

Abstract Submitted
for the DPP16 Meeting of
The American Physical Society

How the Inductive Voltage Adder (IVA) output impedance affects impedance dynamics of a Self-Magnetic Pinch (SMP) diode TIMOTHY RENK, SEAN SIMPSON, TIMOTHY WEBB, MICHAEL MAZARAKIS, MARK KIEFER, Sandia National Laboratories — The SMP diode, fielded on the RITS-6 (3.5-8.5 MV) IVA accelerator at Sandia National Laboratories, produces a focused electron beam (<3mm diameter) onto a high Z metal converter for flash x-ray applications. Experiments have been undertaken with two different magnetically insulated transmission line (MITL) center conductors, of 40 and 80 ohms flow impedance. We have operated in-situ heating and discharge-cleaning hardware in the load region, in order to address the tendency of some shots to undergo premature impedance (Z) collapse, defined as a fall in impedance beyond that due to normal movement of electrode plasmas that reduces the effective A-K gap. The goal of heating/cleaning was to reduce the volume of evolving gases near the A-K gap. Despite clear evidence that the cleaning techniques removed the proton portion of beam current, we observed no consistent increase in diode impedance (ZDIODE). This forced an examination of the role that the IVA flow impedance has on ZDIODE. A preliminary conclusion is that ZDIODE should be at least 1.5 times the flow impedance before ZDIODE is a parameter independent of flow impedance. This has implications for SMP as a load for a IVA, since ZDIODE >100 ohms has not been consistently demonstrated. Data analysis is ongoing, and latest results will be reported.

Acknowledgement: Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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Date submitted: 07 Jul 2016

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