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Measurement of the $ZZ(^*)$ and $Z\gamma$ production cross section at 8 TeV and 13 TeV and limits on anomalous triple gauge couplings with the ATLAS detector (15' + 5')

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Measurements of the cross sections of the production of pairs of electroweak gauge bosons at the LHC constitute stringent tests of the electroweak sector of the Standard Model and provide a model-independent means to search for new physics at the TeV scale.

The ATLAS collaboration has measured inclusive and differential cross sections of the production of ZZ pairs in final states with four charged leptons using data corresponding to 20.3 /fb at a centre-of-mass energy of 8 TeV and data corresponding to 3.2 /fb at a center-of-mass energy of 13 TeV. The studies at 8 TeV are extended to the final state of two charged leptons and two neutrinos, which enhances the acceptance at high transverse momentum. The ATLAS collaboration has also carried out detailed measurements of integrated and differential cross sections of the production of a Z boson in association with an isolated photon using data corresponding to 20.3 /fb at a centre-of-mass energy of 8 TeV. These measurements are carried out in Z boson decays to both charged lepton pairs and neutrinos. These measurements are compared to calculations at NNLO in pQCD and provide constraints on new physics, by setting limits on anomalous triple gauge couplings.

The ATLAS collaboration has also carried out the analysis of the inclusive four-lepton lineshape measurement in the 8 TeV data. The study focuses on the differential cross section as a function of the 4-lepton mass spectrum ranging from 80 to 1000 GeV where several distinct physics processes give rise to the production of 4-lepton final state.

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