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Search for vector boson scattering production of VW pairs in the semi-leptonic channel at CMS

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The search for the electroweak VBS production of a VW pair plus two jets in the semi-leptonic final state is presented. The full CMS dataset (137.1 fb-1) for the LHC Run II of proton-proton collisions at a center-of-mass energy of 13 TeV is analyzed. In the final state, we expect two well-separated jets with a high invariant mass, one lepton from the W boson decay, and the decay products of the W/Z boson. Jets arising from the hadronic decay of vector bosons could be reconstructed either as two additional jets, with invariant mass near the W/Z mass, or as one jet with a larger radius in the case of a boosted decay. The main background arises from the single W production plus jets, which is measured in dedicated control regions with a data-driven strategy. The implementation of sophisticated machine learning techniques enhances the discrimination of the signal from these overwhelming backgrounds.

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