## Phenomenology 2025 Symposium



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## Uncovering Hidden Symmetries in 4HDM: New Tools and Classifications

Tuesday 20 May 2025 18:15 (15 minutes)

Multi-Higgs-doublet models (NHDMs) has been gaining increasing popularity in beyond Standard Model (BSM) research, and people have been using it to address problems like dark matter, fermion mass hierarchies, and neutrino mass. Among these, there is steady growing literature (reaching a hundred) discussing the Four-Higgs-Doublet Model (4HDM). Finite symmetries play a pivotal role in NHDMs, yet many studies in 4HDM rely on ad hoc choices due to the absence of systematic study of all global symmetry options. In this work, we present the first systematic classification of global symmetry groups in the 4HDM. We developed new purely group-theoretic and computational methods that go beyond the more widely-used representation theory. These methods enrich the toolbox for NHDM studies, and offer a new, purely group-theoretic perspective for exploring BSM phenomenology.

## Mini Symposia (Invited Talks Only)

Plenary (Invited talks only)

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Track Classification: Quark and Lepton Flavor Physics