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Reconstruction and analysis of knock-on deuteron images of direct-drive ICF implosions at OMEGA[1] JUSTIN KUNIMUNE, Massachusetts Institute of Technology, HANS RINDERKNECHT, Laboratory for Laser Energetics, PATRICK ADRIAN, JOHAN FRENJE, Massachusetts Institute of Technology, SEAN REGAN, Laboratory for Laser Energetics, FREDRICK SGUIN, MARIA GATU-JOHNSON, Massachusetts Institute of Technology, RADHA BAHUKUTUMBI, JAMES KNAUER, Laboratory for Laser Energetics, BENJAMIN BACHMANN, Lawrence Livermore National Laboratory — Knock-on deuteron imaging is a new diagnostic technique that images the source distribution of deuterons that are elastically scattered by primary neutrons generated in a D-T gas-filled ICF implosion. By energy-resolving these deuteron images, obtained in three near-orthogonal directions, information about the morphology of the hot spot and high-density D-T fuel can be obtained. Experimental demonstrations of the concept were successfully conducted at the OMEGA laser facility. In these experiments, several absolutely co-aligned penumbral knock-on deuteron images, with different energy bands, were obtained in the three different directions, from which the hot spot and surrounding high-density shell could be reconstructed. Reconstruction techniques have been developed that will be presented here, along with examples of resulting images. These results demonstrate that this technique works well.

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