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ssWW VBS Polarisation Measurement - ATLAS

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In 2023, the ATLAS experiment published the first differential cross-section measurement of same-charged W-boson scattering –an essential process for understanding electroweak symmetry breaking. Since W-bosons gain their mass and, consequently, their longitudinal polarization through the Higgs mechanism, studying the scattering of longitudinally polarized W-bosons offers a promising way to probe this mechanism and search for new physics beyond the Standard Model.

However, since W-bosons decay into a charged lepton and a neutrino, directly reconstructing their original polarization is not possible. To overcome this, the analysis presented in this talk employs neural networks to separate the longitudinal component of the same-charged W-boson scattering signal from other polarization states and background processes. This talk aims to give an overview of the analysis strategy and to discuss state of the art techniques used to include higher-order QCD and EW effects in the polarized signal prediction.

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