Laser-based imaging of wire array z-pinches and X pinches on the COBRA pulsed power generator

RYAN McBRIDE, DAVID CHALENSKI, LLOYD MAXSON, SERGEI PIKUZ, TATIANA SHELKOVENKO, JON DOUGLASS, JOHN GREENLY, DAVID HAMMER, BRUCE KUSSE, Laboratory of Plasma Studies, Cornell University, Ithaca, NY, 14853, USA — Initial laser-based imaging experiments of wire array z-pinches and X pinches on the 1 MA COBRA pulsed power generator are presented. The imaging system makes use of a frequency-doubled 532 nm green beam from a Nd:YAG laser source. This source also supplies the frequency-quadrupled 266 nm UV beam that is used to trigger the final output switches of the COBRA generator and initiate a current pulse. Thus, the desired timing of the imaging beam relative to the start of a current pulse is achieved by adjusting the optical path length of the imaging beam. Once the imaging beam has passed through the pinch region, the light is collected on a high resolution CCD camera that is linked to a PC for fast image processing. The laser-based images produced, along with images and measurements from other supporting diagnostics, are presented.

1This research was supported by the NNSA Stockpile Stewardship Academic Alliances program under DOE Cooperative Agreement DE-FC03-02NA00057.

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Date submitted: 20 Jul 2005