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Characterisation of Plasma Filled Rod Pinch electron beam diode operation JAMES MACDONALD, SIMON BLAND, JEREMY CHITTENDEN, Imperial College London — The plasma filled rod pinch diode (aka PFRP) offers a small radiographic spot size and a high brightness source. It operates in a very similar to plasma opening switches and dense plasma focus devices – with a plasma prefill, supplied via a number of simple coaxial plasma guns, being snowploughed along a thin rod cathode, before detaching at the end. The aim of this study is to model the PFRP and understand the factors that affect its performance, potentially improving future output. Given the dependence on the PFRP on the prefill, we are making detailed measurements of the density (10^{15}-10^{18} cm^{-3}), velocity, ionisation and temperature of the plasma emitted from a plasma gun/set of plasma guns. This will then be used to provide initial conditions to the Gorgon 3D MHD code, and the dynamics of the entire rod pinch process studied.

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