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Dark Matter Identification using Gamma Rays from Dwarf Galaxies

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Satellite dwarf galaxies in the vicinity of the Milky Way are ideal candidates for the detection of dark matter annihilation signals. If the positron fraction and combined electron positron flux excesses recently observed by PAMELA and FERMI are due to dark matter annihilation, ground-based atmospheric cherenkov telescopes (ACTs) may be able to observe energetic gamma rays from the accompanying final state radiation from these dwarf galaxies. After discussing the prospects of detecting such signals with current and future ACTs, we investigate the possibility of using ACT observations of dwarf galaxies to distinguish between different dark matter models from the energy distribution of this final state radiation. We find that this can reliably be accomplished with next generation ACTs and, under favorable circumstances, might also be possible at existing instruments.

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