

Joint seminar of the NPI of the CAS

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Electroweak gauge model with ultimately calculable quark and lepton masses and with theory-enforced astro-particle physics sector

Weakly coupled Higgs sector of the electroweak gauge $SU(2)_L \otimes U(1)_Y$ model is replaced by the chiral gauge $SU(3)$ quantum flavor (family) dynamics (QFD), strongly coupled at the astro-particle scale Λ : (i) All chiral SM fermions transform as flavor triplets; (ii) anomaly freedom demands addition of one triplet of sterile right-handed neutrinos ν_{Ri} .

I. Three exponentially small Dirac masses m_f , vacuum condensates of the SM-fermion-composite doublets, strictly prohibited by $SU(2)_L \otimes U(1)_Y$, are **spontaneously** generated by QFD. They should be the calculable multiples of Λ : (i) three composite 'would-be' NG bosons give rise to the W and Z boson masses proportional to the fermion masses. (ii) There is the composite Higgs boson h as the symmetry partner of three 'would-be' NG bosons in the multi-component SM fermion-composite doublet. We suggest to compute the fermion mass splitting of SM fermion species within flavors in terms of their weak hypercharges and the ratios $m_f/m_{W,Z}$ by *the dynamical EW perturbation theory* of Pagels and Stokar.

II. Three Majorana masses $M_f \sim \Lambda$, vacuum condensates of the ν_{Ri} -composite $SU(3)$ sextet, strictly prohibited by $SU(3) \otimes U(1)$, are **spontaneously** generated by QFD. They should be the calculable multiples of Λ . (i) All eight flavor gluons acquire self-consistently the huge masses (QFD of SM fermions is therefore negligibly weak). (ii) There are three superheavy ν_{Ri} -composite Higgs bosons χ_i , and one ν_{Ri} -composite pseudo NG Majoron η_M , the symmetry partners of eight 'would-be' NG bosons in the ν_{Ri} -composite sextet. Remarkably, the whole sector of electroweakly sterile ν_{Ri} interacting by QFD has the natural use for the description of the early Universe.