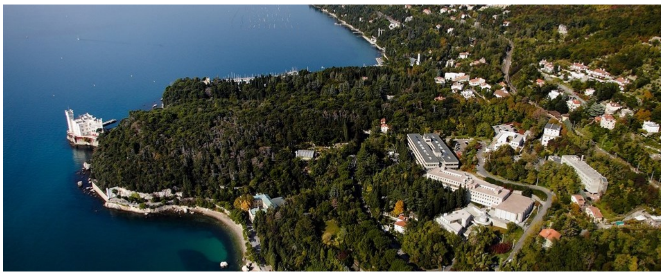

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Addressing the M-beta Degeneracy to Better Constrain the Velocity Anisotropies and Matter Distributions of Milky Way Dwarf Spheroidals

Wednesday 30 August 2023 15:00 (25 minutes)

We use surface brightness and velocity dispersion data to constrain the properties of 10 Milky Way dwarf spheroidal galaxies (dSphs), which span over an order of magnitude in effective radius, over 4 orders of magnitude in stellar mass, and show no signs of tidal disruption. To alleviate the degeneracy between galaxy mass and velocity anisotropy (beta), the "M-beta degeneracy", we consider boundary conditions of the spherical Jeans equation as r –> 0. These boundary conditions constrain the coefficients of a general beta parametrization at the centers of each dSph dark matter (DM) halo, which we model separately with either a cored (Burkert) or cuspy (NFW) DM density profile. The resulting best-fit NFW models tend to fit the data more poorly than do the best-fit Burkert models. The best-fit NFW models also require more (radial, tangential) velocity anisotropies at (small, large) dSph radii than do the best-fit Burkert models. For both the best-fit Burkert and NFW models, we find strong correlations between the scale radius, R_*, and effective radius, R_{eff}, of the dSph luminous matter distributions and all best-fit, DM halo parameters.

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