

DEVELOPMENT OF LARGE AREA HIGH-EFFICIENCY LASER-DRIVEN X-RAY BACKLIGHTERS OF UP TO 7 NS IN DURATION

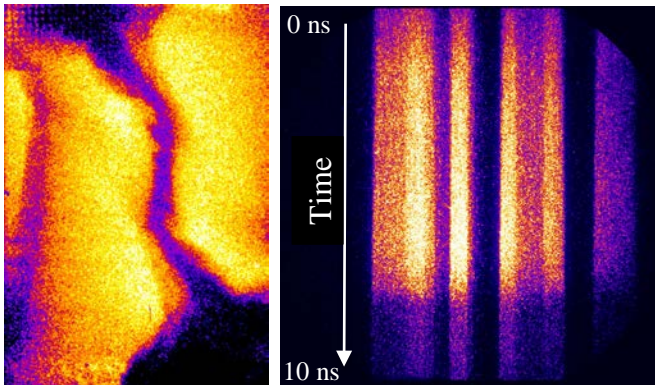
K. A. Flippo¹, J. L. Kline¹, F. W. Doss¹, E. C. Merritt¹, T. S. Perry¹, L. Kot¹, T. J. Murphy¹, E. N. Loomis¹, M. A. Barrios², S. P. Regan³, C. M. Huntington², S. Nagel², H. S. Park²

¹Los Alamos National Laboratory, Los Alamos, NM, U.S.A.[†]

²Lawrence Livermore National Laboratory, Livermore, CA, U.S.A.

³Laboratory for Laser Energetics, University of Rochester, Rochester, NY, U.S.A.
kflippo@lanl.gov

In the course of developing the LANL Shock-Shear platform for the National Ignition Facility (NIF) to study High Energy Density (HED) Kelvin-Helmholtz initiated turbulent mix experiments, we developed the Big Area Backlighter (BABL) [1], and now we have made improvements for a series of very efficient pulse shapes. These pulses convert several percent (3-4%) of the laser energy into He- α x-ray lines, allowing one to take high-quality continuous data in intervals from 2 to 7 ns using either streaked or framing cameras to obtain time resolved radiography data of HED experiments in large areas and volumes. The current area of the BABL is approximately 3×2.5 mm² and can be extended to either larger or smaller areas with relative ease.



Above are images of the Shock-Shear platform (left) using the 3-ns pulse shape with a framing camera and (right) using the 7-ns pulse shape with a streak camera, time on the x-axis and space on y-axis.

[1] Flippo KA, Kline JL, Doss FW, Loomis EN, Emerich M, Devolder B, et al. 2014 Sep Development of a Big Area BackLighter for high energy density experiments *Rev Sci Inst* **85**(9)

[†] Los Alamos National Laboratory, an affirmative action/equal opportunity employer, is operated by the Los Alamos National Security, LLC for the National Nuclear Security Administration of the U.S. Department of Energy under contract DE-AC52-06NA25396. NIF facility and experimental data shown or discussed reflects facility development and operations performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.