Nucleon decay fingerprints from SUSY GUT models (using SusyTCProton)

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Ratios of nucleon decay rates between different channels can provide rich information about the specific GUT model realization in nature. To investigate this fingerprint in the context of SUSY GUTs and D=5 proton decay, we developed the software package SusyTCProton, which is an extension of the module SusyTC, itself to be used as a package of REAP. It takes the effective dimension 5 operators in the superpotential at the GUT scale as input, and assuming MSSM below the unification scale, computes the proton (neutron) partial decay rates into 7 (5) different decay channels.

We demonstrate the utility of this software on a pair of toy SUSY GUT models with different flavor structures. Performing a numerical fit and a subsequent MCMC analysis, we find that both models provide an equally good fit to the low energy data, while they differ in their prediction for nucleon decay fingerprints, making it possible, at least in principle, to experimentally distinguish between them.

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