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Measuring CP properties of Higgs boson interactions with τ leptons with the ATLAS detector

Wednesday, August 10, 2022 8:30 AM (15 minutes)

This poster will present a measurement of the charge conjugation and parity (CP) properties in the Higgs boson interaction with τ leptons. The Yukawa interaction is generalized with a single mixing angle parameter ϕ_τ to describe CP-odd interactions between the Higgs boson and τ leptons. The study is based on a measurement of CP-sensitive angular observables defined by the visible decay products of τ lepton decays, performed using a data sample corresponding to 139 fb^{-1} of proton–proton collisions recorded at a center-of-mass energy of $\sqrt{s}$= 13 TeV with the ATLAS detector at the Large Hadron Collider.
Without assuming Standard Model hypothesis for the $H \to \tau\tau$ signal strength,
the mixing angle ϕ_τ is measured to be $9 \pm 16^\circ$, with an expected value of $0 \pm 28^\circ$ at the 68\% confidence level.
The pure CP-odd hypothesis is disfavoured at 3.4 standard deviations.
The results are compatible with the predictions for the Higgs boson in the Standard Model as well as CP-violating scenarios.

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