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The Techni-Pati-Salam Model

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Composite Higgs models can be extended to the Planck scale by means of the partially unified partial compositeness (PUPC) framework. We present in detail the Techni-Pati-Salam model, based on a renormalizable gauge theory SU(8)×SU(2)L×SU(2)R. We demonstrate that masses and mixings for all generations of standard model fermions can be obtained via partial compositeness at low energy, with four-fermion operators mediated by either heavy gauge bosons or scalars. The strong dynamics is predicted to be that of a confining Sp(4)HC gauge group, with hyper-fermions in the fundamental and two-index anti-symmetric representations, with fixed multiplicities. This motivates for Lattice studies of the Infra-Red near-conformal walking phase, with results that may validate or rule out the model. This is the first complete and realistic attempt at providing an Ultra-Violet completion for composite Higgs models with top partial compositeness.

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