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Lepton Number Violation at Low and High Energies

The violation of lepton number is predicted in many new physics scenarios and it is tightly connected to the potential Majorana character of neutrinos; searching for lepton number violation (LNV) therefore constitutes a crucial pathway to physics beyond the Standard Model. In my talk, I will provide a review of the theoretical aspects of LNV and Majorana neutrinos. I will try to illuminate what consequences the observation of LNV would have on new physics scenarios, specifically on neutrino mass and baryogenesis mechanisms. I will furthermore survey the phenomenology of relevant experimental searches, both at low energies and at high energy colliders such as the LHC. Here I will focus on the role of the nuclear process of neutrinoless double beta decay and its impact on neutrino physics.

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