
if slower: stars would not be luminous enough
Age of the Universe
if older: no solar-type stars in a stable burning phase in the right part of the galaxy
if younger: solar-type stars in a stable burning phase would not yet have formed
Initial Uniformity of Radiation
if smoother: stars, star clusters, and galaxies would not have formed
if coarser: universe by now would be mostly black holes and empty space
Fine Structure Constant
if larger: no stars more than 0.7 solar masses
if smaller: no stars less than 1.8 solar masses
Average Distance between Stars
if larger: heavy element density too thin for rocky planets to form
if smaller: planetary orbits would become destabilized
Decay Rate of the Proton
if greater: life would be exterminated by the release of radiation
if smaller: insufficient matter in the universe for life
Carbon (^{12}C) to 0xygen ($^{16}0$) Energy Level Ratio
if larger: insufficient oxygen
if smaller: insufficient carbon
Ground State Energy Level for Helium (^{4}He)
if larger: insufficient carbon and oxygen
if smaller: insufficient carbon and oxygen
Decay Rate of Beryllium (^{8}Be)
if slower: heavy element fusion would generate catastrophic explosions in all the stars
if faster: no element production beyond beryllium and, hence, no life chemistry possible
Mass excess of the Neutron over the Proton
if greater: neutron decay would leave too few neutrons to form the heavy elements essential for life
if smaller: proton decay would cause all stars to collapse rapidly into neutron stars or black holes
Initial Excess of Nucleons over Anti-Nucleons
if greater: too much radiation for planets to form
if smaller: not enough matter for galaxies or stars to form
Polarity of the Water Molecule
if greater: heat of fusion and vaporization would be too great for life to exist
if smaller: heat of fusion and vaporization would be too small for life's existence; liquid water would become too inferior a solvent for life chemistry to proceed; ice would not float, leading to a runaway freeze-up
Supernovae Eruptions
if too close: radiation would exterminate life on the planet
if too far: not enough heavy element ashes for the formation of rocky planets
if too frequent: life on the planet would be exterminated
if too infrequent: not enough heavy element ashes for the formation of rocky planets
if too late: life on the planet would be exterminated by radiation
if too soon: not enough heavy element ashes for the formation of rocky planets
White Dwarf Binaries
if too few: insufficient fluorine produced for life chemistry to proceed
if too many: disruption of planetary orbits from stellar density; life on the planet would be exterminated
if too soon: not enough heavy elements made for efficient fluorine production
if too late: fluorine made too late for incorporation in protoplanet
Ratio of Exotic to Ordinary Matter
if smaller: galaxies would not form
if larger: universe would collapse before solar type stars could form

Evidence for Design in the Galaxy-Sun-Earth-Moon System for Life Support

Hugh Ross, *The Creator & the Cosmos*
(Colorado Spring, CO, 1993), 129-132.

The following parameters must have values that fall within a narrowly defined ranges for life to exist.

