

# Shining Light on the Scotogenic Model: Interplay of Colliders and Cosmology

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In the framework of the scotogenic model, which features radiative generation of neutrino masses, we explore light dark matter scenario. Throughout the paper we chiefly focus on keV-scale dark matter which can be produced either via freeze-in through the decays of the new scalars, or from the decays of next-to-lightest fermionic particle in the spectrum, which is produced through freeze-out. The latter mechanism is required to be suppressed as it typically produces a hot dark matter component. Constraints from BBN are also considered and in combination with the former production mechanism they impose the dark matter to be light. For this scenario we consider signatures at High Luminosity LHC and proposed future hadron and lepton colliders, namely FCC-hh and CLIC, focusing on searches with two leptons and missing energy as a final state. While a potential discovery at High Luminosity LHC is in tension with limits from cosmology, the situation greatly improves for future colliders.

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