

# Flat rotation curves in Modified Theories of Gravity

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We study the behaviour of the rotational velocities of neutral hydrogen gas clouds around galaxies within the framework of modified gravity theories. The neutral hydrogen gas clouds behave as test particles moving in stable circular orbits around the galactic centres. The behaviour of test particles are explained by postulating the existence of dark matter (DM) through galactic rotation curves. We consider the hybrid metric-Palatini gravity theory, which is a modification of the Einstein-Hilbert action with an  $f(R)$  term in the Palatini variational approach. The theoretical results that we have obtained are compared with observations of few samples of high surface brightness (HSB) galaxies. There is a good agreement between the theoretical and observational results, showing that modified gravity can explain the DM paradigm.