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Freeze-in sterile neutrino dark matter in the minimal gauge B-L model.

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We study the sterile neutrino dark matter produced by the freeze-in mechanism through feeble $U(1)_{B-L}$ gauge interactions. By taking account of the contributions from the on-shell B-L scalar boson (inverse) decay and the single Z' boson production properly, we find that the cosmologically-interesting gauge coupling of $U(1)_{B-L}$ is smaller than $\mathcal{O}(10^{-10})$ if the B-L scalar kinematically can decay into two sterile neutrinos. If not, the gauge coupling of $U(1)_{B-L}$ is of $\mathcal{O}(10^{-6})$, which may be probed by long-lived particle search experiments.

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