Galaxy Type
if too elliptical: star formation would cease before sufficient heavy element build-up for life chemistry
if too irregular: radiation exposure on occasion would be too severe and heavy elements for life chemistry would not be available
Supernova Eruptions
if too close: life on the planet would be exterminated by radiation
if too far: not enough heavy element ashes would exist for the formation of rocky planets
if too frequent: life on the planet would be exterminated
if too infrequent: not enough heavy element ashes would be present for the formation of rocky planets
if too late: life on the planet would be exterminated by radiation
if too soon: not enough heavy element ashes would exist for the formation of rocky planets
White Dwarf Binaries
if too few: insufficient fluorine would be produced for life chemistry to proceed
if too many: planetary orbits would be disrupted by stellar density; life on the planet would be exterminated
if too soon: not enough heavy elements would be made for efficient fluorine production
if too late: fluorine would be made too late for incorporation in protoplanet
Parent Star Distance from Centre of Galaxy
if farther: quantity of heavy elements would be insufficient to make rocky planets
if closer: galactic radiation would be too great; stellar density would disturb planetary orbits out of life support zones
Number of Stars in the Planetary System
if more than one: tidal interactions would disrupt planetary orbits
if less than one: heat produced would be insufficient for life
Parent Star Birth Date
if more recent: star would not yet have reached stable burning phase; stellar system would contain too many heavy elements
if less recent: stellar system would not contain enough heavy elements
Parent Star Age
if older: luminosity of star would change too quickly
if younger: luminosity of star would change too quickly
Parent Star Mass
if greater: luminosity of star would change too quickly; star would burn too rapidly
if less: range of distances appropriate for life would be too narrow; tidal forces would disrupt the rotational period for a planet of the right distance; uv radiation would be inadequate for plants to make sugars and oxygen
Parent Star Color
if redder: photosynthetic response would be insufficient
if bluer: photosynthetic response would be insufficient
Parent Star Luminosity Relative to Speciation
if increases too soon: would develop runaway greenhouse
if increases too late: would develop runaway glaciation
Age
if too young: planet would rotate too rapidly
if too old: planet would rotate too slowly
Magnetic Field
if stronger: electromagnetic storms would be too severe
if weaker: ozone shield and life on the land would be inadequately protected from hard stellar and solar radiation
Inclination of Orbit
if too great: temperature differences would be too extreme
Distance from Parent Star
if farther: planet would be too cool for a stable water cycle
if closer: planet would be too warm for a stable water cycle
Orbital Eccentricity
if too great: seasonal temperature differences would be too extreme
Axial Tilt
if greater: surface temperature differences would be too great
if less: surface temperature differences would be too great
Rotation Period
if longer: diurnal temperature differences would be too great
if shorter: atmospheric wind velocities would be too great
Thickness of Crust
if thicker: too much oxygen would be transferred from the atmosphere to the crust
if thinner: volcanic and tectonic activity would be too great
Albedo (reflected light to total amount falling on surface)
if greater: runaway glaciation would develop
if less: runaway greenhouse effect would develop
Collision Rate with Asteroids & Comets
if greater: too many species would become extinct
if less: crust would be too depleted of materials for life
Surface Gravity (Escape Velocity)
if stronger: planet's atmosphere would retain too much ammonia and methane
if weaker: planet's atmosphere would lose too much water
Oxygen to Nitrogen Ratio in Atmosphere
if larger: advanced life functions would proceed too quickly
if smaller: advanced life functions would proceed too slowly
Carbon Dioxide Level in Atmosphere
if greater: runaway greenhouse effect would develop
if less: plants would be unable to maintain efficient photosynthesis
Water Vapor Level in Atmosphere
if greater: runaway greenhouse effect would develop
if less: rainfall would be too meager for advanced life
Atmospheric Electric Discharge Rate
if greater: too much fire destruction would occur
if less: too little nitrogen would be fixed in the atmosphere
Ozone Level in Atmosphere
if greater: surface temperatures would be too low
if less: surface temperatures would be too high; there would be too much uv radiation at the surface
Oxygen Quantity in Atmosphere
if greater: plants and hydrocarbons would burn up too easily
if less: advanced animals would have too little to breathe
Seismic Activity
if greater: too many life forms would be destroyed
if less: nutrients on ocean floors (from river runoff) would not be recycled to the continents through tectonic uplift
Oceans-to-Continents Ratio
if greater: diversity & complexity of life forms would be limited
if smaller: diversity & complexity of life forms would be limited
Global Distribution of Continents
if too much in the southern hemisphere: seasonal temperature differences would be too severe for advanced life
Gravitational Interaction with a Moon
if greater: tidal effects on the oceans, atmosphere, and rotational period would be too severe
if less: orbital obliquity changes would cause climatic instabilities; movement of nutrients and life from the oceans to the continents and continents to the oceans would be insufficient; magnetic field would be too weak

Convergences Index

Simon Conway Morris *Life's Solution: Inevitable Humans in a Lonely Universe*

NY: Cambridge U Press, 2003. 455-461

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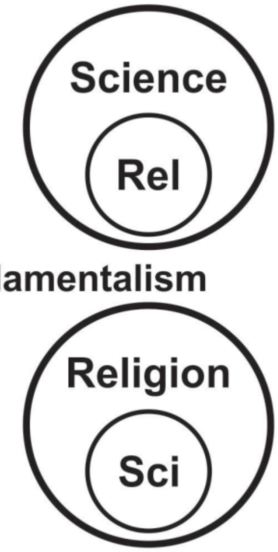
xerophyte

Lamoureux's Science & Religion Model

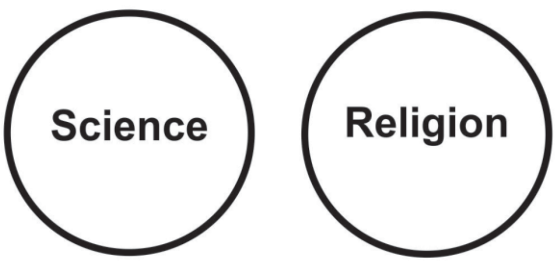
1. Warfare

Scientism

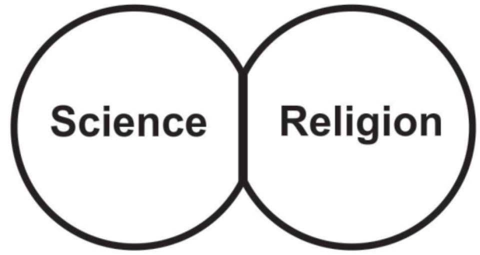
Fundamentalism



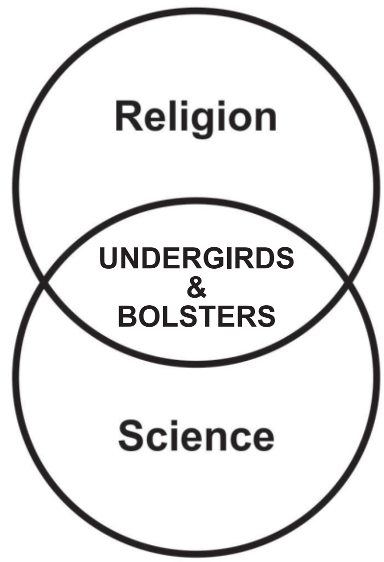
2. Compartment



3. Boundary



4. Complementary



Intelligent Design & Nature: A Complementary Relationship

Intelligent Design

Religion & Philosophy

Ultimate Beliefs

Nature

Scientific Discoveries

Beauty, Complexity & Functionality

Argument from Design to Nature
Downward Arrows

Argument from Nature to Design
Upward Arrows