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An Improved Dark Halo Analysis with MADHAT v2.0

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A key strategy for constraining the properties of particle dark matter is the search for the gamma-rays produced by its annihilation or decay in dwarf spheroidal galaxies. The Model-Agnostic Dark Halo Analysis Tool (MADHAT) is a publicly-available computational tool that uses data from the Fermi-LAT to constrain gamma ray emission from dwarf satellite galaxies and dwarf galaxy candidates due to dark matter annihilation, dark matter decay, or other nonstandard or unknown astrophysics. This tool efficiently provides statistical upper bounds on the number of observed photons in excess of the number expected, based on empirical determinations of foregrounds and backgrounds, using a stacked analysis of any selected set of dwarf targets. Here, I discuss the most current limits from MADHAT v2.0, which can produce optimized constraints for any model of dark matter particle physics or astrophysics.

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