Why Hawking and Mlodinow Think the Universe is a Rare Coincidence

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This short paper critiques Stephan Hawking's and Leonard Mlodinow's 2010 book, **The Grand Design**, and the assumptions behind their worldview.

I read Stephen Hawking and Leonard Mlodinow's book **The Grand Design** [1], and realized what is wrong with their way of thinking.

Quantum mechanics is based on probabilities and as they define particle physics they make it look like if the universe weren't exactly as they describe it then it is improbable that it would be here. But matter isn't based on probability. Everything is the inevitable result of causality. We think some things are improbable simply because we are trying to impose our expectations from mathematical physics.

They are missing the point that there is an absolute universe that exists whether we do or not, and where space, matter, motion and time are integrated and absolute. They are using a physics based on physical reality as we experience it, and an objective reality determined by adding abstractions to make the equations accurate. But objective reality is not the same as absolute reality, it still relies on definitions of relative physics. So the best physicists can do is regard everything to be from dynamic equilibrium and an orbital system as the result of the fortuitous balance of forces. What they are seeing is a universe as a reflection of their own making.

Matter, however, is founded on the principle of the orbital system. An orbital system is how motion transforms space into matter. The nucleus dominates the field condition of the system and the orbiting component (s) screens out everything larger and allows the system to occupy space. The orbital components of particles are single charged strands of virtual waves, and it is the spiraling undulating of these structural waves that generate the electric and gravitational fields.

The orbital component encloses the entire field in a single orbit. Protons and neutrons consist of charged wave strands enclosing a nucleus of charged neutrino halves. There are then atoms and gravitational systems on the same pattern, except that satellites in gravitational systems encircle the equivalent of the entire field in a single orbit. The orbital systems have in common an equal field content, and differ by the components and field density. The size of the system and density of the field depends upon the orbiting component.

If now we consider space as the nonmaterial medium for light waves and fields, it is the ultimate limitless source of everything. The velocity of light is constant as waves in it. The internal field of particles is produced by the oppositely charged neutrino halves and orbiting charged single strands have velocity c and enclose the field and define its density. Analogous systems are repeated with atoms and slower moving electrons, and gravitational systems where the field is a gradient around the central mass. Orbital motion and time are a single entity, the motion-time. The motion is the orbit length and time is /its repetition.

The orbital system is the principle defining matter, and three stages form the absolute scaffold of the universe. The basis of the material universe, therefore, owes its definition and stability to a succession of constants derived from the nonmaterial and fundamental space. All constants are derivatives of it. The velocity of light is a constant because space is its medium.

If now you regard orbital systems as a balance of forces it is the ratio of the forces that is derived from the universal constant. The strong force, which is the electromagnetic force at a shorter distance, is approximately 137 times stronger than electromagnetism and reflects the size difference between particles and atoms. This is alpha, the fine structure constant. A constant based on the force concept, however, makes the conditions based on it seem extremely improbable.

The basic tenet of physics is that everything exists because of dynamic equilibrium. There is a balance between forces of cohesion and those of dissolution that is responsible for the compositions and arrangements of all things material. Everything, therefore, from quarks to atoms to cosmic giants owes its being to the interplay of opposing forces. On close examination, it appears that for the current conditions to have occurred this theory requires extremely narrow limits.

For instance, protons and neutrons transmute into each other with the emission of an electron or positron, and a corresponding neutrino. The mass of the neutron is only about 0.14% larger than that of the proton. Yet if this value were about a third of what it is, free neutrons would be unable to decay into protons. If the neutron's mass were merely 0.2 percent less, free protons would have decayed into neutrons spontaneously and atoms would never have formed.

The strong nuclear force is responsible for the bonding of protons and neutrons in the nuclei of atoms against the electric repulsion of the protons. The simplest bound nucleus is that of deuterium, the deuteron, containing one proton and one neutron. If the strong nuclear force were five percent weaker, the deuteron would not have formed and there would be no deuterium. Without deuterium the main nuclear chain reaction of the sun could not proceed and long-lived stars would not have formed.

If the strong nuclear force were only a few percent stronger, two protons would be able to bond. The existence of di-protons would make ordinary hydrogen catastrophically explosive. Hydrogen would not have formed and the universe would have

been almost entirely of helium. In a universe of helium the stars would have been short-lived, either exploding quickly or burning out in a short time. Without hydrogen there would be no organic matter, no water, no planets with oceans, no biological systems.

The stars too owe their existence to a critical value for the relative values of gravity and electromagnetism. The structure of a star is dependent on the ability of the star to transport heat from its core to the surface. If the mass of the star is large, heat escapes mainly as radiation and a blue giant is formed. If the mass is somewhat lower, radiation can't flow slow enough for the surface to be sufficiently hot to keep atoms ionized. Convection then becomes the dominant escape mechanism for energy, producing a cooler star called a red dwarf.

The blue giant burns so quickly it doesn't last long enough for life to evolve, while the red dwarf radiates too weakly for it ever to get started. In order for there to be life a star needs to have a mass within a narrow range between that of blue giants and red dwarfs. Stars formed in this range are like the sun and stable over a long life time.

According to physical theory nature seems to have selected the fundamental constants in such a way that typical stars lie very close to this boundary of convective instability. If gravity were only slightly weaker, or electromagnetism slightly stronger, all stars would be red dwarfs. If gravity were stronger or electromagnetism weaker, they would all be blue giants. Instead, most of them are in between and are the yellow sun-like type. It seems then that the preponderance of stars are just the right size due to an accidental relationship between the relative strengths of gravity and electromagnetism.

The current physical theory, therefore, makes it look like the universe just happens to be here because of an extremely improbable set of circumstances. That, however, defies logic. The probability is that the universe and all the matter in it are the inevitable consequence of some basic natural law. The problem is they are not the basic natural laws from which the present physical theory is derived.

In reality the balances don't exist. They live only in the equations of physicists. There are no balances because the idea that a force can act across space has no validity. Physicists invented the force concept and then set up the balances of forces to account for the motions and structures that exist. But this is an artificial set of conditions imposed on the universe. Inertial motion can be shown to be an artifact of the process of measuring, and the spontaneous motion of objects in space can be attributed to more logical and basic principles than those upon which the current physical theory is based.

An orbital system is stable by composition. The orbital motion-time is determined by the constant field content which it encloses, and is unrelated to any equilibrium. The systems exist outside the laws of thermodynamics.

This is a great simplification. There is no universe based on quarks and held together by a staircase of unrelated forces with contrive properties. It consists of space, matter, motion and time integrated in self-organizing systems. Energy is in the orbital components, and when the systems couple, the overall saving in orbital motion is released as energy. With atoms it is heat from the excess kinetic energy of the electrons, with protons and neutrons it is the nuclear energy from the frequency and mass reduction of the orbital waves. The orbital systems are the Prime Movers of the material world.

References

[1] Stephen Hawking, Leonard Mlodinow, **The Grand Design** (Bantam, 2010).