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A new tri-particle mono-energetic backlighting platform for the NIF and OMEGA C. K. LI, G. D. SUTCLIFFE, P. J. ADRIAN, N. V. KABADI, B. LAHMANN, J. A. PEARCY, T. M. JOHNSON, R. SIMPSON, H. SIO, J. A. FRENJE, M. GATU JOHNSON, F. H. SEGUIN, R. D. PETRASSO, MIT, H-S. PARK, B. POLLOCK, J. MOODY, LLNL — Inertial-confinement-fusion and laboratory-astrophysical experiments involving lasers create high-energy-density plasmas that are of complex nature involving mixtures of ions, electrons, and electric/magnetic fields. Measurements play a critical role in providing quantitative information in these experiments, but several challenges with the current diagnostics remain to be addressed. Building on previous experience, a new DT^3He tri-particle backlighter offers a unique capability, which has all the characteristic features of the D^3He backlighter, but will substantially advance the capability for diagnosing strong fields and high density in HED plasmas on Omega and the NIF. Radiographs made with the 9.5-MeV deuterons, combined with 3-MeV DD-proton and 15-MeV D^3He-proton radiographs, provide further energy constrains and a third time-of-flight delay, allowing discriminatory, high-quality radiographs of electric and magnetic fields and plasma matter to be recorded. Experiments for studying laser-driven, transit phenomena of HED plasmas, such as plasma transport and dynamics, as well as hydrodynamic/kinetic instabilities would greatly benefit from the additional time-resolved radiograph. This work was supported in part by the U.S. DOE, NLUF, LLE and LLNL.

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