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High Energy X-Ray Diagnostic for Multi-Frame Radiography[1]
CHRIS PLECHATY, BRIAN MADDOX, HYE-SOOK PARK, ANDREW COMLEY, NATHAN KUGLAND, BRUCE REMINGTON, Lawrence Livermore National Laboratory — Laser-driven high-energy (>22 keV) x-ray radiography has been employed as a diagnostic tool in many different types of HED experiments, with applications ranging from material strength studies (Edwards 2004, Park 2010, Park 2010) to capsule implosion experiments. We have developed a new multi-frame radiography technique that takes advantage of the multiple beams available at state-of-the-art laser facilities such as Omega and the National Ignition Facility (NIF). This concept is of particular importance to the NIF and NIF Advanced Radiographic Capability (ARC) since it will yield twice the amount of data per shot. Experiments were performed at the OMEGA/EP laser facility utilizing two short pulse (100 ps) beams to independently irradiate two 300x300x10 μm foils (Cu and Ag). The beams were delayed in time to produce two distinct x-ray pulses. A collimator assembly was employed such that two distinct and spatially separate images were generated by the Cu and Ag sources. A shield was placed between the two foils to protect the delayed backlighter from the hydrodynamic expansion and x-ray emission from the first backlighter.

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