

Naik: Simulating Milky Way-like galaxies under $f(R)$ gravity

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There is a growing body of work utilising N-body simulations with alternative gravity theories, but simulations at a galactic scale remain a relatively unexplored area. In this work, we present the first simulated galaxy rotation curves under $f(R)$ gravity to our knowledge. The $f(R)$ gravity solver MG-GADGET (Puchwein et al. 2013) is employed statically on pre-simulated spiral galaxies, leading to solutions for the rotation curves and screening radii under HuSawicki $f(R)$ gravity. It is shown that under certain parameter regimes, the so-called 'fifth force' yields observable signatures, which can be exploited to constrain departures from classical gravity.