

Probing Flipped Trinification at Colliders

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We investigate the recently proposed gauge symmetry

$$SU(3)_C \otimes SU(3)_L \otimes SU(3)_R \otimes U(1)_X,$$

which naturally embeds both the Left-Right symmetric model and the 3-3-1 framework as subgroups.

Within this unified setting, we introduce four families of leptons and quarks, and perform a systematic study of their contributions to gauge anomaly cancellation for a general value of the parameter β .

Our analysis identifies eight non-universal anomaly-free models with three families and four non-universal anomaly-free sets with two families.

The three-family models provide realistic extensions of the Standard Model while preserving several appealing features of the 3-3-1 scenario. In contrast, the two-family sets offer additional flexibility for constructing models with an even number of generations.

Furthermore, we present LHC bounds on the Z' mass in the specific case $\beta = -1/3$, considering all possible assignments of lepton and quark families.

These limits show a pronounced dependence on the mixing parameter θ , which governs the couplings of Standard Model fermions to the Z' boson.

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