# Design or Chance?

The Fine-Tuning Argument for the Existence of God

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## *The Sun*

Nuclear Fusion Reactor

Hydrogen → Helium

## *Solar Constant*

1.99 cal/min/cm$^2$

93 million miles

## *Solar Constant*

1.99 cal/min/cm$^2$

94 mil. → Frozen oceans

88 mil. → All $H_20$ vapor

Richard Brennan (*Heisenberg Probably Slept Here*, John Wiley & Sons, 1997, p. 215)

## *Properties of Particles*

Charges

Masses

Forces

## *Four Fundamental Forces:*

Gravity

Electromagnetism

Strong Nuclear Force

Weak Nuclear Force

## *Electromagnetism*

Stronger → significantly less starlight

Stars like Sun too cold

John Leslie (*Universes*, Routledge, 1989, p. 4)

## *Electromagnetism*

Stronger → protons repel one another, heavier atoms unstable

John Leslie (*Universes*, Routledge, 1989, p. 4)

## *Electromagnetism*

Weaker → stars like Sun would be very hot, short-lived blue stars.

John Leslie (*Universes*, Routledge, 1989, p. 37)

## *Strong Nuclear Force*

$\varepsilon = .007$

If $\varepsilon = .006$ → no chemistry beyond hydrogen

Martin Rees (*Just Six Numbers*, Weidenfeld & Nicolson, 1999, pp. 54-55)

## *Strong Nuclear Force*

$\varepsilon = .007$

If $\varepsilon = .008$ → no hydrogen, no $H_20$

Martin Rees (*Just Six Numbers*, Weidenfeld & Nicolson, 1999, p. 55)

## *Weak Nuclear Force*

H + H → He

Weaker → little or no hydrogen

John Leslie (*Universes*, Routledge, 1989, pp. 4, 34)

## *Weak Nuclear Force*

H + H → He

Weaker → little or no neutron-decay → all helium

John Leslie (*Universes*, Routledge, 1989, p. 34)

## *Weak Nuclear Force*

H + H → He

Stronger → Neutron-decay too rapid, no heavy elements

Walter L. Bradley ("The 'Just So' Universe" in *Signs of Intelligence*, Brazos Press, 2001, p. 167)

## *Strong Nuclear Force vs. Electromagnetism*

1% stronger → all carbon burned into oxygen

John Leslie (*Universes*, Routledge, 1989, p. 35)

***Strong Nuclear Force vs. Electromagnetism***

2% stronger → no hydrogen, no long-lived stars that burn hydrogen

***Strong Nuclear Force vs. Electromagnetism***

2% stronger → stars burn a billion billion times faster

John Leslie (*Universes*, Routledge, 1989, p. 4)

***Strong Nuclear Force vs. Electromagnetism***

5% weaker → no nuclear fusion, stars could not burn

John Leslie (*Universes*, Routledge, 1989, p. 4)

***Gravity vs. Electromagnetism***

Electromagnetism = $10^{39}$ stronger than gravity

***Gravity vs. Electromagnetism***

$10^{32}$-$10^{36}$ → stars billion times less massive, burn million times faster

Walter L. Bradley ("The 'Just So' Universe" in *Signs of Intelligence*, Brazos Press, 2001, p. 164)

***What are the Odds?***

Design vs. Chance

***What are the Odds?***

How likely is the existence of a finely-tuned, life-permitting universe, given that it was the result of blind, natural processes?

***What are the Odds?***

Universe like ours = $1/10{,}000{,}000{,}000^{124}$

Donald Page of Princeton's Institute for Advanced Study

***What are the Odds?***

Universe like ours = $1/10{,}000{,}000{,}000^{124}$

$10^{80}$ atoms in universe

***What are the Odds?***

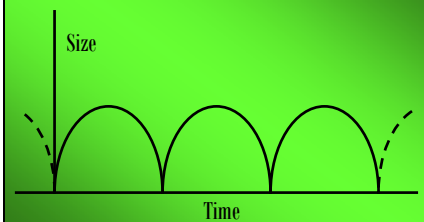
How likely is the existence of a finely-tuned, life-permitting universe, given that it was created by God?

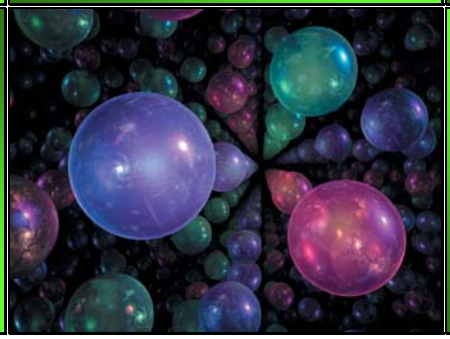
If the probability of E on $H_1$ is greater than the probability of E on $H_2$, then E favors $H_1$ over $H_2$.

***The Cosmic Lottery***

"Sometimes the improbable happens"

**Oscillating Universe Model**



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