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Characterisation of the plasma filled rod pinch diode operation

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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 way to plasma opening switches and dense plasma focus devices - with a plasma prefill supplied by a number of simple coaxial plasma guns, being snowploughed along a thin rod anode before detaching at the end.

The aim of this study is to model the PFRP and understand factors that affect its performance.

Given the dependence on the PFRP on the prefill, we are making detailed measurements of the density (10^{15} - 10^{18} /cm³), velocity, ionisation and temperature of the plasma emitted from the guns. This information will then be used to provide initial conditions to the Gorgon 3d MHD code, and the dynamics of the PFRP operation will then be studied.

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