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Modular symmetry in a radiative inverse seesaw model

We propose a one loop level inverse seesaw model based on the $A_4^\nu \times A_4^\ell$ bi-modular Symmetry, where the SM gauge symmetry is enlarged by the inclusion of the $U(1)_{B-L}$ gauge symmetry. In the model under consideration, the modular A_4^ν symmetry is completely broken, while the A_4^l modular symmetry undergoes spontaneous breaking first to a $\mathbb{Z}_4$ discrete group and then to a remnant $\mathbb{Z}_2$. The remnant $\mathbb{Z}_2$ symmetry is key to ensuring the radiative inverse seesaw mechanism that produces the tiny active neutrino masses and to providing a stable scalar or fermionic dark matter candidate. The model successfully accounts for lepton masses and mixings and is compatible with constraints arising from charged lepton flavor violation, dark matter relic abundance as well as dark matter direct detection.

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