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Dark Matter in the Three Higgs Doublet Model

Content :

Multi-scalar extensions of the Standard Model can accommodate a viable Dark Matter candidate and modification of Higgs decay rates. One of the simplest choices for the extended scalar sector is the Inert Doublet Model, i.e. the Standard Model with an additional inert scalar doublet. The IDM can be further extended by extra doublets or singlets, which may modify both DM- and collider phenomenology.

Dark Matter (DM), arising from an Inert Higgs Doublet, may either be light, below the W mass, or heavy, above about 525 GeV. While the light region may soon be excluded, the heavy region is known to be very difficult to probe with either DM direct detection experiments or the Large Hadron Collider (LHC). We show that adding a second Inert Higgs Doublet helps to make the heavy DM region accessible to both direct detection and the LHC, by either increasing its couplings to the observed Higgs boson, or lowering its mass to 360 GeV, or both.

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