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Rényi Entropy Correction to Expanding Universe

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Abstract : The Re´nyi entropy comprises a group of data estimates that sums up the well-known Shannon entropy, acquiring a considerable lot of its properties. It appears as unqualified and restrictive entropy, relative entropy, or common data, and has found numerous applications in information theory. In the Re´nyi's argument, the area law of the black hole entropy plays a significant role. However, the total entropy can be modified by some quantum effects, motivated by the randomness of a system. In this note, by employing this modified entropy relation, we have derived corrections to Friedmann equations. Taking this entropy associated with the apparent horizon of the Friedmann-Robertson-Walker Universe and assuming the first law of thermodynamics, dE=T_A (dS)_A+WdV, satisfies the apparent horizon, we have reconsidered expanding Universe. Also, the second thermodynamics law has been examined.

Keywords : Friedmann equations, dark energy, first law of thermodynamics, Reyni entropy
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