Contribution ID: **27**   Type: **not specified**

Theory and phenomenology of Flavoured Trinification

Wednesday, 10 April 2024 16:30 (30 minutes)

Given the tremendous phenomenological success of the Standard Model (SM) framework, it becomes increasingly important to understand to what extent its specific structure dynamically emerges from unification principles. In this talk, I will discuss an anomaly-free supersymmetric (SUSY) Grand Unification model based upon gauge trinification SU(3)ˆ3 symmetry and a local SU(2) x U(1) family symmetry, with particle spectra and gauge symmetries inspired by a possible reduction pattern E_8 -> E_6 x SU(2) x U(1), with subsequent E_6 -> SU(3)ˆ3 symmetry breaking step. In this framework, higher-dimensional operators of E_6 induce the threshold corrections in the gauge and Yukawa interactions leading, in particular, to only two distinct Yukawa couplings in the fundamental sector of the resulting SU(3)ˆ3 x SU(2) x U(1) Lagrangian. Among the appealing features emergent in this framework are the Higgs-matter unification and a unique minimal three Higgs doublet scalar sector at the electroweak scale as well as tree-level hierarchies in the light fermion spectra consistent with those observed in nature. In addition, I will overview interesting phenomenological prospects for New Physics searches at particle colliders and for neutrino physics.

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Session Classification: Plenary