

Measurement of the CP properties of the Higgs boson in the decay into tau leptons with the Run 3 data of the CMS experiment

Stepan Zakharov, Alexei Raspereza, Elisabetta Gallo, Andrea Cardini¹

¹Deutsches Elektronen-Synchrotron DESY, Notkestraße 85, D-22607 Hamburg

Abstract

The Standard Model (SM) Higgs boson is predicted to be CP-even. Measurements from Run 2 data at the LHC have excluded a purely CP-odd state at 3 sigma. However, experimental results up to now do not exclude the possibility for the Higgs boson to be a mixture of a CP-even and a CP-odd states. The analysis of the Run 3 combined with the Run 2 data collected by the CMS experiment will allow to elucidate the CP nature of the SM Higgs boson. The Run 3 analysis is developed exploiting observables sensitive to CP in the decay of the Higgs boson to a pair of tau leptons using the Columnflow approach. This talk will cover the strategy of the analysis: starting from the theoretical motivation, discussing the main steps, and presenting first data and Monte Carlo comparisons for some observables with the 2022 datasets.