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Some Aspects of Symmetry Constrained Multi-Higgs Models

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The Higgs particle was predicted in 1964 and discovered at CERN on July 2012, earning Higgs and Englert the 2013 Physics Nobel Prize. This is a spin zero particle (scalar), necessary to give masses to all the other massive particles in the Standard Model of Electroweak interactions. But, there is no fundamental reason why there should be only one such scalar. Thus, as one achieves a more precise determination of the properties of the new particle, one should look for which signals there would be of extra particles; the so-called multi-Higgs theories. We study a 3HDM with softly broken A4 terms in the scalar potential and show that it allows for an excellent fit of quark mass matrices, consistent with the vacuum being a global minimum of the scalar potential.

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