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An 3HDM with S_3 symmetry, dark matter and two inert doublets without FCNC

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We propose a new mechanism to suppress the flavor changing neutral currents in a three-Higgs doublet extension of the standard electroweak model. This mechanism has three ingredients: i) The three SU(2) Higgs scalar doublets transform as the reducible representation triplet of the discrete S_3 symmetry that breaks to the irreducible representations, a doublet and a singlet; ii) an appropriate vacuum alignment and, iii) fermions transform as singlets of S_3 . The mass matrices in both, neutral and charged scalar sectors, have the same form and are diagonalized by the same unitary matrix. In some cases the latter matrix is of the tribimaximal type. However, the natural

suppression of the flavor changing neutral processes does not depend on the form of this matrix.

We also consider in these model that due to the new charged scalars there is an enhancement in the two-photon decay while the other channels have the same decay widths that the SM neutral Higgs. Finally, considering the introduction of right-handed neutrinos we can have good dark matter candidates.

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