

Abstract Submitted
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Characterization of Plasmas in Negative Polarity Rod Pinch Diodes* MARK JOHNSTON, BRYAN OLIVER, JOSHUA LECKBEE, Sandia National Laboratories, DALE WELCH, Voss Scientific, DARRYL DROEMER, MARLON CRAIN, National Security Technologies — Experiments at SNL are underway to investigate plasma formation in rod pinch diodes fielded in negative polarity on the RITS-6 accelerator (7.5MV and 180kA at 40 Ohms). The rod pinch diode consists of a small diameter metal rod which extends through a larger diameter metal cathode plate. Electrons formed at the cathode accelerate across the gap, become self-insulated, and are focused at the rod tip, generating x-rays used for flash radiography. Most of the previous rod pinch work has been performed in positive polarity; however, there is an interest in operating this diode in negative polarity at higher voltages, allowing more flexibility and incorporation into a wider variety of pulsed power devices. In an effort to better understand the basic physics, and the roles ions play in the impedance behavior, a series of shots were taken looking at plasma formation in the diode. Diagnostics include optical imaging and spectroscopy using nanosecond gated ICCD cameras, streak cameras, and photodiode arrays. *Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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