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The Big-Rip A Quantum Study of the Universe

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Editorial Note

In cosmology, the Planck era refers to the period in the history of the Universe during which the four fundamental interactions (electromagnetism, weak interaction, strong interaction and gravitation) were unified, that is to say -to say that they applied at the same time, which prevents it from being described using general relativity or quantum physics, since these theories are incomplete and are only valid when gravitation and quantum effects can be studied separately.

The current physics established on the Standard Model does not allow describing this period because this model does not allow apprehending the way in which the four fundamental forces interact at these levels of energies.

A more evolved theory to unify these forces is needed, as could perhaps be loop quantum gravity, string theory, quantum vacuum theory, parallel universe theory, which are too little completed to be able to describe this possible phase in the history of the Universe. Since the Big Bang 13.7 billion years ago, the Universe has gone through many different phases or eras. Based on our current understanding of how the Big Bang could have progressed, taking into account the theories on Inflation, Grand Unification, etc., we can set up an approximate timeline. Planck Era this is the closest that current physics can get to the absolute beginning of time and very little can be known about this period. General Relativity offers a gravitational singularity prior to this date (although even this can decompose due to quantum effects), and it is assumed that the four fundamental forces (Electromagnetism, weak nuclear force, strong nuclear force, and gravity) all have the same force, and are perhaps even Unified into one fundamental force, held together by perfect symmetry.

The great unification epoch was the period in the evolution of the early universe before the Planck epoch, in which the temperature of the universe was comparable to the temperatures characteristic of the great unified theories. It is possible that such quantum primordial black holes were created in the high-density environment of the early Universe (or Big Bang), or possibly through subsequent phase transitions. They might be observed by astrophysicists through the particles they are expected to emit by Hawking. Stephen Hawking argued that, due to quantum effects, black holes "evaporate" by a process now referred to as Hawking radiation in which elementary particles (such as photons, electrons, quarks, gluons) are emitted. His calculations showed that the smaller the size of the black hole, the faster the evaporation rate, resulting in a sudden burst of particles as the micro black hole suddenly explodes.

At this time universe began from an initial point of singularity, which has expanded over billions of years to form the universe as we now know it. Because current instruments don't allow astronomers to peer back at the universe's birth, much of what we understand about the Big Bang Theory comes from mathematical formulas and models. Astronomers can, however, see the "echo" of the expansion through a phenomenon known as the cosmic microwave background. The universe would not be flat but would rather have the shape of a sphere. The theory of cosmic inflation explains that the universe experienced a very brief expansion stage shortly after the Big Bang. The researchers used all of this information to calculate the universe's present-day expansion rate, a value known as the Hubble constant, after American astronomer Edwin Hubble. The new number is about 46.0 miles (74.03 kilometers) per second per mega parsec; one mega parsec is roughly 3.26 million light-years.

Many physicists say that time began, they insist, in the moment of the Big Bang, and think of anything earlier that is not in the world of science. We will never understand what a pre-Big Bang reality was, how it formed, or why it exploded to form our universe. These concepts go beyond human understanding. Few non-traditional scholars disagree. These physicists hypothesize that, a moment before the Big Bang, every mass and energy of the emerging universe had been compressed into an incredibly dense - yet finite spot.

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