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Characterization of Mono-Energetic, Charged-Particle Radiography for HEDP Experiments M. MANUEL, F.H. SEGUIN, C.K. LI, D. CASEY, J. FRENJE, J. RYGG, R. PETRASSO, MIT, O. GOTCHEV, R. BETTI, J. KNAUER, V. SMALYUK, LLE — Charged-particle radiography, which utilizes mono-energetic protons and alphas, has been used to image various High-Energy-Density Physics (HEDP) phenomena of interest, including capsule implosions, laser-plasma interactions, and Rayleigh-Taylor-instability growth. An imploded D^3He-filled glass capsule – the backlighter – provides mono-energetic 15-MeV and 3-MeV protons and 3.6-MeV alphas for radiographing these various phenomena. This technique provides simultaneously information about areal density and electromagnetic fields in the imaged systems. For successful study of these phenomena, the backlighter yield and size need to be optimized for the imaging geometry and detector used. Understanding the experimental parameters that affect it is therefore essential. Empirical studies of backlighter performance under a variety of conditions are presented. GEANT4 is used as well to investigate the limits and capabilities of this technique. This work was performed in part at the LLE National Laser User's Facility (NLUF), and was supported in part by US DOE, LLNL, LLE and the Fusion Science Center at Univ. Rochester. *Currently at LLNL.

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