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Extending observations to distances larger than 10 kpc should resolve the anomaly of a galaxy lacking dark matter

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We investigated the claim that galaxy NGC 1052-DF2 lacks dark matter. For this purpose, we constructed a novel, theory-based computer simulation of the dynamical interaction of matter and dark matter in a prototypical ellipsoid galaxy and utilized it to predict the distributions of dark matter in a galaxy as a function of the galaxy's core radius and maximal rotation velocity. We ran the simulation using the parameters of NGC 1052-DF2 as well as the parameters of six other UDGs from the Coma cluster and seven dSph galaxies from the local group. For each galaxy, the simulation was run in steps of 2 kpc up to 100 kpc from the galaxy center. Inspection of the distributions of matter and dark matter generated by the simulated, as a function from distance r, reveals the following: (1) Consistent with the ΛCDM paradigm, all the tested galaxies, including galaxy NGC 1051-DF2, are predicted to be dark-matter-dominated. (2) The reported lack of dark matter within r ≤ 10 kpc is supported by the simulation results. However, this result is an aftermath of conducting a "shortsighted"observation for only r < 10 kpc. (3) Consistent with ΛCDM models, the bulk of dark matter at galactic scales resides at the galaxies'halos. (5) The core radius of a galaxy is predictor of the proportions of matter and dark matter in the galaxy.

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