

Upper limits on dark matter annihilation by cosmic-ray electrons and positrons in the solar neighbourhood

We aim to compare upper limits on dark matter annihilation by different measurements of cosmic-ray electrons and positrons in the solar neighbourhood. We focus on dark matter annihilation into electron-positron pairs. The propagation of electrons and positrons is described by a diffusion-loss equation. We consider energy loss processes such as inverse Compton scattering, synchrotron radiation and ionization. We use the data of cosmic-ray electrons and positrons in the solar neighbourhood detected by AMS-02, PAMELA, H.E.S.S. and Fermi-LAT to estimate the upper limits on the dark matter annihilation cross-section. The upper limits on the dark matter annihilation cross-section for different annihilation channels are derived by comparing the observational data with the electron and positron spectrum from our models. The tightest constraint is provided by the positron data of AMS-02 for the electron channel. Dark matter masses below a few GeV are excluded by positron data of AMS-02 for the electron, muon and tau channels.

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