

Boosted dark matter from semi-annihilations in the galactic center

Monday 25 August 2025 16:40 (20 minutes)

In some scenarios, the dark matter relic abundance is set by the semi-annihilation of two dark matter particles into one dark matter particle and one Standard Model particle. These semi-annihilations might still be occurring today in the Galactic Center at a significant rate, generating a flux of boosted dark matter particles. We investigate the possible signals of this flux component in direct detection and neutrino experiments for sub-GeV dark matter masses. We show that for typical values of the semi-annihilation cross-section, the sensitivity of current experiments to the spin-independent dark matter-proton scattering cross-section can be several orders of magnitude larger than current constraints from cosmic-ray boosted dark matter. We also argue that the upcoming DARWIN and DUNE experiments may probe scattering cross-sections as low as 10^{-37} cm^2 for masses between 30 MeV and 1 GeV.

Collaboration you are representing

Author: TOMA, Takashi (Kanazawa University)

Co-authors: Prof. IBARRA, Alejandro (Technical University of Munich); Dr BETANCOURT KAMENETSKAYA, Boris (Technical University of Munich); Prof. FUJIWARA, Motoko (University of Toyama)

Presenter: TOMA, Takashi (Kanazawa University)

Session Classification: Dark Matter and Its Detection

Track Classification: Dark Matter and Its Detection