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Imprint of the seesaw mechanism on feebly interacting dark matter and the baryon asymmetry

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We show that the type-I seesaw, responsible for generating the light neutrino mass, itself is capable of accommodating one of the three right-handed neutrinos as a freeze-in type of dark matter (DM) where the required smallness of the associated coupling is connected to the lightness of the (smallest) active neutrino mass. It turns out that (a) the non-thermal production of DM having mass $\leq \mathcal{O}(1)$ MeV (via decays of W, Z bosons, and SM Higgs) consistent with relic density as well as (b) its stability determine this smallest active neutrino mass uniquely $\sim \mathcal{O}(10{-}12)eV$. On the other hand,
the study of flavor leptogenesis in this scenario (taking into account the latest neutrino data and Higgs vacuum stability issue) fixes the scale of two other right-handed neutrinos.

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