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# Searching for dark matter in galactic subhalos with the Fermi-LAT gamma-ray telescope

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Despite substantial evidence for the existence of astrophysical dark matter, its nature remains undetermined. One primary focus in the search for dark matter (DM) is Weakly Interacting Massive Particles (WIMPs), (1) which are particles with masses in the GeV-TeV range and weak-scale interaction strength. A major method for probing the existence of dark matter particles is through indirect detection, where astrophysical targets with large amounts of dark matter are studied in the search for a sufficiently strong gamma-ray signal from the annihilation or decay of dark matter particles. It is predicted by N-body numerical simulations and galactic evolution theory that dark matter should clump on subgalactic scales, producing substructure in the Galactic Halo (ie. subhalos). These targets are promising for searches of gamma rays from particle-dark-matter interactions since they are dark-matter rich and nearby. Specifically, dwarf spheroidal galaxies (dSphs) are some of the most dark-matter-dominated objects known. Dozens are known to exist nearby in the Milky Way dark-matter halo. Given their proximity and low astrophysical backgrounds, Milky Way dSphs are excellent targets for searching for gamma-ray emission from dark-matter annihilation or decay. In this work we perform an analysis of 14 years of observations by the Fermi Large Area Telescope (Fermi-LAT) of more than 50 Milky Way dSphs, (2) classical and recently discovered, as well as other potential dark matter subhalos of the Galaxy in the search for a gamma-ray signal. In the absence of a significant excess of gamma-ray emission, we present gamma-ray flux upper limits for these systems. Finally, we combine the Fermi-LAT observations of all these subhalos to constrain the dark matter annihilation cross section for dark matter particles with masses between 2 GeV and 10 TeV in different DM particle model scenarios

**Palavras-chave:** Dark matter; Dwarf galaxies; Sub-halos.

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