Contribution ID: **541** Contribution code: **SUP048** Type: **Poster Presentation**

Simulations of IBS through electric field fluctuations

Sunday 10 August 2025 15:00 (3 hours)

We present a study of intra-beam scattering (IBS) that is important for high-brightness electron beams, including a recent theory incorporating enhanced temporal correlations of electric field fluctuations. These correlations primarily arise from the periodic betatron motion of particles within the beam that is not accounted for in conventional theories. To enable direct verification of the theoretical calculations, we perform simulations with particle distributions preserved over time, ensuring conditions compatible with theoretical assumptions.
We focus our study on the energy spread increase in high-brightness electron injectors. Energy spread growth is extracted from simulations in two ways: through the theoretical connection with field correlations, and directly from accumulated energy changes of individual particles. Comparisons are performed across multiple beam distributions and dynamics, from linear motion in an infinite uniform plasma to betatron oscillations in a Gaussian bunch.

Please consider my poster for contributed oral presentation

No

Would you like to submit this poster in student poster session on Sunday (August 10th)

Yes

Footnotes

Funding Agency

I have read and accept the Privacy Policy Statement

Yes

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Session Classification: SUP: Sunday Student Poster Session

Track Classification: MC5 –Beam Dynamics and EM Fields