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Optical Spectroscopy of High Intensity Electron Beam Plasmas[1]
MARK JOHNSTON, BRYAN OLIVER, Sandia National Laboratories, NICHELLE BRUNER, DALE WELCH, Voss Scientific, LLC, YITZHAK MARON, Weizmann Institute of Science — This talk will be an overview of spectroscopic results obtained on the RITS-6 accelerator at Sandia National Laboratories on the Self-Magnetic Pinch (SMP) electron beam diode. The SMP diode produces a focused (<3mm diameter), e-beam at 7MeV and 150kA, which is used as an intense, flash x-ray source. During the ∼45ns electron beam pulse, plasmas are generated on the electrode surfaces which propagate into the A-K vacuum gap, affecting the diode impedance, x-ray spectrum, and pulse-width. These plasmas are measured using a series of optical diagnostics including: streak cameras, ICCD cameras, and avalanche photodetectors. Visible spectroscopy is used to gather time and space information on these plasmas. Density and temperature calculations are made using detailed, time-dependent, collisional-radiative (CR) and radiation transport modelings. The results are then used in conjunction with hybrid PIC/fluid simulations to model the overall plasma behavior. Details regarding the data collection, system calibration, analyses, and interpretation of results will be presented.

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