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Analytical Solution for Stellar Distance Based on Photon Dominated Cosmic Expansion Model

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Abstract : This paper derives the analytical solution of stellar distance according to its redshift based on the photon-dominated universe expansion model. Firstly, it calculates stellar separation speed and the farthest distance of observable stars via simulation. Then the analytical solution of stellar distance according to its redshift is derived. It shows that when the redshift is large, the stellar distance (and its separation speed) is not proportional to its redshift due to the relativity effect. It also reveals the relationship between stellar age and its redshift. The correctness of the analytical solution is verified by the latest astronomic observations of Ia supernovas in 2020.

Keywords : redshift, cosmic expansion model, analytical solution, stellar distance
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