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Light neutrinophilic thermal dark matter

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No signal of the electroweak (EW) scale WIMP has been observed so far, and the lighter WIMP, whose mass is much lighter than the EW scale, attracts attention. However, light WIMP receives severe constraints from cosmological (CMB and BBN) observation when the WIMP couples mainly to electromagnetically interacting particles. We constructed a model where the light WIMP interacts mainly with harmless particles (i.e., neutrinos) in a simple B-L extension of the standard model. It turns out that the model evades not only the cosmological constraint but also those from dark matter searches, such as the direct, indirect, and collider dark matter detections while explaining the observed dark matter abundance vis the well-known freeze-out mechanism and solving the small-scale crisis vis its self-interaction.

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