Probing the CP nature of Higgs couplings in tth events at the LHC

MIGUEL FIOLHAIS, Borough of Manhattan Community College, CHRISTOPHER PEASE, City College of New York, City University of New York, ANTONIO ONOFRE, LIP, University of Minho — The CP nature of the Higgs coupling to top quarks (tth) 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, ttbb. In addition, significant differences between the angular distributions and asymmetries are observed, providing new observables for a global fit of the Higgs couplings parameters.