

## The lower limit on the Fermionic Warm Dark Matter mass from the smallest dwarf spheroidal galaxies

*Wednesday 19 April 2017 09:51 (23 minutes)*

We reconsider the lower bound on the mass of a fermionic dark matter (DM) candidate resulting from the existence of known small Dwarf Spheroidal galaxies, in the hypothesis that their DM halo is constituted by degenerate fermions. By relaxing the common assumption that the DM halo scale radius is similar to the scale radius of the luminous stellar component and by marginalizing on the effects of the unknown stellar velocity dispersion anisotropy, we prove that present observations lead to rather weak constraints on the DM mass, that could be as low as tens of eV. In this scenario, the DM halos would be quite sizable. At the same time, we show that the strongest bound stems instead from the requirement that the time of orbital decay of these Galactic satellites due to dynamical friction in the hosting Milky Way DM halo is long at least as their lifetime. The smallest and nearest Dwarf galaxies lead to a final lower bound of  $m \gtrsim 100$  eV, still quite weaker than previous estimates, but robust and independent from the DM formation and decoupling mechanism.

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**Session Classification:** Dark matter