Transcript: Fine Tuning Argument

From galaxies and stars, down to atoms and subatomic particles, the very structure of our universe is determined by these numbers:

* Speed of Light: $c=299,792,458\ m\ s^{-1}$

* Gravitational Constant: $G=6.673 \times 10^{-11}\ m^3\ kg^{-1}\ s^{-2}$

* Planck's Constant: $1.05457148 \times 10^{-34}\ m^2\ kg\ s^{-2}$

* Planck Mass-Energy: 1.2209×10^{22} MeV

* Mass of Electron, Proton, Neutron: 0.511; 938.3; 939.6 MeV

* Mass of Up, Down, Strange Quark: 2.4; 4.8; 104 MeV (Approx.)

* Ratio of Electron to Proton Mass: $(1836.15)^{-1}$

* Gravitational Coupling Constant: 5.9×10^{-39}

* Cosmological Constant: $(2.3 \times 10^{-3}$ eV)

* Hubble Constant: 71 km/s/Mpc (today)

* Higgs Vacuum Expectation Value: 246.2 GeV

These are the fundamental constants and quantities of the universe. Scientists have come to the shocking realization that each of these numbers have been carefully dialed to an astonishingly precise value - a value that falls within an exceedingly narrow, life-permitting range. If any one of these numbers were altered by even a hair's breadth, no physical, interactive life of any kind could exist anywhere. There'd be no stars, no life, no planets, no chemistry.

Consider gravity, for example. The force of gravity is determined by the gravitational constant. If this constant varied by just one in 10^{60} parts, none of us would exist. To understand how exceedingly narrow this life-permitting range is, imagine a dial divided into 10^{60} increments. To get a handle on how many tiny points on the dial this is, compare it to the number of cells in your body (10^{14}) or the number of seconds that have ticked by since time began (10^{20}). If the gravitational constant had been out of tune by just one of these infinitesimally small increments, the universe would either have expanded and thinned out so rapidly that no stars could form and life couldn't exist, or it would have collapsed back on itself with the same result: no stars, no planets, no life.

Or consider the expansion rate of the universe. This is driven by the cosmological constant. A change in its value by a mere 1 part in 10^{120} parts would cause the universe to expand too rapidly or too slowly. In either case, the universe would, again, be life-prohibiting.

Or, another example of fine-tuning: If the mass and energy of the early universe were not evenly distributed to an incomprehensible precision of 1 part in $10^{10^{123}}$, the universe would be hostile to life of any kind.

The fact is our universe permits physical, interactive life only because these, and many other numbers, have been independently and exquisitely balanced on a razor's edge.

"WHEREVER PHYSICISTS LOOK, THEY SEE EXAMPLES OF FINE-TUNING". - Sir Martin Rees

"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

"IF ANYONE CLAIMS NOT TO BE SURPRISED BY THE SPECIAL FEATURES THE UNIVERSE HAS, HE IS HIDING HIS HEAD IN THE SAND. THESE SPECIAL FEATURES ARE SURPRISING AND UNLIKELY". - David Deutsch

What is the best explanation for this astounding phenomenon? There are three live options. The fine-tuning of the universe is due to either physical necessity, chance, or design. Which of these options is the most plausible?

According to this alternative (physical necessity), the universe must be life-permitting. The precise values of these constants and quantities could not be otherwise. But is this plausible? Is a life-prohibiting universe impossible? Far from it! It's not only possible; it's far more likely than a life-permitting universe. The constants and quantities are not determined by the laws of nature. There's no reason or evidence to suggest that fine-tuning is necessary.

How about chance? Did we just get really, really, really, really lucky? No. The probabilities involved are so ridiculously remote as to put the fine-tuning well beyond the reach of chance. So, in an effort to keep this option alive, some have gone beyond empirical science and opted for a more speculative approach known as the multiverse. They imagine a universe generator that cranks out such a vast number of universes that, odds are, life-permitting universes will eventually pop out. However, there's no scientific evidence for the existence of this multiverse. It cannot be detected, observed, measured, or proved. And the universe generator, itself, would require an enormous amount of fine-tuning!

Furthermore, small patches of order are far more probable than big ones. So the most probable, observable universe would be a small one, inhabited by a single, simple observer (Boltzmann brain). But what we actually observe is the very thing we should least expect: a vast, spectacularly complex, highly ordered universe, inhabited by billions of other observers. So even if the multiverse existed (which is a moot point), it wouldn't do anything to explain the fine-tuning.

Given the implausibility of physical necessity or chance, the best explanation for why the universe is fine-tuned for life may very well be it was designed that way.

"A COMMON SENSE INTERPRETATION OF THE FACTS SUGGESTS THAT A SUPERINTELLECT MONKEYED WITH PHYSICS... AND THAT THERE ARE NO BLIND FORCES WORTH SPEAKING ABOUT IN NATURE. THE NUMBERS ONE CALCULATES FROM THE FACTS SEEM TO ME SO OVERWHELMING AS TO PUT THIS CONCLUSION ALMOST BEYOND QUESTION". - Fred Hoyle

"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 HEAVENS DECLARE THE GLORY OF GOD; THE SKIES PROCLAIM THE WORK OF HIS HANDS. DAY AFTER DAY THEY POUR FORTH SPEECH; NIGHT AFTER NIGHT THEY REVEAL KNOWLEDGE". - Psalm 19:1-2

Read more: http://www.reasonablefaith.org/transcript-fine-tuning-argument