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Arithmetic reconstruction tomography of self-emission x-ray images of the imploded core plasmas at National Ignition Facility¹ NOBUHIKO IZUMI, L.R. BENEDETTI, C. CERJAN, J. EDWARDS, S. GLENN, S. GLENZER, O.L. LANDEN, P. SPRINGER, R. PJ. TOWN, A.J. MACKIN-NON, P. BELL, D.K. BRADLEY, Lawrence Livermore National Laboratory, G.A. KYRALA, Los Alamos National Laboratory, J. KILKENNY, General Atomics — To achieve density and temperature required for the thermonuclear ignition, capsules of inertial confinement fusion targets have to be compressed with keeping good spherical symmetry. Due to axisymmetric geometry of the targets (a spherical capsule located in the center of a cylindrical hohlraum), non-uniformity of the x-ray drive is usually dominated by axisymmetric modes. However, x-ray core images observed on the hohlraum axis often show azimuthal perturbation caused by the diagnostic holes, the fuel filling tube, or limited number of the beam-spots on the hohlraum wall. To reduce the non-uniformities and improve the volumetric compression, it is crucial to quantify deformation of the core-fuel boundary in a three-dimensional manner. We performed an arithmetic reconstruction tomography (ART) of the xray images obtained from two orthogonal directions and demonstrated capability to track deformation of the gas-fuel boundary including azimuthal perturbation.

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Nobuhiko Izumi Lawrence Livermore National Laboratory

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