

Preon model and family replicated E_6 unification

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Abstract

In the present talk we suggest a new preon model of composite quark-leptons and bosons constructed in the framework of the superstring-inspired ‘flipped’ $E_6 \times \widetilde{E}_6$ gauge symmetry group. Here E_6 and $\widetilde{E}_6$ are non-dual and dual sectors of the Chan-Tsou Yang-Mills theory with hyper-electric g and hyper-magnetic $\tilde{g}$ charges respectively. Following the old idea by J. Pati we assume that preons are dyons confined by hyper-magnetic $SU(6) \times U(1)$ strings which are $\mathbf{N} = 1$ supersymmetric non-Abelian generalization of the Abrikosov-Nielsen-Olesen flux tubes created by the condensation of spreons near the Planck scale. We consider preons belonging to the 27-plet of E_6 group of symmetry and show that the breakdown of E_6 and $\widetilde{E}_6$ near the Planck scale into the $SU(6) \times U(1)$ and $\widetilde{SU}(6) \times \widetilde{U}(1)$ gauge groups respectively leads to the creation of the six types of strings having fluxes $\Phi_n = n\Phi_0$ ($n = \pm 1, \pm 2, \pm 3$) which produce three (and only three) generations of composite quark-leptons and bosons. Having the three generations of composite gauge bosons (‘hyper-gluons’) the model predicts the existence of the family replicated gauge group $[E_6]^3$ near the Planck scale which at lower scale can undergo the breakdown to the ‘AntiGUT theory’ $[SMG \times U(1)]^3$ developed by H.B. Nielsen and his collaborators (here SMG is the Standard Model gauge group of symmetry $S(3) \times SU(2) \times U(1)$). The model explains the hierarchies of masses in the Standard Model naturally.

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