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CEPC benchmark analyses: Higgs recoil analysis and Higgs width measurement (15' + 5')

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The CEPC collider is designed to be operated as a Higgs factory at the ~ 240 GeV center-of-mass energy. Comparing to the proton-proton collider, one of the most distinguishable advantage of such an electron-positron collider is the model-independent tagging of Higgs boson via the recoil mass method. This method allows absolute measurement of the couplings between Higgs boson and other most fundamental particles, and provides a very sensitive probe to the Higgs exotic decays. Benefitting from the recoil mass method applied on ZH events, the absolute widths of the Higgs boson can be measured to the percentage level at the CEPC. The Higgs boson width determination is complex as it requests the combination of many individual physics analyses. It involves the $H \rightarrow WW, ZZ$ branching fraction measurements, which demands an efficient identification and precise measurement of a full set of physics objects: isolated lepton, missing energy/momentum and jets.

This talk reports full simulation study of $e^+e^- \rightarrow ZH$ in CEPC to determine $\sigma(ZH)$, the mass of the Higgs, and the upper limits of the Higgs to invisible, leptonic and hadronic exotic final states. This talk also summarizes the status of the simulation study of the measurement of the Higgs boson widths at the CEPC. Preliminary results of the detector optimization towards these measurements will also be presented.

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