

# Dark matter density profiles in dwarf satellites

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Dwarf spheroidal satellites of the Milky Way are a prime target for dark matter indirect searches. E.g., upper limits on gamma-ray fluxes in their directions, obtained with the Fermi Large Area Telescope, have been recently used to update constraints on weakly interacting massive particles (WIMPs), excluding pair annihilating cross sections at the level of WIMP thermal relic cross sections for WIMP masses lighter than about 100 GeV. The mapping of a limit on the flux onto a limit on particle dark matter properties stems from the knowledge one has regarding the distribution of dark matter in each dwarf. Such dark matter density profiles are usually derived assuming that dwarfs are equilibrium, pressure-supported, spherical systems, and implementing the spherical Jeans equation to link mass profiles to stellar velocity dispersions. This link requires assumptions regarding quantities like the stellar anisotropy profiles, which are not measurable and are usually treated as nuisance parameters over which to marginalize. We propose here a novel approach to infer the dark matter mass profiles, based on the analytical inversion of the spherical Jeans equation. This method allows us to revisit the so-called mass-anisotropy degeneracy problem, and more direct assessments of the uncertainties on line-of-sight integrals of dark matter halo density profiles. Implications for dark matter indirect detection limits are discussed.

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