Contribution ID: **28** Type: **not specified**

Upper limits on lepton number violating particles from neutrino masses

Friday, 19 April 2019 11:25 (25 minutes)

In this talk I will discuss a model-independent framework to classify and study the plethora of 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 the lowest-dimensional lepton number violating operator, which contains this particle. Demanding the generation of neutrino masses it is possible to obtain generic and robust upper bounds on the mass of the new particle. I will also discuss the less robust ones from Higgs naturalness, as well as the model-dependent lower bounds from direct searches, lepton flavor violation, wash-out arguments and in some cases baryon number violation.

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Session Classification: Neutrinos

Track Classification: Neutrinos