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Dark Matter in scalar extensions of the Standard Model

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Multi-scalar extensions of the Standard Model can accommodate a viable Dark Matter candidate and modifications of the Higgs decay rates, particularly into two photons. 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. LHC measurements of the decay of the SM-like Higgs boson into two photons and PLANCK/WMAP results provide very strong constraints for the IDM. We discuss also further extensions of the scalar sector by additional singlets or doublets, which may modify the viable DM mass regions and allow for new phenomena not present in the IDM.

Summary

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