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Search for Dark Matter produced in association with a Standard Model Higgs boson decaying to b-quarks using the full Run 2 collision data with the ATLAS detector

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This poster presents a search for Dark Matter produced in association with a Higgs boson decaying to b-quarks using the data corresponding to an integrated luminosity of 139/fb collected with the ATLAS detector in pp collisions at $\sqrt{s} = 13$ TeV at the Large Hadron Collider. The targeted events typically contain large missing transverse momentum and either two b-tagged small-radius jets or a single large-radius jet associated with two b-tagged subjects. No significant deviation from Standard Model expectations is observed. The results are interpreted in two benchmark models with two Higgs doublets extended by either a heavy vector boson Z' or a pseudoscalar singlet a and which provide a dark matter candidate χ . Significant improvements in sensitivity have been achieved with respect to previous results owing to optimized event selections as well as advances in the object identification, such as the use of the likelihood-based significance of the missing transverse energy and variable-radius track jets. In the case of the Two-Higgs-Doublet model with an additional vector boson Z' , the observed limits extend up to a Z' mass of 3.1 TeV at 95 % confidence level for a mass of 100 GeV for the Dark Matter candidate. For the Two-Higgs-Doublet model with an additional pseudoscalar a , masses of a are excluded up to 520 GeV and 240 GeV for $\tan\beta = 1$ and $\tan\beta = 10$ and a Dark Matter mass of 10 GeV, respectively. In addition, limits on the visible cross sections are set and range from to 0.05 fb to 3.26 fb, depending on the missing transverse momentum and b-quark jet multiplicity requirements.

In-person participation

Yes

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