

Measurement of the Higgs Boson Transverse Momentum in the Di-photon Channel with the ATLAS detector

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The Standard Model (SM) of particle physics, with the discovery of the Higgs boson, is a complete model of the known fundamental particles and their interactions. The data taken in the 2012 run was then compared to the Monte Carlo and an excess has been found in the Higgs transverse momentum in the di-photon and ZZ decay channels. A possible explanation is a beyond the SM pseudo scalar boson is being produced which would then decay into a dark matter particle and a Higgs Boson that looks like the current SM. This dark matter particle would provide the Higgs with excess momentum which may account for the discrepancy observed. A first attempt at modelling the production of the heavier than the SM Higgs (or Pseudo scalar boson) showed that as the centre of mass energies increase the production cross-section of the Pseudo scalar increased faster than the SM Higgs boson. This indicates that if the hypothesis is true then we should expect greater Higgs boson productions during the 2015 run at higher centre of mass energies. A better understanding of the observed excess is needed before any further conclusions can be made.

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