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Measurement of Z bosons produced in association with jets via vector boson fusion at 13 TeV with the ATLAS detector (student talk)

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At the large hadron collider, most Z bosons are produced in a $q\bar{q}Z$ vertex, sometimes in association with jets produced via the strong interaction. A more rare production mode for Z bosons is through a triple gauge coupling via a process called vector boson fusion (VBF). This VBF Z process is similar in nature to VBF Higgs production, which is of great interest and is being studied by large groups of physicists on the ATLAS and CMS experiments. VBF Z production is interesting in its own right as a probe for new physics via the triple gauge coupling. Measurements of the cross section and kinematic distributions of VBF Z production can also be used to constrain new physics scenarios, such as fits to an effective field theory extension of the Standard Model Lagrangian. An analysis of the standard model VBF Z process is ongoing, the general structure of the analysis will be discussed along with details of the systematic variations and pileup contamination of the Monte Carlo (MC) simulation. The VBF signal is measured by extrapolating between carefully chosen regions of phase space to best model signal and background distributions. Understanding the MC simulation is crucial to making an accurate final measure of the VBF Z cross section.

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