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Title: THE NEUTRON IMAGING SYSTEM FIELDDED AT THE
NATIONAL IGNITION FACILITY

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THE NEUTRON IMAGING SYSTEM FIELDDED AT THE NATIONAL IGNITION FACILITY

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A detailed description of the neutron imaging system that has been fielded at the National Ignition Facility (NIF), Lawrence Livermore National Laboratory, Livermore, CA, USA will be presented. The neutron imaging system was constructed to collect images of fusion neutrons produced in the implosion of inertial confinement fusion experiments at the NIF and scattered neutrons from (n,n') reactions of the source neutrons in the surrounding dense material. A description of the neutron imaging system will be presented, including the pinhole array aperture, the line-of-sight collimation, the scintillator-based detection system and the alignment systems and methods. Discussion of the alignment, resolution and signal-to-noise of the system will be presented. We will also discuss future improvements to the system hardware. This work was performed for the U.S. Department of Energy, National Nuclear Security Administration and by the National Ignition Campaign partners: Lawrence Livermore National Laboratory (LLNL), University of Rochester -Laboratory for Laser Energetics (LLE), General Atomics (GA), Los Alamos National Laboratory (LANL), and Sandia National Laboratories (SNL). Other contributors include Lawrence Berkeley National Laboratory (LBNL), Massachusetts Institute of Technology (MIT), Atomic Weapons Establishment (AWE), England, and Commissariat à l'Énergie Atomique (CEA), France. Prepared by LLNL under Contract DE-AC52-07NA27344