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Solar dark matter scattering constraints with the Fermi Large Area Telescope

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Dark matter (DM) particles from the Galactic halo can be gravitationally trapped by the Sun, where they might annihilate into long-lived mediators, which are able to escape from the Sun and decay into different channels, with the production of gamma rays in the final states. All these processes are expected to yield an excess in the gamma-ray energy spectrum towards the Sun. We have implemented a dedicated analysis using a 13.5-years sample of gamma-ray events from the Sun collected by the Fermi Large Area Telescope, searching for possible signatures of these processes. Since no statistically significant excess is found, we have set upper limits on the signal intensity, which have been converted into constraints on the DM-nucleon scattering cross section for DM masses between a few GeV/c^2 up to 1TeV/c^2. The limits are in the range 10^{-45} to 10^{-39} cm^2 for the spin-dependent scattering and in the range 10^{-47} up to 10^{-42} cm^2 for the spin-independent case. The range of variation depends on the mediator decay channel considered and on its decay length.

Track

Dark Matter

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