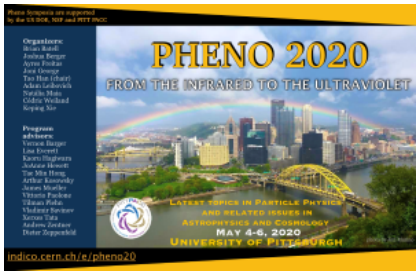

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Constraining Sterile Neutrino Dark Matter in Left-Right Theories

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$SU(2)_L \times SU(2)_R$ gauge symmetry requires three right-handed neutrinos (N_i), one of which, N_1, can be sufficiently stable to be dark matter. In the early universe, W_R exchange with the Standard Model thermal bath keeps the right-handed neutrinos in thermal equilibrium at high temperatures.
N_1 can make up all of dark matter if they freeze-out while relativistic and are mildly diluted by subsequent decays of a long-lived and heavier right-handed neutrino, N_2. We systematically study this parameter space, constraining the symmetry breaking scale of $SU(2)_R$ and the mass of N_1 to a triangle in the (v_R, M_1) plane, with $v_R = (10^6 - 3 \times 10^{12})$ GeV and $M_1 = (2\,\mathrm{keV} - 1\,\mathrm{MeV})$. Much of this triangle can be probed by signals of warm dark matter, especially if leptogenesis from N_2 decay yields the observed baryon asymmetry. In addition, there is a component of hot N_1 dark matter resulting from the late decay of $N_2 \to N_1 \ell^+ \ell^-$ that can be probed by future cosmic microwave background observations.

Summary

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