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# $f(R)$ GRAVITY AND DYNAMICS OF STELLAR SYSTEMS

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$f(R)$ modified gravity has been shown to successfully fit rotation curves of spiral galaxies without need for a dark matter. Here we study whether this type of modified gravity, especially its power-law version - $R^n$, is also able to reproduce the stellar dynamics in elliptical galaxies. For that purpose we investigate the possible connection between the parameters of fundamental plane equation (effective radius, central velocity dispersion and mean surface brightness within the effective radius) and those of gravity potential in the case of $R^n$ gravity (characteristic length scale and dimensionless universal constant). For that purpose we compared theoretical predictions for circular velocity in $R^n$ gravity with the corresponding values from the large sample of observed elliptical galaxies. The obtained results indicate that this type of gravity can successfully fit the observed central velocity dispersion of elliptical galaxies, as well as the existence of correlation between their effective radii and characteristic length scale of $R^n$ gravity.