10th MEFT Workshop



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Searching for Higgs boson anomalous couplings with the ATLAS detector

There are many observed phenomena in Nature which the Standard Model of Particle Physics (SM), despite its successes, is not able to describe. One of the major questions left unaddressed by the SM is the observed asymmetry between matter and antimatter in the Universe. Violation of charge-parity (CP) symmetry in the Higgs boson sector is a well motivated way to address the discrepancy between theory and observation, and requires precise measurements of the Higgs boson couplings. In fact, after the Higgs boson discovery, one of the main goals of the Large Hadron Collider (LHC) is to precisely measure its properties, in the quest to find signs of new physics.

The Higgs boson is a particularly good probe for new physics given its unique characteristics and connection to the electroweak symmetry breaking mechanism. In this project, the student will join the LIP ATLAS team to search for anomalous couplings between the Higgs boson and the W boson, in the WH production channel. The student will explore new likelihood-free inference methods and apply them to this search for the first time, taking advantage of state-of-the-art machine learning to place powerful constraints on new physics.

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