Contribution ID: **1064** Contribution code: **MOPM037** Type: **Poster Presentation**

FCC-ee optics tuning studies with pyAT and Xsuite

Monday 2 June 2025 16:00 (2 hours)

The FCC-ee is a future high-luminosity circular electron-positron collider aiming at achieving unprecedented luminosities with beam energies ranging from 45.6 up to 182.5 GeV. FCC-ee demands precise optics tuning to achieve its ambitious performance goals. This study investigates the tuning and correction of FCC-ee optics under simulated magnet misalignments, with a particular focus on the stringent initial alignment tolerances required in the Interaction Region (IR). Random misalignment errors were introduced, and correction algorithms were applied to recover the nominal lattice configuration using the pyAT optics framework. Post-correction dynamic aperture studies were conducted to assess the stability and resilience of the lattice under realistic operational scenarios. Benchmarking pyAT outcomes against the Xsuite framework validated the reliability and consistency of the corrections. The study offers valuable insights into alignment tolerance limits, correction methodologies, and their implications for beam dynamics, providing essential guidance for the development and operation of the FCC-ee.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

Author: JAGABATHUNI, Satya Sai (European Organization for Nuclear Research)

Co-authors: Dr CARLIER, Felix (Ecole Polytechnique Fédérale de Lausanne); LIUZZO, Simone (European Synchrotron Radiation Facility)

Presenter: JAGABATHUNI, Satya Sai (European Organization for Nuclear Research)

Session Classification: Monday Poster Session

Track Classification: MC1 :Colliders and Related Accelerators: MC1.A02 Lepton Circular Colliders