

Abstract Submitted
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Electromagnetic Simulation Studies of Photocathode Sources¹

MARK HESS, CHONG SHIK PARK, Indiana University Cyclotron Facility — We present the results of electromagnetic simulation studies on space-charge dominated electron beams produced by photocathode sources. In particular, we demonstrate the computational requirements on the Green's function based simulation code IRPSS (Indiana Rf Photocathode Source Simulator) for obtaining relative space-charge electromagnetic field errors of at most 1%, and show how these fields compare with electrostatic based field solver methods. We also present the results of a multi-slice method used within IRPSS for modeling electron bunches, which approximates a local region of beam density as a zero longitudinal thickness slice. We show how these results can be applied to realistic photocathode experiments, such as the 1.3 GHz AWA photoinjector experiment at Argonne National Laboratory [1].

[1] P. Schoessow, et al, The Argonne Wakefield Accelerator Overview and Status, Proceedings of PAC'03, Washington, D.C., p.2596.

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