Contribution ID: **1352** Contribution code: **MOPM047** Type: **Poster Presentation**

Laser compton backscattering for precision beam intensity control in the FCC-ee electron-positron collider

Monday 2 June 2025 16:00 (2 hours)

In this study, we explore the application of laser-driven Compton backscattering (CBS) as a method to precisely adjust and regulate the intensity of colliding particle bunches in the Future Circular Collider (FCC-ee). Maintaining a tightly controlled charge balance between collision partner bunches within a 3–5% tolerance is critical for mitigating the impact of beamstrahlung on bunch length and preventing flip-flop instabilities. We present a realistic design for the CBS optical beamline and provide detailed simulation results that demonstrate its performance in the FCC-ee. Our analysis includes the distribution of scattered positrons, illustrating the feasibility of CBS for achieving the stringent intensity control requirements in this next-generation collider.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

Author: DREBOT, Illya (Istituto Nazionale di Fisica Nucleare)

Co-authors: ZIMMERMANN, Frank (European Organization for Nuclear Research); BROGGI, Giacomo (European Organization for Nuclear Research); GESSNER, Spencer (SLAC National Accelerator Laboratory); REDAELLI, Stefano (European Organization for Nuclear Research)

Presenter: DREBOT, Illya (Istituto Nazionale di Fisica Nucleare)

Session Classification: Monday Poster Session

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