

SOLVING THE MISSING MATTER PROBLEM AT GALACTIC SCALES THROUGH A NEW FUNDAMENTAL GRAVITATIONAL RADIUS

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The role of $f(R)$ gravity, as well as the other modifications of standard Einstein's gravity, is to explain the accelerated expansion and structure formation of the Universe, as well as some other phenomena at extragalactic scales without dark matter hypothesis. Starting from $f(R)$ theories of gravity, we demonstrate the existence of a new fundamental gravitational radius, besides the standard Schwarzschild one, determining the dynamics at galactic scales. We also show that using this new gravitational radius, $f(R)$ theories of gravity are able to explain the observed baryonic Tully-Fisher relation of gas-rich galaxies in a natural way and without need for dark matter hypothesis.