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Seesaw mechanism in the R-parity violating supersymmetric standard model with the gauged flavor $U(1)_X$ symmetry

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This talk is based on arXiv:2112.10337. We study the seesaw mechanism in the supersymmetric standard model (SSM) with the Z_3 symmetry called Matter triality (M_3). The Abelian discrete symmetry prohibits the baryon number violation operators at the (non-)renormalizable level, which ensures the proton longevity. The cubic coupling by the right-handed neutrinos generates the Majorana mass term after right-handed sneutrinos develop into the vacuum expectation values. Due to the R-parity violation, the active neutrinos masses can be generated not only from the mixing angles with right-handed neutrinos but also from the ones with MSSM-neutralinos. In this setup, we propose a model where M_3 is embedded into the gauged flavor symmetry. Then, the flavor charges are constrained by the anomaly cancellation conditions and the requirements to realize the fermion masses and mixing angles in the quark and lepton sectors. We analyze the assignments of the flavor charge and show that the sterile neutrinos masses are allowed to be below the soft SUSY breaking scale, which contribute to the neutrinoless double beta decay.

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