

Study of the Vector Boson Scattering $W^\pm W^\pm$ production at $\sqrt{s} = 13.6$ TeV

Thursday, 18 December 2025 09:15 (60)

In this seminar, I will present a study of Vector Boson Scattering (VBS) at the Compact Muon Solenoid (CMS) experiment at CERN, focusing on same-sign $W^\pm W^\pm$ scattering and its sensitivity to physics beyond the Standard Model. The analysis targets the leptonic final state with two same-sign charged leptons, two neutrinos, and two forward tagging jets, providing a clean handle on the electroweak nature of VBS and its characteristic event topology. I will outline the main experimental challenges, emphasizing the dominant background contributions and the strategies used to control them — particularly reducible backgrounds from non-prompt leptons, which are among the most significant sources of contamination. I will also present the expected cross-section measurements for this channel. Finally, I will introduce the interpretation within the Standard Model Effective Field Theory (SMEFT) framework, highlighting some preliminary results from the phenomenology part of my project, and conclude with an outlook on future SMEFT studies.

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