Abstract Submitted
for the DPP17 Meeting of
The American Physical Society

High-resolution Imaging of Deuterium-Tritium Capsule Implosions on the National Ignition Facility[1] BENJAMIN BACHMANN, Lawrence Livermore Natl Lab, RYAN RYGG, GILBERT COLLINS, Laboratory for Laser Energetics, University of Rochester, PRAVESH PATEL, Lawrence Livermore Natl Lab — Highly-resolved 3-D simulations of inertial confinement fusion (ICF) implosions predict a hot spot plasma that exhibits complex micron-scale structure originating from a variety of 3-D perturbations [1]. Experimental diagnosis of these conditions requires high spatial resolution imaging techniques. X-ray penumbral imaging can improve the spatial resolution over pinhole imaging while simultaneously increasing the detected photon yield at x-ray energies where the ablator opacity becomes negligible [2]. Here we report on the first time-integrated x-ray penumbral imaging experiments of ICF capsule implosions at the National Ignition Facility that achieved spatial resolution as high as 4 micrometer. 6 to 30 keV hot spot images from layered DT implosions will be presented from a variety of experimental ICF campaigns, revealing previously unseen detail. It will be discussed how these and future results can be used to improve our physics understanding of inertially confined fusion plasmas by enabling spatially resolved measurements of hot spot properties, such as radiation energy, temperature or derived quantities. [1] D. S. Clark *etal.*, Phys. Plasmas 22, 022703 (2015) [2] B. Bachmann *etal.*, RSI. 87, 11E201 (2016)

[1]This work performed under the auspices of the U.S. Department of Energy by LLNL under Contract DE-AC52-07NA27344

Benjamin Bachmann
Lawrence Livermore Natl Lab

Date submitted: 16 Jul 2017 Electronic form version 1.4