

Title: Models with three Higgs doublets in the triplet representations of A(4) or S-4

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Abstract: We consider the quark sector of theories containing three scalar SU(2)(L) doublets in the triplet representation of A(4) (or S-4) and three generations of quarks in arbitrary A(4) (or S-4) representations. We show that for all possible choices of quark field representations and for all possible alignments of the Higgs vacuum expectation values that can constitute global minima of the scalar potential, it is not possible to obtain simultaneously nonvanishing quark masses and a nonvanishing CP-violating phase in the Cabibbo-Kobayashi-Maskawa quark mixing matrix. As a result, in this minimal form, models with three scalar fields in the triplet representation of A(4) or S-4 cannot be extended to the quark sector in a way consistent with experiment. DOI: 10.1103/PhysRevD.87.055010.

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