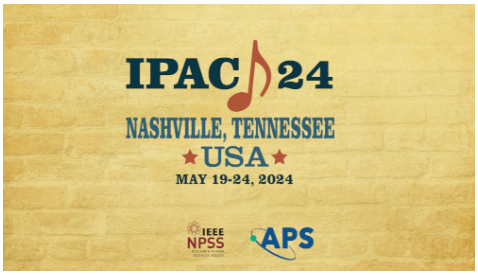

Contribution ID: **2197** Contribution code: **SUPG030** Type: **Poster Presentation**

Review of MAD-X for FCC-ee studies

Sunday, 19 May 2024 16:00 (2 hours)

The design of the electron-positron Future Circular Collider (FCC-ee) challenges the requirements on optics codes (like MAD-X) in terms of accuracy, consistency, and performance. Traditionally, MAD-X uses a transport formalism by expanding the transfer map about the origin up to second order to compute optics functions and synchrotron radiation integrals in the TWISS and EMIT modules. Conversely, particle tracking uses symplectic maps to propagate particles. These approaches solve the same problem using different approximations, resulting in a mismatch between the models used for tracking and for optics. While in a machine like LHC these differences are not relevant, for FCC-ee, given the size and the sensitivity to phase advance, the different approaches lead to important differences in the models. For instance, a tapering strategy that matches the tunes for optics needs to apply approximations that would mismatch the tune in tracking and vice versa. In this paper, we show the effectiveness of advanced methods that bring the maps used for optics and tracking closer and that will be used to reduce the gap between optics and tracking models to an acceptable level for FCC-ee studies.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Europe

Primary author: SIMON, Guillaume (European Organization for Nuclear Research)

Co-authors: FAUS-GOLFE, Angeles (Université Paris-Saclay, CNRS/IN2P3, IJCLab); VAN RIESEN-HAUPT, Léon (Ecole Polytechnique Fédérale de Lausanne); DE MARIA, Riccardo (European Organization for Nuclear Research); PIELONI, Tatiana (Ecole Polytechnique Fédérale de Lausanne)

Presenter: FAUS-GOLFE, Angeles (Université Paris-Saclay, CNRS/IN2P3, IJCLab)

Session Classification: Student Poster Session

Track Classification: MC5: Beam Dynamics and EM Fields: MC5.D11 Code Developments and Simulation Techniques