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Dark matter as an integral part of an alternative gravity model

HONTAS FARMER, Northern Illinois University — The purpose of this paper is to reconcile observations of dark matter effects on the galactic and cosmological scales with the null results of astroparticle physics observations such as CDMS and ANTARES. This paper will also provide a candidate unified and simpler mathematical formulation for the Lambda CDM model. Unification is achieved by a combination of the f(R) approach, with the standard LCDM approach and inflationary models. It is postulated that dark matter-energy fields depend on the Ricci curvature R. Standard methods of classical and quantum field theory on curved space time are applied. When this model is treated as a quantum field theory in curved space-time, the dark matter-dark matter fermion annihilation cross section grows as the square of the Ricci scalar. It is proposed and mathematically demonstrated that in this model dark matter particles could have shorter lifetimes in regions of relatively strong gravity such as near the sun, near the Earth, or any other large mass. The unexpected difficulties in directly observing fermionic particles of dark matter in Earth based observatories are explained by this theory. The gravitational field of the Sun and Earth may effect them in ways the standard WIMP models would never predict.

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