

Dark matter production in association with a single top-quark at the LHC in a two-Higgs-doublet model with a pseudoscalar mediator

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The sensitivity of the LHC experiments to the associated production of dark matter with a single top is studied in the framework of an extension of the standard model featuring two Higgs doublets and an additional pseudoscalar mediator. It is found that the experimental sensitivity is dominated by the on-shell production of a charged Higgs boson. Dedicated selections considering one and two lepton final states are developed to assess the coverage in parameter space for this signature at a centre-of-mass energy of 14 TeV. It is found that this novel signature highly complements the parameter space coverage of the mono-Higgs, mono-Z and $t\bar{t}+E_{\text{miss}}$ signatures considered in previous publications for this model.

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