



Contribution ID: 1144 Contribution code: WEPR31

Type: **Poster Presentation**

Introducing a semi-Gaussian mixture model for simulating multiple coulomb scattering in RF-Track

Wednesday, 22 May 2024 16:00 (2 hours)

The deflection of charged particles in matter can be characterized by multiple-Coulomb scattering. Simulating the interaction of each particle with the Coulomb forces of the material is prohibitively time-consuming from a computational perspective. To address this, scientists have developed a scattering probability models, such as the Moliere model, which have seen refinements and contributions from various researchers over the past decades. In the context of a design study of a LINAC for ionization cooling, RF-Track has recently incorporated particle interactions with matter. This inclusion enables simulations for applications like ionization cooling channels for muon colliders and the design of machines for medical purposes. Within RF-Track, a novel Semi-Gaussian mixture model has been introduced to describe the deflection of charged particles. This innovative model comprises a Gaussian core and a non-Gaussian tail function to account for the effects of hard scattering. To validate the accuracy of our results, we conducted a benchmarking against other particle tracking codes, with the outcomes demonstrating a high level of agreement.

Footnotes

Funding Agency

Paper preparation format

LaTeX

Region represented

Europe

Primary author: STECHAUNER, Bernd (European Organization for Nuclear Research)

Co-authors: FRÜHWIRTH, Rudolf (Austrian Academy of Sciences); LATINA, Andrea (European Organization for Nuclear Research); SCHULTE, Daniel (European Organization for Nuclear Research); SCHIECK, Jochen (Austrian Academy of Sciences)

Presenter: STECHAUNER, Bernd (European Organization for Nuclear Research)

Session Classification: Wednesday Poster Session

Track Classification: MC1: Colliders and other Particle and Nuclear and Physics Accelerators:
MC1.A09 Muon Accelerators, Neutrino Factories, Muon Colliders