

FLASY 2025 - 11th Workshop on Flavour Symmetries and Consequences in Accelerators and Cosmology



Contribution ID: 44

Type: **not specified**

Sterile neutrino DM production

Tuesday 1 July 2025 15:10 (20 minutes)

The presence of a dark matter component in the Universe, together with the discovery of neutrino masses from the observation of the oscillation phenomenon, represents one of the most important open questions in particle physics today. A concurrent solution arises when one of the right-handed neutrinos, necessary for the generation of light neutrino masses, is itself the dark matter candidate. In this article, we study the generation of such a dark matter candidate relying solely on the presence of neutrino mixing. This tightly links the generation of dark matter with searches in laboratory experiments on top of the usual indirect dark matter probes. We find that the regions of parameter space producing the observed dark matter abundance can be probed indirectly with electroweak precision observables and charged lepton flavor violation searches. Given that the heavy neutrino masses need to lie at most around the TeV scale, probes at future colliders would further test this production mechanism.

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Session Classification: Parallel session II