

Improve event selection of $H \rightarrow l\bar{l}\gamma$ with Machine Learning

After finding evidence for the very rare Higgs decay to two leptons and a photon in 2021, we are now starting to re-optimize the analysis for the LHC Run 3. The previous analysis was completely based on rectangular cut-based selections and event classifications. We suggest having a summer student try out a BDT or NN to improve this. We would start with simulated samples, and with a simple ggF vs VBF classification to improve the sensitivity. Further categories and more realistic background can be added if there is time.

Breakdown: 90% physics, 10% computing

Field

B1: Particle physics analysis (software-oriented)

DESY Place

Hamburg

DESY Division

FH

DESY Group

ATLAS

Special Qualifications:

Prerequisites: Some coding experience.

Primary author: OJEDA, Martina Laura (ATLAS (ATLAS Higgs Physics))

Co-authors: STAPF, Birgit (ATLAS (ATLAS Higgs Physics)); HEIM, Sarah (DESY)