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Scalar Mixing in New Physics Models

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The discovery of the Higgs boson in 2012 was an important achievement in particle physics. This scalar particle is essential in the Standard Model to explain the mass of the other particles. However, there is nothing in the theory that restricts the scalar sector of the Standard Model to have only one particle. Therefore, theoretical physicists are trying to understand what are the consequences of adding more particles to this part of the Standard Model and if this extensions are in agreement with the experimental data.

A formalism was developed by Grimus and Neufeld to work with a general model where an arbitrary number of scalar singlets and doublets are added to the scalar sector of the Standard Model. In my thesis I will first extend this formalism to work also with models with scalar triplets and, on a second stage, I will compute some physical observables using this extended formalism.

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