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Higgs boson physics and LHC phenomenology in an inverted-hierarchy flavor symmetry model

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\begin{abstract}
The LHC phenomenology of a low-scale gauged flavor symmetry model with inverted hierarchy is studied. A new scalar (a flavon) emerges with mass in the TeV range along with a new heavy fermion associated with the standard model top quark. After verifying the constraints from electroweak precision observables, we investigate the influence of the model on Higgs boson physics notably its production cross section and decay branching fractions. Limits on the flavon s from heavy Higgs boson searches at the LHC at 7 and 8 TeV are presented. The branching fractions of the flavon are computed as a function of the flavon mass and the Higgs-flavon mixing angle. We also explore possible discovery
of the flavon at 14 TeV, particularly the $s \to Z^0 Z^0$ decay channel in the $2\ell 2\ell'$ final state, and standard model Higgs boson pair production $s \to hh$ in the $b\bar{b}\gamma\gamma$ final state. We conclude that the flavon mass range up to 500 GeV could probed down to quite small values of the Higgs-flavon
mixing angle with 300 fb^{-1} of integrated luminosity at 14 TeV.
\end{abstract}

Summary

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