

Abstract Submitted
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Comparing cold dark matter, interacting dark matter and modified Newtonian dynamics using galaxy rotation curves: data favors a dark matter disk NICOLAS LOIZEAU, GLENNYS FARRAR, New York Univ NYU — We compare 8 different dark matter models on an equal footing using 159 high quality rotation curves with gas and stars distributions (SPARC database). We pay special attention to the handling of the stellar mass-to-light ratios. The compared models are: two non-interacting dark matter models (NFW and pseudo-isothermal), a self interacting DM model, two hadronically interacting DM models, a total-baryon-rescaling model and two modified Newtonian dynamics type models: the historical MOND, and the recently developed Radial Acceleration Relation (McGaugh et al). The models with Gas-DM interactions generate a disk component in the dark matter, which significantly improves the fits to the rotation curves compared to all other models. The effective Gas-DM interaction needed to produce the required DM disk component is compatible with current limits on DM-baryon interactions from the CMB and direct detection experiments. It remains to be determined whether gravitational effects alone can also produce sufficient deviation from an spherically-symmetric CDM halo to agree with the rotation curve data.

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