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A systematic approach to neutrino masses and their phenomenology

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We propose a model-independent framework to classify and study neutrino mass models and their phenomenology. The idea is to introduce one particle beyond the Standard Model which couples to leptons and carries lepton number together with an operator which violates lepton number by two units and contains this particle. This allows to study processes which do not violate lepton number, while still working with an effective field theory. The contribution to neutrino masses translates to a robust upper bound on the mass of the new particle. We compare it to the stronger but less robust upper bound from Higgs naturalness and discuss several lower bounds.

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