

# QED challenges at FCC-ee precision measurements

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The expected experimental precision of the rates and asymmetries in the Future Circular Collider with electron positron beams (FCC-ee) in the energy range 88-365GeV considered for construction in CERN, will be better by a factor 5-200.

This will be thanks to very high luminosity, factor up to  $10^5$  higher than in the past LEP experiments.

This poses the extraordinary challenge of improving the precision of the Standard Model predictions by a comparable factor.

In particular the perturbative calculations of the trivial QED effects, which have to be removed from the experimental data, are considered to be a major challenge for almost all quantities to be measured at FCC-ee.

The task of this paper is to summarize on the “state of the art” in this class of the calculations left from the LEP era and to examine what is to be done

to match the precision of the FCC-ee experiments – what kind of technical advancements are necessary.

The above analysis will be done for most important observables of the FCC-ee like the total cross sections near  $Z$  and  $WW$  threshold, charge asymmetries, the invisible width of  $Z$  boson, the spin asymmetry from tau lepton decay and the luminosity measurement.

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