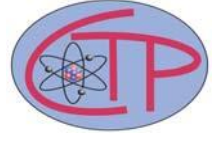




NEW YORK CITY COLLEGE OF TECHNOLOGY
Physics Department
Center for Theoretical Physics



Studying the CP nature of the Higgs couplings in $t\bar{t}H$ events at the LHC

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Thursday, December 1 at 12 noon
Namm, Room 823

The CP nature of the Higgs coupling to top quarks ($t\bar{t}H$) is studied in proton-proton collision events at a centre-of-mass energy of 13 TeV at the LHC. Pure scalar and pseudo-scalar Higgs boson signal events are generated with MadGraph5_aMC@NLO, and analysed in dileptonic final states with two oppositely charged leptons and four jets. These events are fully reconstructed by applying a kinematic fit. As a result, new angular distributions of the decay products as well as CP angular asymmetries are explored to separate the scalar from the pseudo-scalar components of the Higgs boson, which allows to reduce the contribution from the dominant irreducible background, $t\bar{t}b\bar{b}$. In addition, significant differences between the angular distributions and asymmetries are observed, providing new observables for a global fit of the Higgs couplings parameters.