Abstract Submitted
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Development of a laser-produced plasma x-ray source for phase-contrast imaging of DT fuel ice layers[1] N. IZUMI, Livermore National Laboratory, Livermore CA, 94550, E. DEWALD, B. KOZIOZIEMSKI, J.A. KOCH, Lawrence Livermore National Laboratory — Because beryllium capsules for NIF experiments are not transparent to visible light, optical microscopy is not applicable for metrology of deuterium-tritium (DT) ice layers. X-ray absorption radiography cannot be used either because absorption in DT ice is negligible, so to quantify the quality of the DT ice surface, x-ray phase-contrast imaging is used in order to enhance contrast of surface imperfections. Phase contrast imaging of ice layers typically utilizes micro-focus x-ray tube sources, but available x-ray fluxes are limited, and these sources cannot be used to quantify changes in the ice surface quality over the second timescales appropriate for rapidly-cooled layers. We have therefore explored the use of a laser-produced plasma x-ray source in order to determine if it has sufficient brightness to produce high-quality phase-contrast flash radiographs of DT ice layers. We irradiated Ti, Fe, Cu, and Au targets with 5-ns, 300-J, 527-nm laser light at the Janus laser facility, and measured absolute x-ray conversion efficiency and x-ray spot size. We will discuss this data as well as phase-contrast radiographs we obtained of non-cryogenic shells.

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