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Vector Boson Scattering with Machine Learning in Boosted Topologies at CMS

Vector boson scattering (VBS) processes serve as a powerful probe for detecting potential deviations from the Standard Model (SM) of particle physics. Recently, there has been increasing interest in studying VBS, with a particular focus on incorporating the polarization states of the gauge bosons. While the reconstruction of fully leptonic final states is clearer, hadronic final states require a precise characterization of the final state topology.

At the CMS experiment, cutting-edge machine learning tools, such as ParticleNet and ParT, are employed to extract detailed jet properties, enabling more precise measurements of these processes. In this presentation, we will review the current status of VBS measurements, discuss the tools and techniques used at CMS, and outline our plans for the ongoing BOOST project (funded by Spoke2 - ICSC HUB) project, with a particular emphasis on VBS processes involving final states with jets in boosted topologies

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