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From Neutron Stars to Beam Dumps: 2-to-3 Process with Single Photon Final State

Tuesday 20 May 2025 18:00 (15 minutes)

In this work, we focus on the 2-to-3 scattering process between dark matter (DM) and nuclei, mediated by the Standard Model (SM) photon and a scalar particle with its mass spanning from 10 keV to 100 GeV. This process provides an efficient channel for producing energetic photons in the final state. These photons serve as a powerful probe in multiple contexts: they investigate unexplored regions of parameter space, and their distinctive energy spectrum offers a means to isolate potential signal from background channels. We explore the viable parameter space by combining constraints from both astrophysical observations—such as neutron star heating—and terrestrial searches. In particular, we present predictions for this process at proton beam dump experiments, such as at the ongoing Short-Baseline Neutrino (SBN) program at Fermilab.

Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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