

Lecture 1: New Avenues for Proton Decay

Thursday, 20 January 2022 14:10 (1h 30m)

Within this decade, a new generation of underground detectors—JUNO, DUNE and Hyper-Kamiokande— are projected to improve significantly on the present sensitivities to various baryon decay modes. This presents a unique opportunity to test new decay modes in supersymmetric models that have not been considered before, partially because the sensitivity to those modes was not in the reach of the past underground detectors.

Encouraged by the results in 1912.04888 and 2011.03554, where we find that in many cases, the next generation of underground detectors should be able to probe models with sparticle masses that are $O(10)$ TeV, we would like to explore B-L and flavor violating decaying modes. Non-supersymmetric B-L violating modes were considered in 1203.5544 and flavor violating modes in the context of high-scale supersymmetry in 1312.7854. Probing supersymmetric scenarios with proton decay will give us an insight into what may lie beyond the SM, an insight that the LHC will not be able to give us, since $O(10)$ TeV masses are beyond the reach of the LHC.

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