

Probing the Higgs self-coupling with the ATLAS Detector at the LHC

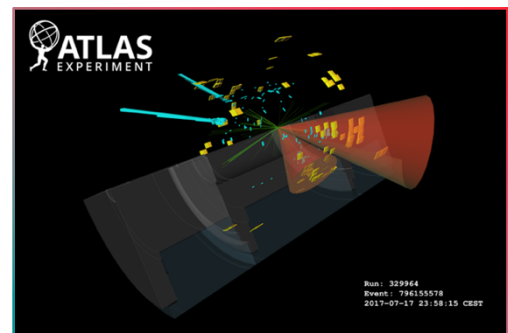
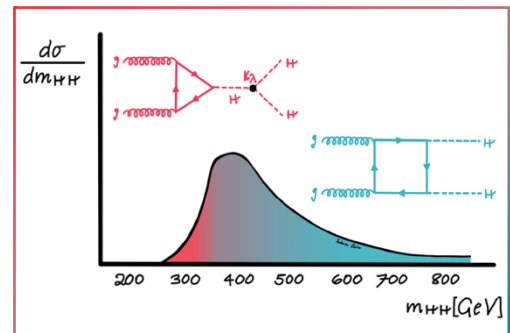
Dr. Valentina Cairo (SLAC National Accelerator Laboratory)

The post-Higgs discovery era has been characterized by an exciting physics programme targeting the investigation of the Higgs boson properties and couplings.

The Higgs self-coupling, which determines the shape of the Higgs potential, is one of the building blocks of the Standard Model of Particle Physics, directly connected to the electroweak symmetry breaking mechanism.

Probing the self-coupling is among the most important goals of the High-Luminosity phase of the Large Hadron Collider (LHC) experiments, but much can already be learned from the available Run 2 dataset and from the upcoming Run 3 data taking expected to start in 2022.

This talk will describe the state of the art of direct tests of the Higgs self-coupling with the ATLAS experiment via Higgs pair production, with emphasis on the $HH \rightarrow b\bar{b}\gamma\gamma$ final state and will describe the power of the High-Luminosity LHC to shed light on the determination of the Higgs self-coupling.



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About the speaker:

Dr. Cairo is an Experimental Particle Physicist currently working as Research Associate at SLAC National Accelerator Laboratory and about to join CERN as Research Staff. Before SLAC, she worked as a post-doctoral researcher for the State University of New York at Albany. She obtained her PhD in 2017 from the University of Calabria in Italy.



Dr. Cairo is a member of the ATLAS Collaboration at the Large Hadron Collider, where she is pursuing her research programme spanning from Quantum Chromodynamics to Higgs Physics. She is a leader in the field of Higgs pair production analyses for the direct investigation of the Higgs self-coupling. In this context, she is co-coordinating the ATLAS $HH \rightarrow b\bar{b}\gamma\gamma$ team. She is also an expert in the reconstruction of charged-particle trajectories and interaction vertices. Since 2020, she covers the role of co-convenor of the ATLAS Tracking group. At SLAC, Dr. Cairo is involved in the construction activities of the new silicon-only ATLAS Inner Tracker for the High-Luminosity phase of the LHC. Beyond LHC, her research includes Higgs Physics and detector technologies at future electron-positron machines.