

Higgs boson suppression in quark-gluon matter

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The final-state interactions of a Higgs boson with a dense quark-gluon medium are studied. The dominant Higgs-parton scattering processes, $g H \rightarrow g g, Q \bar{Q}$, have a total cross section $\sigma_{Hg} \approx 1\text{-}10\mu b$, in the kinematical range of relevance at current and future hadron colliders. Such medium-induced enhancement of the Higgs decays into a pair of jets leads to an effective depletion of its final visible yields in the standard $H \rightarrow \gamma\gamma, ZZ^*(4\ell)$ discovery channels, compared to the accurately known theoretical predictions for its production and decay in the absence of final-state interactions. By embedding a Higgs boson, with transverse momenta spectra computed at NNLO+NNLL accuracy, in a quark-gluon medium described by a 2D+1 viscous hydrodynamics expansion with the lattice-QCD equation of state, we present realistic estimates of the expected Higgs boson suppressed yields as a function of its transverse momentum p_T , and the total particle density in pp, pPb, and PbPb collisions at LHC and FCC energies. Yields suppressions of up to 15% are expected, mostly in the region p_T below 50 GeV.

Summary

Authors: D'ENTERRIA, David (CERN); LOIZIDES, Constantinos (ORNL)

Presenter: LOIZIDES, Constantinos (ORNL)

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