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Explaining Fermions Mass and Mixing Hierarchies through $U(1)_X$ and Z_N Symmetries

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For understanding the hierarchies of fermion masses and mixing, we extend the standard model gauge group with $U(1)_X$ and Z_N symmetry. The field content of the Standard model is augmented by three heavy right-handed neutrinos and two new scalar singlets. $U(1)_X$ charges of different fields are considered after satisfying anomaly cancellation conditions. In this scenario, the fermion masses are generated through higher dimensional effective operators. The small neutrino masses are obtained through type-1 seesaw mechanism using the heavy right handed neutrino fields. We discuss the flavor-changing neutral current processes which is originated due to the sequential nature of $U(1)_X$ symmetry. We have written effective higher dimensional operators in terms of renormalizable dimension four operators by introducing vector like fermions.

Track type

Flavour Physics

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