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Institute of Physics
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Invitation

to the seminar of Division of Elementary Particle Physics of the
Institute of Physics of the Czech Academy of Sciences



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

Abstract: Weakly coupled Higgs sector of the electroweak gauge $SU(2)_L \times U(1)_Y$ model is replaced by the chiral gauge $SU(3)$ quantum flavor (family) dynamics (QFD) with the only parameter, the astro-particle scale Λ . Anomaly freedom demands addition of one triplet of sterile right-handed neutrinos ν_{fR} . We demonstrate: I. Three exponentially small Dirac masses m_{f} , strictly prohibited by $SU(2)_L \times U(1)_Y$, are spontaneously generated by QFD. They should be the calculable multiples of Λ . Consequently: (i) The W and Z bosons acquire masses proportional to the fermion masses m_{f} . (ii) There is the SM-fermion-composite Higgs boson h. The fermion mass splitting of SM fermion species within flavors is calculable in terms of their weak hypercharges and the ratios $m_{\text{f}}/m_{\text{W,Z}}$ by the *dynamical EW perturbation theory* of Pagels and Stokar. II. Three Majorana masses $M_{\text{f}} \sim \Lambda$, strictly prohibited by $SU(3) \times U(1)$, are spontaneously generated by QFD. They should be the calculable multiples of Λ . Consequently: (i) All eight flavor gluons acquire self-consistently the huge masses. (ii) There are three superheavy ν_{fR} -composite Higgs bosons χ_{b} , and one ν_{fR} -composite pseudo NG Majoron η_{M} . Remarkably, the whole sector of electroweakly sterile ν_{fR} interacting by QFD has the natural use for the description of the early Universe.

When: Thursday, March 7, 2024 at 2PM

Where: Main conference hall, Institute of Physics, Na Slovance 2, Prague 8

For more information, please see <https://indico.fzu.cz/event/241/>