

Snowmass2021 - Letter of Interest

Higgs boson CP properties at CEPC

Thematic Areas: (check all that apply /■)

- (EF01) EW Physics: Higgs Boson properties and couplings
- (EF02) EW Physics: Higgs Boson as a portal to new physics
- (EF03) EW Physics: Heavy flavor and top quark physics
- (EF04) EW Precision Physics and constraining new physics
- (EF05) QCD and strong interactions: Precision QCD
- (EF06) QCD and strong interactions: Hadronic structure and forward QCD
- (EF07) QCD and strong interactions: Heavy Ions
- (EF08) BSM: Model specific explorations
- (EF09) BSM: More general explorations
- (EF10) BSM: Dark Matter at colliders
- (Other) [*Please specify frontier/topical group*]

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The CP properties of the Higgs boson and its anomalous couplings to gauge bosons in the presence of BSM physics, can be measured at CEPC using the production mode $e^+e^- \rightarrow Z^* \rightarrow ZH \rightarrow \mu^+\mu^-b\bar{b}$. Two of the anomalous HZZ coupling measurements are of particular interest: the fraction of the high-order CP-even contribution due to either SM contribution or new physics, f_{a2} , and the fraction of a CP-odd contribution due to new physics, f_{a3} . We will measure these couplings in terms of the angular distributions of the decay products. We will also explore the kinematics in the $H \rightarrow b\bar{b}$ decays and include other Z decay final states to improve the measurements.