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Invited Lecture

HYBRID MODIFIED GRAVITY AROUND MASSIVE COMPACT OBJECTS

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We investigate the possibility to explain theoretically the stellar motion around the massive compact object using gravitational potentials derived from extended gravity models, but in absence of dark matter. Our aim is to explain galactic and extragalactic dynamics without introducing dark matter. We make the comparisons between the simulated orbits in hybrid modified gravity and astronomical observations. Our simulations resulted in strong constraints on the range of hybrid modified gravity interaction. Also, we show that the hybrid modified gravity potential induces precession of S2 star orbit in the same direction as General Relativity (GR) like in Sanders potential, but with value which is much closer to GR. The future observations with advanced facilities, such as GRAVITY or/and European Extremely Large Telescope, are needed in order to verify these claims.