

Limiting FCNC induced by a CP symmetry of order 4

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CP4 3HDM is a three-Higgs-doublet model based on the CP symmetry of order 4 (CP4). Imposing CP4 leads to remarkable connections between the scalar and Yukawa sectors and unavoidably generates tree-level flavor-changing neutral couplings (FCNC). It remains unclear whether FCNC can be sufficiently suppressed in the CP4 3HDM. In this paper, we systematically explore this issue. We first develop an efficient scanning procedure which takes the quark masses and mixing as input and expresses the FCNC matrices in terms of physical quark observables and quark rotation parameters. This procedure allows us to explore the FCNC effects for all the Yukawa sectors possible within the CP4 3HDM. We find that, out of the eight possible CP4 Yukawa sectors, only two scenarios are compatible with the K, B, Bs and, in particular, D-meson oscillation constraints. The results of this work serve as clear guidelines for future phenomenological scans of the model.

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