

HTPD 2018



Contribution ID : 226

Type : not specified

4.45 High-resolution and high energy x-ray penumbral imaging of layered DT implosions on the NIF

Monday, 16 April 2018 20:31 (120)

We present the status and progress of x-ray penumbral imaging of layered DT implosions on the NIF [1-3]. When imaging ICF hot spots with penumbral imaging, the increased aperture solid angle leads to up to a 100-fold increased photon flux in comparison to regular pinhole imaging. This increased flux and resulting improvement in SNR gives us experimental access to the hot spot self-emission spectrum that is beyond the ablator opacity threshold (~15 keV) and thus allows us to obtain unobstructed, high-resolution (5 micrometer) images of the hot spot. This is achieved by increased x-ray filtration which brings the emission weighted average x-ray energy from ~9 keV (pinhole imaging) to 17 - 30 keV. We will further describe the potential of x-ray penumbral imaging for enabling spatially resolved measurements of Te and mix in ICF DT implosions, which are key measurements for improving our understanding of the hot fuel assembly and evolution. References [1] B. Bachmann et al., Rev. Sci. Instrum. 85, 11D614 (2014) [2] B. Bachmann et al., Rev. Sci. Instrum. 87, 11E201 (2016) [3] B. Bachmann et al., Proc. SPIE 10390, 103900B (2017) This work performed under the auspices of the U.S. DOE by LLNL under Contract DE-AC52-07NA27344 and was supported in part by GA under Contract DE-NA0001808.

Primary author(s) : BACHMANN, Benjamin (Lawrence Livermore National Lab)

Co-author(s) : ABU-SHAWAREB, Hatim (General Atomics); ALEXANDER, Neil (General Atomics); AYERS, Jay (LLNL); BAILEY, Chris G. (LLNL); BELL, Perry (LLNL); BENEDETTI, Laura R. (LLNL); BRADLEY, David (LLNL); COLLINS, Gilbert (University of Rochester, LLE); DIVOL, Laurent (LLNL); DOEPPNER, Tilo (LLNL); FELKER, Sean (LLNL); FIELD, John (LLNL); FORSMAN, Andrew (General Atomics); GALBRAITH, Justin (LLNL); HARDY, Michael (LLNL); HILSABECK, Terry (General Atomics); IZUMI, Niko (LLNL); JARROTT, Charles (LLNL); KILKENNY, Joe (General Atomics); KRAMER, Steven (LLNL); LANDEN, Otto L. (LLNL); MA, Tammy (LLNL); MACPHEE, Andrew (LLNL); MASTERS, Nathan (LLNL); NAGEL, Sabrina (LLNL); PAK, Arthur (LLNL); PATEL, Prav (LLNL); PICKWORTH, Louisa A. (LLNL); RALPH, Joseph E. (LLNL); REED, Chris (General Atomics); RYGG, James R. (LLNL); THORN, Daniel B. (LLNL)

Presenter(s) : BACHMANN, Benjamin (Lawrence Livermore National Lab); ABU-SHAWAREB, Hatim (General Atomics); ALEXANDER, Neil (General Atomics); AYERS, Jay (LLNL); BAILEY, Chris G. (LLNL); BELL, Perry (LLNL); BENEDETTI, Laura R. (LLNL); BRADLEY, David (LLNL); COLLINS, Gilbert (University of Rochester, LLE); DIVOL, Laurent (LLNL); DOEPPNER, Tilo (LLNL); FELKER, Sean (LLNL); FIELD, John (LLNL); FORSMAN, Andrew (General Atomics); GALBRAITH, Justin (LLNL); HARDY, Michael (LLNL); HILSABECK, Terry (General Atomics); IZUMI, Niko (LLNL); JARROTT, Charles (LLNL); KILKENNY, Joe (General Atomics); KRAMER, Steven (LLNL); LANDEN, Otto L. (LLNL); MA, Tammy (LLNL); MACPHEE, Andrew (LLNL); MASTERS, Nathan

(LLNL); NAGEL, Sabrina (LLNL); PAK, Arthur (LLNL); PATEL, Prav (LLNL); PICKWORTH, Louisa A. (LLNL); RALPH, Joseph E. (LLNL); REED, Chris (General Atomics); RYGG, James R. (LLNL); THORN, Daniel B. (LLNL)

Session Classification : Session #4, Monday Night Poster Session