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# Simulation and experimental characterization of a high power electron diode for linear induction accelerators

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X-Ray flash radiography is a useful diagnostic for investigating the structural response of matter during hydrodynamic experiments. Intense pulsed X-ray sources are required to freeze the motion during these experiments and hence, produce sharp images. For this purpose, Linear Induction Accelerators (LIA) provide high flux X-rays pulses [1-2]. In order to optimize the electron beam transport, a good knowledge of e-beam characteristics and its dynamics out of the injector is required. Studying and predicting the beam dynamics in various regions, including within the injector, is critical for improving the radiographic spot size [3] and the dose for existing and future accelerators. This work describes the numerical model developed in order to assess the beam dynamics. The computational model is based on the LSP particle-in-cell code [4]. The simulation setup will be presented and results will be discussed. This model was used to increase the beam intensity from 2 kA to 2.5 kA on the first axis at the EPURE facility. The good agreement between the simulation and the measurements on the first axis validates this simulation tool for designing novel high power electron diodes.

[1] A. Georges et al, “Status on AIRIX restart”, Proceedings of LINAC 2014, Geneva, Switzerland.
[2] C. Ekdahl, “Modern electron acccelerators for radiography,” IEEE Trans. Plasma Sci., vol. 30, n°. 1, pp. 254-261, 2002.
[3] N. Pichoff et al, “Contributors to AIRIX focal spot size”, Proceedings of EPAC 2006, Edinburgh, Scotland.
[4] LSP is a product of Mission Research Corp., Albuquerque, 417 NM.

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