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Neutron imaging development for inertial confinement fusion experiments TONY CAILLAUD, OLIVIER LANDOAS, ISABELLE THFOIN, FRANCK PHILIPPE, ALEXIS CASNER, JEAN-LUC BOURGADE, CEA, DAM, DIF, F-91297 Arpajon, France, VLADIMIR GLEBOV, FREDERIC J. MARSHALL, CRAIG SANGSTER, LLE, University of Rochester, NY 14623, USA, HYE SOOK PARK, HARRY ROBEY, PETER AMENDT, LLNL, Livermore, CA 94550, USA — Various failure mechanisms may limit fuel compression and ignition during Inertial Confinement Fusion (ICF) experiments with MegaJoule class lasers (e.g., the Laser MégaJoule: LMJ and the National Ignition Facility: NIF). A Neutron Imaging System (NIS) may be used to determine the asymmetries in the hot core and the surrounding cold fuel shell. To reveal such asymmetries, a NIS must record both a primary (14 MeV) and a down-scattered (5-10 MeV) neutron image with high SNR and an image plane spatial resolution as low as 5 μm. We report on the continuing development of an NIS diagnostic at the OMEGA laser facility, using coded apertures. A new large neutron camera (150 mm entrance diameter: scaled for LMJ/NIF design) has been activated at OMEGA. This camera will allow 5 μm resolution for LMJ neutron source. We have tested a set of three detectors that can be used for various NIS diagnostic experiments on OMEGA from low yield (10^9-10^{10} neutrons) low resolution (32 μm) measurements at 4 m from the neutron source to high yield (10^{12}-10^{14} neutrons) high resolution (15 μm) measurements at 13 m. The low yield configuration allowed us to record, the first neutron image on an indirect drive shot with pure deuterium filled capsules.

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