

MHDM's and Singular Alignment

Tuesday, 1 October 2019 17:30 (12 minutes)

We will talk about a novel way to avoid FCNC's at tree level in any multi-scalar extension of the Standard Model. This approach called Singular Alignment consists in taking all Yukawa matrices to be singularly aligned in flavor space. We mean by this that the Yukawa matrices are given as linear combinations of the rank 1 matrices that appear in the singular value decomposition of the mass matrix. We then discuss the application of this alignment to a 4-Higgs-doublet model in which each Higgs doublet gives mass to one of the fermion sets $\{m_t\}$, $\{m_b, m_\tau, m_c\}$, $\{m_\mu, m_s\}$, and $\{m_d, m_u, m_e\}$. The sets have the feature that within each of them the masses are similar. Our model explains the mass hierarchies of the sets by hierarchies of the vacuum expectation values of the Higgs doublets associated to them. All Yukawa couplings are therefore of order one. Neutrino masses could be generated by a type-I seesaw mechanism with PeV-scale singlet neutrinos. Finally, we provide the smoking gun for testing the realization of this model in nature.

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