Contribution ID: **156** Contribution code: **TUP039** Type: **Poster Presentation**

Evolution of Realistic Beam Distributions in Space-Charge-Dominated Electron Beams

Tuesday 12 August 2025 16:00 (2 hours)

Idealized models predict beam moments and envelopes, but not the detailed beam structure within those envelopes. We explore in experiment and simulation the interplay of space charge and angular momentum with realistic beam distributions in a low-energy transport system. Our realistic phase space distributions derive from direct experimental measurements near the beam source. The platform for this work is our Long Solenoid Experiment (LSE), a beam line designed to explore flat-to-round (FTR) and round-to-flat (RTF) beam transformations where space charge is a significant factor. Our transport system employs a thermionic electron gun, a slit mask, and skew quadruples to generate and manipulate flat beams with emittance ratios up to 20:1. The LSE is equipped with a sliding view-screen, enabling detailed phase space diagnostics over multiple plasma periods. We present simulations, initialized with realistic phase space distributions and validated against experimental results, that reveal the sensitivities of transverse beam dynamics to specific initial conditions and lattice parameters.

Please consider my poster for contributed oral presentation

Yes

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

Yes

Footnotes

Funding Agency

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I have read and accept the Privacy Policy Statement

Yes

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