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Dark Matter through the Neutrino Portal

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We study the connection between the two indications of physics beyond the Standard Model (SM): the masses and mixing of neutrinos and the existence of dark matter (DM). The most attractive proposal for the origin of neutrino mass, the type I seesaw mechanism, can also account for matter-antimatter asymmetry via leptogenesis. We show that a minimal extension of type I seesaw models can also provide a portal to dark matter. As a concrete example, we study a minimal type I seesaw model with a right-handed neutrino portal to a minimal dark sector containing the dark matter candidate particle. In the minimal model, the parameters of the seesaw sector are fixed by neutrino oscillation data and leptogenesis. With the seesaw parameters fixed, we explore the portal and dark parameters required to obtain the observed DM relic abundance. Within this framework, we show how DM may be directly related to neutrino physics.

Collaboration name

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