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From E8-inspired SUSY trinification to a L-R symmetric theory

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In this talk we propose a new supersymmetric model based on the trinification gauge group with global SU(3) flavour symmetry. We aim at solving the major issues of conventional trinification GUTs, such us multi-TeV SM fermion masses, as well as providing a natural way to introduce a SU(2)_L x SU(2)_R symmetry. We investigate whether it is possible to spontaneously break the original gauge symmetry and find that the minimal field content allowing for stable vacuum solutions requires three copies of a full E6 27-plet, three gauge octets from an adjoint 78-plet and a flavour octet, all belonging to a common fundamental 246-plet of E8. Unlike older realizations, the new flavour symmetry forbids leptons from acquiring tree-level masses naturally suppressing them from the GUT scale. Besides gauge coupling unification we also predict novel features such as top-bottom-tau Yukawa unification alongside with Higgs-lepton unification, which are only possible in supersymmetric realizations of the trinification model.

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