Contribution ID: **27** Type: **20 minutes talk**

Higgs-like resonant signals in a no-universal 2HDM.

Friday 6 December 2024 11:40 (25 minutes)

We study the possibility of obtaining the Standard Model (SM) of particle physics as an effective theory of a more fundamental
one, whose electroweak sector includes two non-universal local $U(1)$ gauge groups, with the chiral anomaly cancellation taking place through an interplay among families. As a result of the spontaneous symmetry breaking, a massive gauge boson Z' arises, which couples differently to the third family of fermions (by assumption, we restrict ourselves to the scenario in which the Z' couples in the same way to the first two families). Two Higgs doublets and one scalar singlet are necessary to generate the SM fermion masses and break the gauge symmetries.
We show that in our model, the flavor-changing neutral currents (FCNC) of the Higgs sector are identically zero if each right-handed SM fermion is only coupled with a single Higgs doublet. This result represents a FCNC cancellation mechanism different from the usual procedure in Two-Higgs Doublet Models˜(2HDM).
The non-universal nature of our solutions requires the presence of three right-handed neutrino fields, one for each family. Our model generates all elements of the Dirac mass matrix for quarks and leptons, which is quite non-trivial for non-universal models. Thus, we can fit all the masses and mixing angles with two scalar doublets. Finally, we show the distribution of solutions for the scalar boson masses in our model by scanning well-motivated intervals for the model parameters. We consider two possibilities for the scalar potential and compare these results with the Higgs-like resonant signals recently reported by the ATLAS and CMS experiments at the LHC.
Finally, we also report collider, electroweak, and flavor constraints on the model parameters.

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Session Classification: Beyond the Standard Model