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Cabibbo-Kobayashi-Maskawa matrix phase from top-bottom quark components of bosons in a fermion basis, within the standard model

Within the CKM phenomenological matrix, the class of unmixed quarkfield phase transformations to the top-bottom phase give around $\pi/2$. This value is derived from 1) electroweak and heavy-quark mass connections [Phys. Rev. D 99, 073001 (2019)] through the common Higgs operator, as the boson fields' discrete degrees of freedom can be equivalently represented in terms of the fermions', given Lorentz and gauge symmetries, and 2) a quantized formulation; fixing the Higgs vacuum expectation value, top-bottom orthogonal consistent configurations favor that phase value and mass hierarchy.

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