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On Flavour Invariants of the N Higgs Doublet Model

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The Standard Model (SM) of particles physics is the best description of Nature at the most fundamental level we currently have. Nevertheless, it does not account for the dark matter content of the Universe, it does not explain the matter anti matter asymmetry observed, and, in its simplest form, does not account for neutrino masses. As such, and to try and solve some of these problems, one solution may be to extend the SM with new particles and interactions. The N Higgs Doublet Model (NHDM) is one example of such extensions.

In the most general NHDM, there are flavour changing neutral couplings between quarks and scalars in its flavour sector. These are known from experiment to be very small. So far, no systematic analysis of flavour physics has been developed for the NHDM. In this work, this will be done, by characterising the flavour sector of the NHDM in terms of eigenvalue and mixing matrices akin to the mass matrices and CKM matrix of the SM. Furthermore, a description of the flavour sector of the NHDM will be provided in terms of flavour invariants, quantities that don't depend on the basis for the quarks.

Field of Research/Work

Particles and Fields

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