

Contribution ID: 374

Type: Oral

PREDICTIVE MODELLING OF THE MERLIN SMP DIODE PERFORMANCE

Wednesday 21 June 2017 15:00 (15 minutes)

AWE conducts hydrodynamic trials as part of its continual mission to maintain the UK nuclear deterrent. The trials utilise flash x-ray radiography as a key diagnostic for studying explosively driven experiments. Future trials will use a Self-Magnetic Pinch diode on the Merlin Inductive Voltage Adder as one of the radiographic sources.

This body of work presents predictions of the radiographic performance of a Self-Magnetic Pinch diode on Merlin, which have been made for anticipated optimal and sub-optimal diode geometries. The predictions are made using an ensemble of codes including: the transmission line code, Bertha; the Particle-in-Cell code, LSP; the Monte-Carlo code, MCNP; and the Bayes Inference Engine. The methodology of sequentially linking predictions from a circuit model through to dose measurements on a radiograph will be illustrated. Specific attention will be given to how the electron beam focussing within a Self-Magnetic Pinch diode is modelled.

This represents the first attempt to make such a broad range of predictions of a flash radiographic diode ahead of experimental data at AWE. Together with the results a number of strengths and weaknesses identified in the simulation methodology will be presented, which suggest how future models can be developed for better accuracy and speed.

Authors: Mr GOUDE, David (AWE); Dr WILLIAMS, Richard (AWE)

Presenter: Mr GOUDE, David (AWE)

Session Classification: Oral session 18 - Intense Electron and Ion Beams, Plasma, Ion and Electron Sources - Session Chair : Jacob Zier

Track Classification: Particle Beam and Accelerator Technologies