

Abstract Submitted for the Forty-Seventh Annual
Meeting
Division of Plasma Physics
October 24–28, 2005, Denver, Colorado

Category Number and Subject: 10.0.0 Undergraduate Research

Theory Experiment

Phase Contrast Imaging of Inertial Confinement Fusion Capsules Using a Compact X-pinch,* B. DeBono, Z. Karim, K. Waqschal, F.N. Beg, *UCSD*, R.B. Stephens, *GA* – The baseline NIF cryo-ignition fusion target contains a $100\text{-}\mu\text{m}$ thick layer of DT ice inside a cu-doped Be shell. X-ray phase contrast radiography is currently the only known method for verifying the presence and uniformity of this ice layer, but presently available sources require minutes-long exposure, which results in a blurred image due to shell vibrations. A compact x-pinch generator is an excellent source of bright and energetic x-rays, and has the unique advantage of pulsed exposure ($<1\text{ ns}$) while being small enough to fit on a tabletop. Initial results from experiments performed to characterize Be coated, Al coated, and plain CH capsules (various diameters and wall thicknesses) are presented. A compact x-pinch device capable of producing 80 kA of current with a rise time of 40-ns was used. X-pinchs of various wire materials including W, Mo, and Al were used. The rough spectrum with Ross filter pairs shows x-rays in 1-10 keV range. The phase contrast images of CH capsules reveal a source size of 2-3 μm .

*Supported by US DOE National Undergraduate Fusion Fellowship, DE-AC03-01SF22260, and DE-AC02-76CH03073.

Oral Poster