

Searches for Dark Matter with the Fermi Large Area Telescope

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The era of precision cosmology has revealed that ~80% of the total amount of matter in the universe is dark matter. One promising candidate, motivated by both particle physics and astrophysics, is the Weakly Interacting Massive Particle (WIMP). WIMPs are predicted to couple to the Standard Model via annihilation or decay. The annihilation or decay products of particular interest are neutrinos and gamma rays, which are detectable by IceCube and the Fermi Large Area Telescope (Fermi LAT) respectively. Since they do not carry charge, they can be traced back to the original source. Indirect searches such as these complement direct and collider (production) searches and are necessary to fully investigate the particle nature of dark matter. For nearly nine years, Fermi LAT has been surveying the sky in the energy range 20 MeV to >300 GeV from low Earth orbit. I present several recent results from the Fermi LAT Collaboration for a variety of indirect search targets, including the dwarf spheroidal galaxies, and the Galactic center. To date, the Fermi LAT Collaboration has not detected a convincing WIMP signal and has reported upper limits, which for some search targets are now challenging the standard expectations for WIMP dark matter. I will also discuss the prospects with the Fermi LAT and future gamma-ray telescopes.

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