

VBS measurement in semileptonic final states with ATLAS Run-2 data

Vector boson scattering (VBS) processes probe the fundamental structure of electroweak (EW) interactions and provide a high sensitivity to new physics phenomena affecting gauge and Higgs couplings. The semileptonic final states, where one of the scattered EW boson decays hadronically into a quark/antiquark pair and the other boson decays leptonically into electrons, muons or neutrinos, has high statistics in the WW, WZ and ZZ processes. The hadronically decaying gauge boson can be reconstructed as two small-radius jets or one large-radius jet in case of high boost. An ATLAS Run-2 analysis using 140/fb of proton collisions at a center-of-mass energy of 13 TeV allowed to observe EW diboson production accompanied with jets in semileptonic final states for the first time and to measure its fiducial cross section. The results are also interpreted in an Effective Field Theory (EFT) framework to set competitive constraints on anomalous Quartic Gauge Couplings (aQGC) through dimension-8 operators, benefiting from the boosted regime and the high statistics provided by the semileptonic final states

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