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Measurement of the properties of Higgs boson in two photon final state in ATLAS

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The measurements of the Higgs bosonproperties are performed in Higgs decaying into two photons channel after the discovery. The gluon-gluon fusion, the vector boson fusion, the Higgs production in association with a W or Z boson or a top-quark pair are measured in this final state. The multivariate analysis (MVA) method is applied to extract the Higgs boson in the vector boson fusion enriched category to enhance the signal significance. The couplings of the each production modes are measured using 20.3\,fb^{-1} 2012 data taken at $\sqrt{s}$\,=\,8\,TeV and 4.5\,fb^{-1} 2011 data taken at $\sqrt{s}$\,=\,7\,TeV in the ATLAS detector. No significant deviations from the predictions of the Standard Model are found.

The measurements of the fiducial and differential cross sections are performed for Higgs boson production using 2012 data in this final state as well. The distribution of several kinematic variables of the two photons and jets are studied. The observed signals are extracted from the data and unfolded to the truth level. The results are compared with the several theoretical Higgs boson production mechanisms.

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