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Phenomenology of Composite 2-Higgs Doublet Models

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We investigate the phenomenology of Composite 2-Higgs Doublet Models (C2HDMs) of various Yukawa types based on the global symmetry breaking $SO(6) \rightarrow SO(4) \times SO(2)$. The kinetic part and the Yukawa Lagrangian are constructed in terms of the pseudo Nambu-Goldstone Boson (pNGB) matrix and a 6-plet of fermions under $SO(6)$. The scalar potential is assumed to be the same as that of the Elementary 2-Higgs Doublet Model (E2HDM) with a softly-broken discrete Z_2 symmetry. We first survey their parameter spaces allowed by theoretical bounds from perturbative unitarity and vacuum stability. We also investigate their parameter spaces allowed by experiments. We then discuss the phenomenological differences between the E2HDM and C2HDM by focusing on the deviations from Standard Model (SM) couplings of the discovered Higgs state (h) as well as on the production cross sections and Branching Ratios (BRs) at the Large Hadron Collider (LHC) of extra Higgs bosons. We also investigate single- and double- h , the discovered Standard Model (SM)-like Higgs boson, production at future e^+e^- colliders in Composite 2-Higgs Doublet Models (C2HDMs) and Elementary 2-Higgs Doublet Models (E2HDMs) with a softly-broken Z_2 symmetry.

Presentation type

Parallel talk

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