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keV sterile neutrino Dark Matter in gauge extensions of the Standard Model

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It is known, that a keV scale sterile neutrino is a good Warm Dark Matter (WDM) candidate. We study how this possibility could be realised in the context of gauge extensions of the Standard Model (SM). The naive expectation leads to large thermal overproduction of sterile neutrinos in this setup. However, we find that it is possible to use out-of-equilibrium decay of the other right-handed neutrinos of the model to dilute the present density of the keV sterile neutrinos and achieve the observed DM density. We present the universal requirements that should be satisfied by the gauge extensions of the SM, containing right-handed neutrinos, to be viable models of WDM, and provide a simple example in the context of the Left-Right symmetric model.

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