

Tri-unification: a separate $SU(5)$ for each fermion family

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I discuss a grand unified theory that assigns a separate $SU(5)$ gauge group to each fermion family. The equality of the gauge couplings at the unification scale is enforced by means of a cyclic \mathbb{Z}_3 symmetry. Such tri-unification reconciles the idea of gauge non-universality with gauge coupling unification, opening the possibility to build consistent non-universal descriptions of Nature that are valid all the way up to the scale of grand unification. A minimal example which can account for all the quark and lepton masses and mixings will be presented, showing that it is possible to unify the gauge couplings into a single value associated with the cyclic $SU(5)^3$ gauge group while being consistent with the existing proton decay searches, in particular in the dominant $e^+\pi^0$ channel.

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