

Before Big Bang

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Abstract

The article discusses the circumstances before the Big Bang. Only a photon can exist in such conditions. This article discloses a variant how the Universe can emerge from “nothing”.

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There was nothing before the Big Bang: no space, no time [1], no matter. Only a photon could exist in such circumstances. Only a photon is self-sufficient. The photon does not need ordinary (gravity) space and/or time. The photon creates its own electromagnetic space [2].

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It seems incredible, but in such conditions the photon may have any amount of energy. In reality, according to Heisenberg uncertainty principle [3] the product of energy and time is:

$$\Delta E \Delta t > h \quad \text{or} \quad \Delta E > h/\Delta t, \quad (1)$$

where: ΔE – energy,
 Δt – time,
 h – Planck constant.

If $\Delta t \rightarrow 0$, then $\Delta E \rightarrow \infty$. Therefore at $t = 0$, the energy of a photon can be within the range from h to any value. In such case the law of energy conservation is not in force.

If the energy of a photon exceeds the mass of an electron twice, the photon can split [4] into a pair of leptons, i.e., an electron and an anti-electron (positron). They are bound together by Coulomb forces. The lepton has a positive mass and therefore gravity. The anti-lepton has a negative mass and therefore anti-gravity. Gravity space and time emerges. Gravity forces repel the lepton away from the anti-lepton. Since Coulomb forces are 10^{36} times stronger than gravity forces, the lepton and anti-lepton pair will annihilate in a short while and convert back to the photon. The gravity, space and time will disappear. This may happen many times until the magnitude of photon energy reaches a level sufficient for creating the particle-antiparticle pair with gravity which can repel particles far enough away from each other.

In this case the particle-antiparticle system is stable. Expanding [5] gravity space and time emerges around the particle. Expanding anti-space and anti-time emerges around the anti-particle. The particle decays to the ordinary Universe. The anti-particle decays to the Anti-universe. The cold Big Bang [6] begins in both Universes. Both Universes are in a quantum entanglement state. It is reasonable to call the system of

these Universes the Omniverse because it includes several Universes as a complete system. The full symmetry of time, of space, of electric charge and of mass exists in the Omniverse. According to the Noether theorem each symmetry is associated with a specific conservation law [7]. For this reason, conservation of energy, conservation of momentum, conservation of charge, etc., is in force in the Omniverse.

The Omniverse is complete [8] because the sum of all items (space, time, charge, mass, energy etc.) is zero.

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