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Interferences in the quark sector of the general 2HDM from flavour physics

The general 2HDM allows for off-diagonal flavour violating couplings in the quark sector which are strongly constrained by experiments in traditional 2HDMs. We study how the allowed parameter space of the general 2HDM changes once interactions between 1-3 and 2-3 quark generations are included, generating new interference terms in the one loop diagrams relevant for meson mixing constraints and radiative decays. We show that this interference effect plays a crucial role in simultaneously fitting those constraints and the so-called charged current flavour anomalies. These couplings can be probed and further constrained by current and future measurements by the ATLAS detector via multi-top decay searches with multi-lepton and b-tagged jets.

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