Contribution ID: **52** Type: **not specified**

SU(5) Yukawa sectors at NLO

$SU(5)$ grand unified model, which unifies SM quarks and leptons in $\overline{5}$ and 10 dimensional irreducible representations˜(irrep), yields observationally inconsistent tree-level Yukawa relations when only a single $5_{\rm H}$ or $45_{\rm H}$ dimensional irrep having a single Higgs contributes to the Yukawa sector. For instance, only $5_{\rm H}$ dimensional Higgs in the Yukawa sector yields $Y_d = Y_e^T$, while $45_{\rm H}$ gives $3Y_d = Y_e^T$. These inconsistent tree-level Yukawa relations can be rendered viable by switching on one-loop corrections to different Yukawa vertices. The former scenario requires extending the minimal model by $SU(5)$ singlets while the latter one requires splitting of mass of scalars residing in the same multiplet. Other setups are also explored where radiative effects make the inconsistent tree-level frameworks viable. Importantly, the findings highlight the feasibility of the simplest Yukawa sector when accounting for quantum corrections and substantial threshold effects.

Author: SHUKLA, Saurabh K. (Physical Research Laboratory)

Presenter: SHUKLA, Saurabh K. (Physical Research Laboratory)

Session Classification: Non-SUSY extensions of the Standard Model

Track Classification: Non-SUSY extensions of the Standard Model