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Validity of Expanding Universe Theory

—Static Universe Still Consistent with Hubble's Law

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Abstract

This note questions the validity of the Expanding Universe Theory with simple mathematics and shows Static Universe is still consistent with Hubble's Law without assumption of expansion of the space (or the universe). If we had an explosion of a huge celestial body (including a black-hole) containing all substances of the current galaxies in the past, "the further away the galaxy, the greater the speed of recession" is always true without requiring the assumption of expansion of the space (or the universe).

Subject Areas

Theoretical Physics

Keywords

Expanding Universe, Static Universe, Formation of Galaxies, Big Bang, Hubble's Law

The Expanding Universe Theory explains the space (or the universe) is expanding based on the fact that "the further away the galaxy, the greater the speed of recession" [1] (*Fact* 1). But how can we attest that the space is expanding based on the observation of the speed of substances in the space? *Fact* 1 only says the distances between the galaxies are expanding, but it should not necessarily lead to a conclusion that the space around the galaxies is expanding.

Suppose there was a big explosion of a huge celestial body (including a black-hole) containing all substances of the current galaxies in the past. When we express positions of the galaxies ∂, β, γ right after the explosion in **Figure 1** below, and suppose the center of the explosion is (0, 0) in **Figure 1**; t is the elapsed time after the explosion; a, b, c, d, e, f, are the speeds of galaxies ∂, β, γ right after the explosion in the directions of the x- or y-axis gained from the

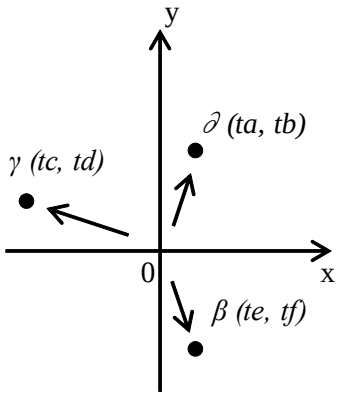

Figure 1. How respective galaxies (*α*, *β*, *γ*) move toward respective directions from the center of the explosion (0) certain time (t) after the explosion.

energy of the explosion.

In **Figure 1**, the distances among the galaxies can be expressed as follows:

$$\overline{\partial\beta} = \sqrt{(ta-te)^2 + (tb-tf)^2}$$

$$\overline{\partial\gamma} = \sqrt{(ta-tc)^2 + (tb-td)^2}$$

$$\overline{\beta\gamma} = \sqrt{(tc-te)^2 + (td-tf)^2}$$

Then,

$$\overline{\partial\beta} = t\sqrt{(a-e)^2 + (b-f)^2}$$

$$\overline{\partial\gamma} = t\sqrt{(a-c)^2 + (b-d)^2}$$

$$\overline{\beta\gamma} = t\sqrt{(c-e)^2 + (d-f)^2}$$

In this situation, "the further away the galaxy, the greater the speed of recession" is always true because "*t*" in $\overline{\partial\beta}$, $\overline{\partial\gamma}$, $\overline{\beta\gamma}$ is the elapsed time, $\sqrt{(a-e)^2 + (b-f)^2}$, $\sqrt{(a-c)^2 + (b-d)^2}$, $\sqrt{(c-e)^2 + (d-f)^2}$ are the speeds of the galaxies *∂*, *β*, *γ* going apart each other, and if the speed going apart is greater, the distance is greater and *vice versa*.

Thus, if we had an explosion of a huge celestial body (including a black-hole) containing all substances of the current galaxies in the past, "the further away the galaxy, the greater the speed of recession" is always true without requiring the assumption of expansion of the space (or the universe). And this conclusion is supported by recent discussions from other perspectives [2].

Above theory is also consistent with Hubble's Law. Hubble's Law is commonly summarized as $v = Hd$, where v is the velocity at which a distant galaxy is receding from the Earth, d is the distance from the Earth and H is the Hubble Constant [3]. When we assume

$$d = \overline{\partial\beta} = t\sqrt{(a-e)^2 + (b-f)^2},$$

$$v = \sqrt{(a-e)^2 + (b-f)^2},$$

Then,

$$\sqrt{(a-e)^2+(b-f)^2} = H \times t\sqrt{(a-e)^2+(b-f)^2}$$

$$1 = H \times t$$

$$t = \frac{1}{H}$$

And Hubble Time is commonly expressed as $T_H = \frac{1}{H_0}$ under Hubble's Law [4].

Einstein proposed Static Universe, but Edwin Hubble proposed Expanding Universe with Hubble's Law as evidence [5]. But now it is obvious that even Hubble's Law is consistent with Static Universe and we do not need to rely on Expanding Universe to understand the origin of the universe.

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