

Title: SU(5) x SU(5) unification revisited

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Abstract: The idea of grand unification in a minimal supersymmetric SU(5) x SU(5) framework is revisited. It is shown that the unification of gauge couplings into a unique coupling constant can be achieved at a high-energy scale compatible with proton decay constraints. This requires the addition of a minimal particle content at intermediate energy scales. In particular, the introduction of the SU(2)(L) triplets belonging to the (15, 1)+(15 over bar, 1) representations, as well as of the scalar triplet Sigma(3) and octet Sigma(8) in the (24, 1) representation, turns out to be crucial for unification. The masses of these intermediate particles can vary over a wide range, and even lie in the TeV region. In contrast, the exotic vector-like fermions must be heavy enough and have masses above 10(10) GeV. We also show that, if the SU(5) x SU(5) theory is embedded into a heterotic string scenario, it is not possible to achieve gauge coupling unification with gravity at the perturbative string scale.

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