

Phenomenology 2022 Symposium: From Virtual to Real



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Constraining Vector Dark Matter with Neutrino experiments

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Vector Dark Matter (VDM) that couples to the flavor lepton number (L_e, L_μ, L_τ) acts as a chemical potential for neutrino flavor eigenstates. The effect is strongest on the lighter side of the allowed mass range as the oscillation of the VDM doesn't get averaged over the baseline of the experiment. The resulting modification in neutrino oscillation is within the observational reach of the existing and upcoming neutrino experiments. In particular, we use non-observation of such a signal from Super-Kamiokande and DUNE (proposed) experiments to rule out the existence of dark matter in a region of parameter space several orders of magnitude beyond other current constraints.

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