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# A Measurement of the W/Z Cross Section Ratio as a Function of Hadronic Activity with the ATLAS Detector



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Abstract
Hadronic collisions at the LHC at CERN probe particle interactions at the highest energy scale of any experiment to date. We present a research program measuring $R_{jet}$ = &sigma$_W$BR(W&rarr&mu&nu) / (&sigma$_Z$BR(Z&rarr&mu&mu)) as a function of a number of hadronic variables. The measurements are performed with the ATLAS detector at the LHC, using the 2011 data set, consisting of 4.64 fb-1 of pp collisions at a center of mass energy of 7 TeV. This measurement is a robust way to test the Standard Model and the modeling of perturbative QCD, and is sensitive to a wide variety of possible new physics in events with high jet $E_T$, including some variations of Supersymmetry. By taking the ratio of W/Z production, a large number of systematic uncertainties cancel, including those associated with luminosity, jet energy scale and resolution, and many theoretical uncertainties.

The measurement of $R_{jet}$ is performed as a function of the $p_T$ and rapidity

of the 1st-4th leading jet, $S_T$, $H_T$, and a number of dijet variables, including invariant mass and angular separations. The measurements are compared with NLO theoretical predictions from Blackhat+Sherpa, as well as using leading order simulations from Alpgen and Sherpa. Over most of the kinematic phase-space, there is good agreement between the data and theoretical predictions. There is a significant deviation for exactly one selected jet above 30 GeV, where Blackhat+Sherpa over-estimates the ratio $R_{jet}$ by 12%.