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## Search for Dark Matter in 2HDM+complex singlet at LHC and future Lepton Colliders

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We investigate the phenomenological prospects of the Two Higgs Doublet and Complex Singlet Scalar Extension (2HDMS) in the context of dark matter (DM) and Higgs phenomenology. The 2HDMS provides an enlarged Higgs sector along with a DM candidate. In this work, we perform an exhaustive scan to find representative benchmarks which are consistent with all theoretical and experimental constraints. We choose benchmarks with light, intermediate and massive DM masses and in some cases, also accommodate the 95 GeV excess in  $b\bar{b}$  and  $\gamma\gamma$  channels observed at the Large Electron-Positron Collider (LEP) and Large Hadron Collider (LHC). We focus on the relevant signatures at the LHC and at proposed future lepton colliders, including electron-positron and muon colliders. Using a cut and count analysis, we show that while the High Luminosity LHC (HL-LHC) may give a hint of new physics, future lepton colliders prove to be efficient discovery probes for the 2HDMS.

## Secondary track

T02 - Dark Matter

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