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Search for the Higgs boson in the di-photon decay in association with intermediate missing energy with the ATLAS detector

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The ATLAS detector is a particle detector at the Large Hadron Collider (LHC) at CERN which is used to understand the Standard Model and to search for new physics. This is made possible through the production of highly energetic proton-proton collisions provided by the LHC. In Run I ATLAS reported the discovery of a “Higgs-like” particle through the detection of its decay products. The Higgs Boson plays a crucial role in the Standard Model, as it explains why elementary particles have mass. From the Run I data, the Higgs Boson transverse momentum spectrum does not seem to be completely consistent with the prediction from the Standard Model. This could be a hint of the production of a Higgs Boson in association with Missing Transverse Energy (MET). Missing energy is used to infer the presence of non-detectable particles such as the SM neutrino and Dark matter particles. For the upcoming Run II, the data will be analyzed using an improved MET definition. This new definition will be put in place to better fight the High Pileup and pave way for new physics discoveries. The status of the analysis for the search of the Higgs boson in association with intermediate MET using the di-photon decay is presented.

Apply to be considered for a student award (Yes / No)?

Yes

Level for award (Hons, MSc, PhD, N/A)?

Msc

Main supervisor (name and email) and his / her institution

Prof. Bruce Mellado

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Yes

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