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Exploring new physics in events with missing transverse energy and a Higgs boson decaying to two photons with the ATLAS detector

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The results of a search for new phenomena in events with missing transverse energy (MET) and a Higgs boson decaying to two photons are presented. Data from proton-proton collisions at a centre-of-mass energy of 13 TeV, corresponding to an integrated luminosity of 36.1 fb^{-1} have been collected with the ATLAS detector at the LHC in 2015 and 2016. The results of this search are interpreted in terms of a model in which a heavy scalar, denoted 'H', decays into the Higgs boson and dark matter candidates ($H \rightarrow h\chi\chi$). A model formulated based on inconsistencies in the Higgs boson transverse momentum distribution ($p_{T,H}$) measured by ATLAS and CMS as well as other excesses in the data. Limits were placed on the branching ratio of $H \rightarrow h\chi\chi$ using Run II data and the analysis is performed in several categories based on MET and MET significance and splitting into the same vertex method. The results from this search are discussed.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

PhD

Main supervisor (name and email) and his / her institution

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Would you like to submit a short paper for the Conference Proceedings (Yes / No)?

Yes

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