

Indirect search of Dark Matter signatures in the gamma-ray flux towards the Sun with the Fermi LAT

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Dark matter particles in the Galactic halo could interact with the nuclei in the solar environment and be then gravitationally trapped by the Sun. In this framework, the overdensity of dark matter particles in the Sun core or in external orbits will result in annihilations of these particles producing gamma rays outside the Sun, either directly or via long-lived intermediate states.

We perform a dedicated analysis of 10-years of Fermi Large Area Telescope searching for the possible features that these processes would yield in the energy spectrum of gamma rays from the Sun. In the case of dark matter annihilation via long-lived mediators, our results constrain the dark matter-nucleon spin-dependent and spin-independent scattering cross sections in a dark matter mass range from a few GeV up to about 100 GeV at the level of $10^{-46} - 10^{-45} \text{ cm}^2$ and $10^{-48} - 10^{-47} \text{ cm}^2$ respectively.

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