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The implementation of the Type III seesaw mechanism for neutrino masses in the context 2HDM

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The seesaw mechanism has remained the most elegant scheme to explain the smallness of the neutrino masses without having to unnaturally fine tune the Yukawa couplings to arbitrary small values. In the so-called type-III seesaw, three triplet fermions under $SU(2)$ are added to the standard model particle contents. Once these heavy leptons are integrated out from the theory, the dimension-5 Weinberg operator is generated. After electroweak symmetry breaking Majorana neutrino masses are generated from this operator. The smallness of the neutrino mass is explained by the largeness of the heavy fermion mass and without having to fine tune the Yukawa couplings to very small values.

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