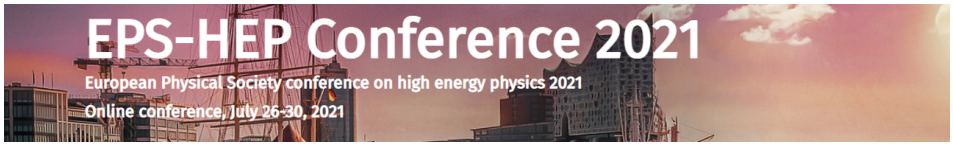

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Indirect CP probes of the Higgs–top-quark interaction: current LHC constraints and future opportunities

Tuesday 27 July 2021 16:40 (20 minutes)

The CP structure of the Higgs boson in its coupling to the particles of the Standard Model is amongst the most important Higgs boson properties which have not yet been constrained with high precision. In this study, all relevant inclusive and differential Higgs boson measurements from the ATLAS and CMS experiments are used to constrain the CP-nature of the top-Yukawa interaction. The model dependence of the constraints is studied by successively allowing for new physics contributions to the couplings of the Higgs boson to massive vector bosons, to photons, and to gluons. In the most general case, we find that the current data still permits a significant CP-odd component in the top-Yukawa coupling. Furthermore, we explore the prospects to further constrain the CP properties of this coupling with future LHC data by determining tH production rates independently from possible accompanying variations of the $t\bar{t}H$ rate. This is achieved via a careful selection of discriminating observables. At the HL-LHC, we find that evidence for tH production at the Standard Model rate can be achieved in the Higgs to diphoton decay channel alone.

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Collaboration / Activity

Phenomenological study

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