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Yukawa Alignment in a Multi Higgs Doublet Model: An effective approach

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In the two Higgs doublet model, natural flavour conservation can be achieved through the use of a discrete Z2 symmetry. A less restrictive condition is the requirement of alignment in the Yukawa sector. So far, alignment has been an anzatz, not rooted in a specific model. In this letter we present a model for alignment, which starts with 2+N Higgs doublets, with natural flavour conservation imposed by a discrete symmetry. Only two of these scalars couple to the fermions, the other N scalars are in a hidden sector. Assuming that the two scalar doublets coupled to fermions are heavy, their decoupling leads to an effective Yukawa interaction. The latter connects the fermions and the scalars of the hidden sector, and exhibits the same Yukawa coupling matrix for each of the N scalars.

Author: SERODIO, Hugo (CFTP-IST)

Presenter: SERODIO, Hugo (CFTP-IST)

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