

Search for CP violation in the tau Yukawa coupling with CMS Run 3 data

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Abstract

Following the discovery of the Higgs boson in 2012 by the ATLAS and CMS Collaborations, studies are required to investigate its Charge-Parity (CP) properties in the Yukawa interaction with tau leptons. This talk presents an ongoing master's thesis in the μa_1 decay channel. Different reconstruction techniques are implemented in the μa_1 channel to enhance the sensitivity to the CP properties of the Higgs boson to investigate whether its properties are CP-even, CP-odd, or CP-mixed. The a_1 channel denotes the decay $\tau \rightarrow \nu_\tau \pi \pi \pi$. The data were collected with the CMS detector during 2022-2023 at $\sqrt{s} = 13.6$ TeV, corresponding to an integrated luminosity of 63 fb^{-1} .