A new discovery of the most condensed matter in the Universe, 10^{25} times of a black hole (Cidtonium)

If we want to get the constituent of the Big Bang, we can suggest the photon as the option which is the smallest, lightest, fastest, and ... particle in the world. According to this particle, the volume and density of the Big Bang will be:

$$m_T = 10^{53}\ kg$$
$$m_p = 1.67 \times 10^{-35}\ kg$$
$$r_p = 1.2 \times 10^{-17}\ m$$
$$n = \frac{m_T}{m_p} = \frac{10^{53}}{1.67 \times 10^{-35}} \Rightarrow n = 6 \times 10^{87}$$
$$V_p = \frac{4}{3}\pi {r_p}^3 = \frac{4}{3}\pi(1.2 \times 10^{-17})^3 \Rightarrow V_p = 7.23 \times 10^{-51}\ m^3$$
$$\rho_p = \frac{m_p}{V_p} = \frac{1.67 \times 10^{-35}}{7.23 \times 10^{-51}} \Rightarrow \rho_p = 2.31 \times 10^{15}\ {kg}/{m^3}$$
$$V_{BB} = nV_p = 6 \times 10^{87} \times 7.23 \times 10^{-51} \Rightarrow V_{BB} = 4.33 \times 10^{37} m^3$$
$$V_{BB} = \frac{4}{3}\pi {r_{BB}}^3 \Rightarrow {r_{BB}}^3 = \frac{4.33 \times 10^{37}}{\frac{4}{3}\pi} \Rightarrow r_{BB} = 2.18 \times 10^{12} m$$
$$\rho_{BB} = \frac{m_T}{V_{BB}} = \frac{10^{53}}{4.33 \times 10^{37}} \Rightarrow \rho_{BB} = 2.31 \times 10^{15}\ {kg}/{m^3}$$

Where m_T is the total mass of universe, n is the number of photon, m_p, r_p, V_p *and* ρ_p are the mass, radius, volume and density of the photon and r_{BB}, V_{BB} *and* ρ_{BB} are the radius, volume and density of the Big Bang sphere.

Considering that the density of the Big Bang obtained by using photons is not more than $10^{15}\ {kg}/{m^3}$ and the radius of the Big Bang sphere will be from the Earth to Jupiter. So, it could not be a suitable choice for the Big Bang, because it does not meet the definition that we expect for the Big Bang. In order to achieve our desired goal, we define a particle whose radius is one billionth of a photon, "Cidtonium". According to definition of this new particle we have:

$$r_C = r_p \times 10^{-9} = 1.2 \times 10^{-26}\ m$$
$$V_C = \frac{4}{3}\pi {r_C}^3 = \frac{4}{3}\pi(1.2 \times 10^{-26})^3 \Rightarrow V_C = 7.23 \times 10^{-78}\ m^3$$
$$\rho_C = \frac{1.67 \times 10^{-35}}{7.23 \times 10^{-78}} \Rightarrow \rho_C = 2.31 \times 10^{42}\ {kg}/{m^3}$$
$$V'_{BB} = nV_C = 6 \times 10^{87} \times 7.23 \times 10^{-78} \Rightarrow V'_{BB} = 4.33 \times 10^{10} m^3$$
$$V'_{BB} = \frac{4}{3}\pi {r'_{BB}}^3 \Rightarrow {r'_{BB}}^3 = \frac{4.33 \times 10^{10}}{\frac{4}{3}\pi} \Rightarrow r'_{BB} = 2.18 \times 10^{3} m$$
$$\rho'_{BB} = \frac{m_T}{V'_{BB}} = \frac{10^{53}}{4.33 \times 10^{10}} \Rightarrow \rho'_{BB} = 2.31 \times 10^{42}\ {kg}/{m^3}$$

Where m_T is the total mass of universe, n is the number of Cidtonium, r_C, V_C and ρ_C are the radius, volume and density of the Cidtonium and r'_{BB}, V'_{BB} and ρ'_{BB} are the radius, volume and density of the Big Bang sphere based on Cidtonium.

It is clear that the size of the Big Bang sphere is about the Moon and the density is about $10^{42}\ {}^{kg}/_{m^3}$. Therefore, this particle could be a suitable choice for the nature of the Big Bang.

Result

The defined particle is the same sub-photon, which its radius is 10^{-9} of a photon, or its volume is 10^{-27} of the volume of a photon.