Reports from the Astronomy

Horst Fritsch

The Big Bang - a Mirage

For the 100^{th} Birthday of the General Theory of Relativity

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Zum 100. Geburtsjahr der Allgemeinen Relativitätstheorie

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The brochure introduce an alternative – the Cosmic Time-Hypothesis (CTH) – to the Big Bang theory. It arises as a logical consequence of the General Relativity theory (GR) if one assumes that the universe is expanding at the velocity of light. The CTH demands that time must not only be made more flexible in relation to other moving systems (SRT) and different gravitational fields (GR), but also when one considers different times. Time flows more rapidly the farther we look back into the past (see Figure 4, page 19) and its cycle frequency tends to infinity in the Big Bang singularity. Thus, time has no beginning and the universe is infinitely old. Amazingly, the CTH can provide solutions for many cosmological problems because it observes these from a new perspective - problems that the current standard model of cosmology (ΛCDM model) cannot solve.

The most important results of the CTH are:

- It solves some old problems of the Big Bang theory in a simple and natural way. The problem of the horizon, flatness, of galaxy formation and the age of the world. Inflation theory is thus superfluous.
- It solves one of the biggest problems of cosmology - the problem of the cosmological constant (Λ) - by which it cancels the relationship between Λ and the vacuum energy density ε_V ($\Lambda = 0$, $\varepsilon_V > 0$). According to the CTH, the vacuum energy density ε_V is not negative and constant as previously thought, but a positive and time-dependent ($\varepsilon_V \sim t^{-2}$). ε_V is part of the total energy density (ε) of the universe, and is included in the stress-energy tensor of Einstein's field equations. Cosmology is thus freed of unwanted ballast, i.e., a free parameter (= constant of nature) is dispensed with ($\Lambda = 0$). Conclusion: There is no "dark energy"!
- The measurement data obtained from observations of SN Ia supernovae, which suggest a currently accelerating expansion of the universe, reveal, when interpreted from the perspective of CTH, a decelerating expansion, as required by the Einstein-de Sitter universe.
- According to the CTH, the numerical value of the vacuum energy density is by a factor of $\approx 10^{-122}$ less than the value calculated from quantum field theory and is in accordance with the observation.

- Also, "dark matter" could not possibly exist because the CTH demands that the "gravitational constant" be time-dependent and becomes all the greater the further the observed objects are removed from us in space, and thus also in time ($G \sim t^{-2/3}$).
- The CTH requires that the strongest force (strong nuclear force) and the weakest (gravitational force) should have been united, as all forces of nature, into a single super force at the Planck time ($t_p \approx 10^{-43}$ seconds after the "Big Bang"), were equally large, and had the same range. According to the CTH, the product of strength and range of the gravitational force is constant, i.e. independent of time, and is identical to that from the strong nuclear force.
- The universe had the size of an elementary particle at the Planck time ($R_P = r_E \approx 10^{-15}$ m). This value also corresponds to the range of the strong nuclear force (Yukawa radius) and the Planck length for the Planck time.
- The CTH offers a possible explanation for the first and second Mach principle.
- Gravitationally bound local systems, for example, Earth-Moon or Earth-Sun, expand according to the same law as the universe. This explains why the Hubble law is also valid within very small groups of galaxies, as is evident from observations.
- The CTH provides the theoretical basis for the theory of the Earth's expansion.