

Hard Probes 2018: International Conference on Hard & Electromagnetic Probes of High-Energy Nuclear Collisions

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Observing the Higgs boson in ultraperipheral heavy-ion collisions at the LHC and FCC

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We present a study the two-photon production of the Higgs boson, $\gamma\text{-}\gamma\text{-}\rightarrow\text{H}$, at the LHC and Future Circular Collider (FCC) in ultraperipheral PbPb and pPb collisions at $\sqrt{s_{\text{NN}}} = 5.5, 8.8, 39$ and 63 TeV. Signal and background events are generated with MADGRAPH 5, including gamma fluxes from the proton and lead ions in the equivalent photon approximation, yielding $\sigma(\gamma\text{-}\gamma\text{-}\rightarrow\text{H}) = 18$ pb, 0.17 pb at the LHC and 1.75 nb and 1.5 pb at the FCC in PbPb and pPb collisions respectively. We analyse the $\text{H}\text{-}\rightarrow\text{b}\text{-}\bar{\text{b}}$ decay channel including realistic reconstruction efficiencies for the final-state b-jets, showered and hadronized with PYTHIA 8, as well as appropriate selection criteria to reduce the dominant exclusive $\gamma\text{-}\gamma\text{-}\rightarrow\text{b}\text{-}\bar{\text{b}}$ continuum background. Observation of the Higgs boson is achievable in the first FCC year with the expected PbPb integrated luminosities.

Summary

Authors: REBELLO TELES, Patricia (CBPF - Brazilian Center for Physics Research (BR)); E. MARTINS, Daniel; D'ENTERRIA, David (CERN)

Presenter: REBELLO TELES, Patricia (CBPF - Brazilian Center for Physics Research (BR))

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