

Observable proton decay in Flipped SU(5)

Tuesday 7 June 2022 15:45 (15 minutes)

We explore proton decay in a class of realistic supersymmetric flipped $SU(5)$ models supplemented by a $U(1)_R$ symmetry which plays an essential role in implementing hybrid inflation. Two distinct neutrino mass models, based on inverse seesaw and type I seesaw, are identified, with the latter arising from the breaking of $U(1)_R$ by nonrenormalizable superpotential terms. Depending on the neutrino mass model an appropriate set of intermediate scale color triplets from the Higgs superfields play a key role in proton decay channels that include $p^+ \rightarrow (e^+, \mu^+) \pi^0$, $p^+ \rightarrow (e^+, \mu^+) K^0$, $p^+ \rightarrow \bar{\nu} \pi^+$, and $p^+ \rightarrow \bar{\nu} K^+$. We identify regions of the parameter space that yield proton lifetime estimates which are testable at Hyper-Kamiokande and other next generation experiments. We discuss how gauge coupling unification in the presence of intermediate scale particles is realized, and a Z_4 symmetry is utilized to show how such intermediate scales can arise in flipped $SU(5)$. Finally, we compare our predictions for proton decay with previous work based on $SU(5)$ and flipped $SU(5)$.

Primary author: MEHMOOD, Maria (Quaid-i-Azam University, Islamabad, Pakistan)

Co-authors: Dr UR REHMAN, Mansoor (Quaid i Azam University Islamabad); Prof. SHAFI, Qaiser (University of Delaware)

Presenter: MEHMOOD, Maria (Quaid-i-Azam University, Islamabad, Pakistan)

Session Classification: Parallel