

# Lawrence Berkeley National Laboratory

## LBL Publications

### Title

Ion beam driven HEDP experiments on NDCX

### Permalink

<https://escholarship.org/uc/item/9m66v2hn>

### Authors

Bieniosek, F.M.

Barnard, J.J.

Henestroza, E.

et al.

### Publication Date

2010-09-01

## APSDPP 2010 Abstract

### Ion beam driven HEDP experiments on NDCX\*

FM Bieniosek, JJ Barnard, E Henestroza, S Lidia, RM More, PA Ni, PK Roy, PA Seidl

#### Abstract

Intense beams of heavy ions are capable of delivering precise and uniform beam energy deposition, with the capability to heat volumetric samples of any solid-phase target material to high energy density. The WDM conditions are achieved by combined longitudinal and transverse space-charge neutralized drift compression of the ion beam to provide a hot spot on the target with a beam spot size of about 1 mm. Initial experiments use a 0.3 MeV, 30-mA  $K^+$  beam from the NDCX-I accelerator to heat foil targets such as Au, Pt, W, Al and Si. The NDCX-1 beam contains a low-intensity uncompressed pulse up to  $>10$   $\mu$ s of intensity  $\sim 0.4$  MW/cm<sup>2</sup>, and a high-intensity compressed pulse (FWHM 2-3 ns and fluence  $\sim 4$  mJ). WDM experiments heat targets by both the compressed and uncompressed parts of the NDCX-I beam, and explore measurement of temperature, droplet formation and other target parameters. Future plans include target experiments using the NDCX-II accelerator, which is designed to heat targets at the Bragg peak using a 2-3 MeV lithium ion beam.

\*This work was performed under the auspices of the U.S Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344, and by the University of California, Lawrence Berkeley National Laboratory under Contract DE-AC02-05CH11231.