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The Radial Acceleration Relation (RAR): is it really universal?

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McGaugh et al. (2016) have found, in a large sample of disc systems, a tight nonlinear relationship between the radial gravitational acceleration (g) and its baryonic component (gb). They claim the universality of such relation in any galaxy and at any radius. This is of difficult understanding in a standard "DM + Newtonian" scenario. Anyway, trough a recent investigation (Di Paolo & Salucci) on the Low Surface Brightness (LSB) and Dwarf Discs galaxies, I found that the McGaugh et al. relationship breaks down, i.e. it is not really universal. Furthermore, I found that a more complex relation exists among g, gb and also an additional variable: the normalised galactic radius r/R_opt. This is the direct consequence of the baryonic + DM distribution in galaxies. Moreover, I showed that the McGaugh et al. relation can be interpreted only as a limit of our complex relation when we consider galactic radii larger than the stellar disc scale length.

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