

Erik Bachmann – HEP Seminar – November 7, 2025
Dresden

Title: Evidence for longitudinal polarization in same-sign WW scattering with the ATLAS detector

Abstract:

The Standard Model leaves key questions unanswered, motivating sustained searches for physics beyond it. Due to larger datasets and improvements in the theoretical description, recent years have seen a surge of interest in vector boson polarization as a new avenue to probe the SM. Of particular interest is the scattering of longitudinally polarized vector bosons where, in the Standard Model, delicate gauge cancellations involving the Higgs boson are necessary to restore unitarity at high energies. As a result, the measurement of longitudinal VBS provides an independent probe of the spontaneous electroweak symmetry breaking mechanism and is commonly listed as one of the main goals for the HL-LHC.

Recently, ATLAS has reported the first evidence for longitudinal polarization in same-sign WW scattering as the first milestone in this endeavor. In this seminar, I will give an introduction to vector boson polarization, walk you through the main ingredients of the ATLAS analysis -- discussing the theoretical modelling, signal vs. background discrimination and the statistical analysis -- and give an outlook to the HL-LHC.