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ATLAS VH(bb) Run II Search

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The Higgs boson discovered at LHC in 2012 has been observed coupling directly to W and Z bosons and tau leptons, and indirectly to top quarks. In order to probe if it is indeed the particle predicted by the Standard Model (SM), or by a theory beyond the SM, direct couplings of Higgs boson to quarks must also be measured and compared with the SM prediction. From all quarks, the Higgs boson decays most often to a pair of bottom quarks (58% of times). When the Higgs boson signal is produced alone in gluon-gluon fusion, the signal (S) is overwhelmed by the regular multi-jet background (B) produced in the SM. By requiring the Higgs boson to be produced in association to a vector (W or Z) boson, which is required to decay leptonically, data events can be selected using charged-lepton triggers. This enhances greatly the S to B ratio. For the VH(bb) search, the combined Tevatron 2012 results presented evidence of its existence with 3 standard deviation (σ) excess, while ATLAS and CMS using Run I LHC data saw in 2014 data excesses on the order of 2 σ . In this poster we present the ATLAS VH(bb) search using Run II data. The analysis uses both the regime where the two b-jets are reconstructed separately, and the regime where they merge into a large radius jet at high Higgs candidate transverse momentum.

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