

Hunting for dark matter and dark photon-photon trident

Thursday, 11 July 2024 18:30 (20 minutes)

We discuss a novel decay process for dark matter searches known as the dark photon-photon trident, where a dark photon can interact with Standard Model particles through kinetic mixing with the visible photon, producing three-photon final states. Indirect searches for this process are categorized into two scenarios. Firstly, dark photons can be produced by dark matter annihilation in celestial objects and dwarf galaxies. Secondly, the dark photon can itself constitute dark matter, which decays into photons falling into the energy range of X-ray observations. We give constraints on dark matter-Standard Model interactions and the dark photon parameter space based on these search strategies.

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Session Classification: Parallel 2

Track Classification: Parallel session: Indirect detection