Contribution ID: **259** Type: **Parallel**

Electroweak Precision Physics at the FCC-ee

Friday 11 July 2025 09:50 (20 minutes)

The electron-positron stage of the Future Circular Collider (FCC) will provide measurements of the Z and W bosons couplings and masses 1–3 orders of magnitude better than the present state-of-the-art. With the run around the Z pole, where the integrated luminosity is expected to be about six orders of magnitude larger than at LEP, the Z boson mass and width, as well as the $Z \to b\bar{b}$ partial width, and the forward-backward asymmetries for leptons and quarks will be measured with ppm-scale precision. As a result, the effective weak mixing angle and the electromagnetic coupling at the Z pole can be extracted with $O(10^{-5})$ relative uncertainties. Similarly, the 2×10^8 W boson pairs expected close to the threshold, will deliver top-notch precision determinations of the W boson mass and width at the level of few hundred keV. This new level of experimental accuracy requires a proactive study of accelerator operation and detector design beyond anything that has so far been achieved at colliders. Such studies have begun and welcome new ideas and participants. Via electroweak loop corrections or mixing of new physics with the SM particles, the indirect discovery potential for new weakly interacting particles extends up to energy scales of around 50 TeV, or down to couplings of 10^{-11}.

Secondary track

Author: KLUTE, Markus (KIT)

Session Classification: T06

Track Classification: T06 - Top and Electroweak Physics