On the Amazing Coincidences of Existence
(Was it all due to an amazing series of accidents?)

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Richard Wolfson, PhD. *Physics in Your Life* Lect 36. The Teaching Company 2004
In evolution of stars, hydrogen fusions into helium (N=2). It is very improbable that three heliums would fuse to form carbon (N=6). However, two heliums can collide to form an isotope of beryllium, which is very unstable but this particle can then collide with another helium to form carbon, essential for life. If the life time of the beryllium were only a little shorter, carbon would never have formed, and life would not have developed.

Ervin Laszlo, PhD. *Science and the Akashic Field*
Coherence of cosmic ratios
Even in the 1930s, Sir Aurthur Eddington and Paul Dirac noted some remarkable correspondences in the "dimensionless ratios" that relate the basic parameters of the universe, such as ratios of forces and ratio of sizes, masses and numbers of elementary particles, gravitational constant, charge of an electron, Plank's constant and the speed of light.

The cosmic background microwave radiation is uniform in all spatial directions. According to Big Bang theory, it was emitted when the universe was about 400,000 years old. By that time light could have traveled only 400,000 light years, yet at that time the expanding universe was already ten million light years across. Author argues that this uniformity cannot be the result of physical linkages.

Fine tuning of physical constants
The basic parameters of the universe have exactly the value that allows complex structure to evolve. …The fine tuning involves upward of thirty factors and considerable accuracy. Such factors include universe expansion rate, ratio of electromagnetic to gravitational force. Also important are the precise charge of electrons and protons, and mass of neutron and proton (this mass differs by twice the mass of an electron)

Paul Davies, PhD. *Superforce* Touchstone books, 1984: Chapter 14: A Cosmic Plan? (p. 222-243)
A rational universe
Steven Weinberg once wrote: "The more the universe seems comprehensible, the more it also seems pointless." His remark is typical of many made by scientists, who infer from their work that the universe must be considered as a vast and meaningless accident. Other scientists, surveying the same data, arrive at other conclusions. To them, nature is

too subtle; too profound. To them, our scope of vision is far too narrow to grapple with deep issues of meaning and purpose. A few scientists are more bold; more positive. They are sufficiently impressed by the way that the law of nature hang together that they feel compelled to believe there is something behind it all. Fred Hoyle said "The universe is a put-up job." The evidence goes beyond unity. Every advance in fundamental physics seems to uncover yet another facet or order.

The harmony of nature

The second law of thermodynamics states, essentially, that disorder can never spontaneously give rise to order. No violations of this law have ever been observed. Even black holes, which bring together gravity, quantum mechanics, and thermodynamics, follow the second law of thermodynamics.

Natural genius

Design in the universe

If nature can exploit mechanisms that amaze us with their ingenuity; and if the world's finest minds can unravel only with difficulty the deeper workings of nature, is that not persuasive evidence of intelligent design behind the physical universe? One of the most articulate proponents of theological intelligent design is William Paley. Attempts to deduce intelligent design form the working of nature has been attacked. Three rebuttals still used today are: 1) that we impose order on the world to make sense of it; 2) that the reasoning is flawed; 3) that any order which exists in nature is the product of blind chance and not design. 1) is not convincing when applied to science. It is sometimes objected that the existence of design in the universe is based on the fallacy of *a posteriori* reasoning, or "thinking backwards". Davies notes that "thinking backwards" has its pitfalls, but that it is not always fallacious. How do we know when "thinking backwards" is likely to lead us astray in looking at the order in the world. This brings him to the objection 3).

The key in using "thinking backwards" is to distinguish between two distinct forms of order. One meaning of order is complex organization, as for example living organisms. For biologists, the theory of evolution provides a satisfactory explanation for living organisms. Complex organization can therefore arise spontaneously, without the need for any preplanning. Evolution, however, can only work given millions of organisms and millions of generations. A second type of order is symmetry and simplicity. The atomic crystal lattice and simple harmonic motion are examples. Neither spatial or temporal order is merely an incidental feature of the world. Both are built into the underlying laws. It is the laws which encapsulate the astonishing orderliness of the world, rather than the actual physical structures.

Is there a meaning behind existence?

How finely must the laws of physics be "tuned" to allow complex structures to exist? In a famous article in the journal *Nature*, British astrophysicists Bernard Carr and Martin Rees concluded that the world is extraordinarily sensitive to even minute changes in the laws of physics, so that if the particular laws we have were to be altered in any way the universe would change beyond recognition. They found that the existence of complex

structures depend on the numerical values of the “fundamental constants”, including the speed of light and masses of subatomic particles. astrophysicist Brandon Carter has studied stellar evolution, and finds an almost unbelievable delicacy in the balance between gravity and EM within a star. Calculations find that changes in the strength of either by only one par in 10 to the 40 could spell catastrophe for stars like our sun.

In Davies’ book *The Accidental Universe*, he made a comprehensive study of all the apparent ‘accidents’ and ‘coincidences’ that seem to be necessary in order for complex structures to exist. The sheer improbability that these concurrences could have been the result of a series of lucky accidents has prompted many scientists to agree with Hoyle’s statement. The supreme example of complex organization is life itself. If we agree that life requires the existence of heavy atoms such as carbon, then stringent limits can be placed on some of the constants. The upshot to the studies is that had the universe been created with slightly different laws, not only would we not be here, but it is doubtful if there would be any complex structure at all.

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

. **Hugh Ross, PhD.** ***How the Greatest Scientific Discoveries of the Century Reveal God***
This book throws down the gauntlet and proclaims that there are no coincidences, that all of the fine tuning is evidence of intelligent design. Chapter 14 of this book is titled ***A Just Right Universe***, and Chapter 15; ***Earth: The Place for Life***.

In a critique of Ross' methodology, Victor Stenger notes that Ross lists in this book 26 parameters that have to fall within narrow ranges "for life of any kind to exist" (p. 118). These range from the strength of the strong nuclear force to the ratio of exotic to ordinary matter. He also notes that Ross bends the data, as needed, to be consistent with a created universe.

. See: http://www.actionbioscience.org/evolution/nhmag.html : Three proponents of Intelligent Design (ID) present their views of design in the natural world. Each view is immediately followed by a response from a proponent of evolution (EVO).