Contribution ID: **46** Type: **Parallel session**

3HDM with a CP symmetry of order 4: a phenomenological update

Thursday, 30 November 2023 11:20 (15 minutes)

Unsatisfied with model-building opportunities offered by the 2HDM or singlet extensions, many researchers turn to more elaborate Higgs sectors. 3HDMs offer to a bSM model-builder many novel options absent in the 2HDM. One of them is CP4, the CP symmetry of order 4, physically distinct from the usual CP. Imposing CP4 on the 3HDM leads to remarkable connections between the scalar and Yukawa sectors and unavoidably generates tree-level flavor-changing neutral couplings (FCNC). In this talk, I will report on our study of whether and how FCNCs can be sufficiently suppressed in the CP4 3HDM to agree with neutral meson oscillation parameters. Out of the eight possible CP4 Yukawa sectors, only two scenarios are found to be compatible with the K, B, Bs and, in particular, D-meson oscillation constraints. I will present the results of a parameter space scan which produced benchmark models with intriguing phenomenology.

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Session Classification: Parallel: BSM