same-sign WW scattering

main objective

- full exploitation of SSWW VBS channel with LHC Run 3
  - differential measurements
  - rigorous EFT treatment
  - use of ML techniques

Objectives

- Despite its low production cross-section, same-sign (SS) WW scattering is one of the most promising channels because of the very low irreducible background, so that it's the only final state, to date, where WBS has been observed at the LHC. This project will fully exploit LHC Run3 CMS data to perform differential cross-section measurements, to constrain higher dimension BSM effects in the EFT formalism and to find the first evidence of longitudinally-polarised WBS, with a large improvement wrt current projections thanks to the application of deep learning techniques. After understanding the physics case and a first data recognition in the first months of the PhD, the ESR will spend three months in secondment at CERN, to develop with local ML HEP experts the analysis algorithms and apply them to the dataset collected by the LHC. During a secondment at NVidia premises in the second year of PhD, she/he will work with ML algorithms on GPUs, and will then exploit this knowledge in the analysis itself. The project will terminate publishing the results, and actively participating in the overall combination of the single analyses results. Contact with the CMS Coll. will be ensured by frequent travels at CERN.

Secondments

- CERN
- Nvidia
- V. Sanz?