Contribution ID: **1221** Contribution code: **MOPM049** Type: **Poster Presentation**

Longitudinal wakefield implementation in the circulant matrix model

Monday 2 June 2025 16:00 (2 hours)

The influence of longitudinal wakefields on the beam dynamics in electron-positron colliders, particularly their role in beam instabilities such as Transverse Mode Coupling Instability (TMCI) and other transverse-longitudinal effects, necessitates a robust approach to accurately model these effects. This work focuses on the implementation of wakefield effects in the Circulant Matrix Model (CMM), a linear model that can facilitate the representation of these instabilities. We study the impact of potential well distortion and synchrotron frequency shifts due to longitudinal wakefields for FCC-ee and implement these effects in the CMM. The implementation is benchmarked against reference multiparticle tracking simulations to validate its accuracy in predicting longitudinal wakefield-driven instabilities. Results enable further studies featuring longitudinal wakefields for collider designs and operating machines.

Footnotes

Paper preparation format

LaTeX

Region represented

Europe

Funding Agency

Author: SOOS, Roxana (Laboratoire de Physique des 2 Infinis Irène Joliot-Curie)

Co-authors: FAUS-GOLFE, Angeles (Université Paris-Saclay, CNRS/IN2P3, IJCLab); BUFFAT, Xavier (European Organization for Nuclear Research)

Presenter: SOOS, Roxana (Laboratoire de Physique des 2 Infinis Irène Joliot-Curie)

Session Classification: Monday Poster Session

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