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Recent Work

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Cold fluid model of an axisymmetric charged particle beam

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Author

Lee, Edward P.

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Cold Fluid Model of an Axisymmetric Charged Particle Beam*, - E. P. LEE, E. CHACON-GOLCHER, *Lawrence Berkeley National Laboratory, Berkeley, CA 94720* – A space charge-dominated beam extracted from a planar source is modeled as cold, non-relativistic fluid. Deviations from Child-Langmuir flow are inevitable and generate aberrations in the current density in the radial direction. A truncated power series solution (in the radial direction) to the fluid equations is utilized to describe the two-dimensional flow properties of the beam near its source. In lowest orders, the model recovers known results such as the Child-Langmuir Law and the envelope equation for the beam edge radius. Numerical solution in higher order yields beam features such as aberrations and emittance growth.

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- Prefer Poster Session
 Prefer Oral Session

Edward P. Lee
EPLee2@lbl.gov
Lawrence Berkeley National Laboratory

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