



Contribution ID: 1026

Type: Parallel Talk

Higgs physics at the FCC: the stunning complementarity between ee and pp

Friday, 8 July 2022 14:45 (15 minutes)

The Future Circular Collider (FCC) is at the heart of the vision of the EU Strategy for Particle Physics, and the highest priority for Europe and its international partners. A technical and financial feasibility study of the 100-km infrastructure and of the colliders that would be installed in it is underway. The physics programme is based on the sequence of a 90-400 GeV high-luminosity and high-precision e+e- collider, FCC-ee, followed by a 100 TeV hadron collider FCC-hh including heavy ion and optionally e-p collisions. A main objective of the FCC is a full program of exploration of the properties of the Higgs boson, making full use of the complementarity of the various machines.

The FCC-ee fully uses the well-known centre-of-mass energy by using Z tagging to perform a model independent determination of the ZH cross-section at 240 GeV. This will serve a fixed candle for Higgs coupling measurements of the total width and of its ZZ, WW, bb, cc, tautau, gg decays and couplings at the FCC-ee, and similarly for the more rare gamma-gamma, mu+mu-, Zgamma final states at the FCC-hh. The measurements of top quark properties at FCC-ee will be instrumental in the measurements of the ttH coupling at the FCC-hh. The Higgs self-coupling which lays at the root of the Electroweak symmetry breaking will be determined from loop effects in the ZH cross-section at different energies, and in a different and complementary way from HH production at FCC-hh. Finally, the FCC-ee offers a unique opportunity to measure the electron Yukawa coupling by searching for the s-channel Higgs production. Thanks to the huge rate of Higgs production at FCC-hh, the invisible decay width will be determined at the sub permil level. Interestingly, the existence of a Yukawa coupling to the neutrinos would result in the existence of right-handed neutrinos that can be searched for extremely efficiently in Z decays at FCC-ee.

In-person participation

Yes

Primary author: D'ENTERRIA, David (CERN)**Presenter:** SELVAGGI, Michele (CERN)**Session Classification:** Higgs Physics**Track Classification:** Higgs Physics