

## Documents

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**Analysis of repulsive central universal force field on solar and galactic dynamics**

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**Abstract**

Recent astrophysical observations hint toward the need for an extended theory of gravity to explain puzzles presented by the standard cosmological model such as the need for dark matter and dark energy to understand the dynamics of the cosmos. This paper investigates the effect of a repulsive central universal force field on the behavior of celestial objects. Negative tidal effect on the solar and galactic orbits, like that experienced by Pioneer spacecrafts, was derived from the central force and was shown to manifest itself as dark matter and dark energy. Vertical oscillation of the sun about the galactic plane was modeled as simple harmonic motion driven by the repulsive force. The proposed universal field was used to infer the shape of dark matter halos as generated from a planar component of the universal force and to explain galactic warp, galactic halo density, and galactic rotation curves. It was found that the repulsive field addition to Newton's gravity mimics the Yukawa potential correction employed by many current gravitational theories that modify gravity. © 2019 K. Barghout, published by De Gruyter.

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