

Measurement of Vector Boson plus Jet Production Cross Sections and Dark Matter Interpretation with the ATLAS Detector

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A measurement of Z boson plus jet, W boson plus jet and photon plus jet production at high transverse boson momentum in proton-proton collisions at $\sqrt{s} = 13$ TeV is presented. The measurement is performed using data collected with the ATLAS detector at the Large Hadron Collider with an integrated luminosity of 139 fb^{-1} . Differential cross sections are measured for final states with the Z boson decaying to a pair of neutrinos or a pair of oppositely charged electrons or muons, the W boson decaying to an electron-neutrino or a muon-neutrino pair and for final states containing at least one photon. Both a monojet-like and a vector boson fusion topology are measured.

The measured cross sections are compared to Sherpa predictions at next-to-leading order in QCD and the agreement with the Standard Model is evaluated in a goodness-of-fit test. The measured cross sections are also interpreted in the context of beyond the Standard Model physics and can be used to set exclusion limits on a large number of new physics models. Improved exclusion limits are presented for a model predicting pair production of weakly interacting Dark Matter.