Contribution ID: **165** Type: **Parallel Sessions**

Electron Yukawa determination

Wednesday 20 October 2021 09:20 (10 minutes)

Measuring the electron Yukawa is impossible in Higgs boson decays, H -> e+e- , given the smallness of the electron mass that leads to a vanishingly small decay branching fraction. The only direct method to extract the Higgs-electron coupling is through resonant s-channel production in e+e- collisions running at the Higgs pole mass. Such a measurement is possible at the FCC-ee provided one can monochromatize the beams, leading to a center-of-mass energy spread not much larger than the Higgs boson width of ˜4 MeV, as well as having a prior accurate and precise knowledge of the Higgs boson mass, within MeV uncertainties. Under such conditions, a study combining 10 different Higgs decay modes indicates that a ˜1.3sigma significance for the e+e- -> H process can be reached, above the (much larger) backgrounds, for every 10 ab-1 of integrated luminosity per FCC-ee interaction point (IP). Depending on the number of IPs and years running at the Higgs pole, such a measurement will provide the only means known to access the electron Yukawa.

speaker known

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Session Classification: Parallel: Snowmass/Future colliders

Track Classification: Future colliders and experiments