

Production of Synthetic Phase Contrast Images for Comparison with CRASH Radiograph Output*

C. Todd ^a, M. Trantham ^a, A. G. R. Thomas ^a, Y. Ma ^a, M. Balcazar ^a, F. Albert ^b, N. Lemos ^b,
P. King ^{b, c}, S. Mangles ^d, B. Kettle ^d, C. Colgan ^d, E. Los ^d, H. Tsai ^e, T. Ostermayr ^e,
C. G. R. Geddes ^e, C. B. Schroeder ^e, T. Schenkel ^e, E. Esarey ^e, C. C. Kuranz ^a

(a) College of Engineering, Nuclear Engineering & Radiological Sciences, University of Michigan – Ann Arbor (cwtodd@umich.edu, mtrantha@umich.edu, agrt@umich.edu, yongm@umich.edu, balcazar@umich.edu, ckuranz@umich.edu)

(b) National Ignition Facility & Photon Science, Lawrence Livermore National Laboratory (albert6@llnl.gov, candeiaslemo1@llnl.gov, king100@llnl.gov)

(c) Department of Physics, University of Texas – Austin (king100@llnl.gov)

(d) Faculty of Natural Sciences, Department of Physics, Imperial College London (stuart.mangles@imperial.ac.uk, b.kettle@imperial.ac.uk, cary.colgan13@imperial.ac.uk, e.los18@imperial.ac.uk)

(e) BELLA Center, Lawrence Berkeley National Laboratory (haientsai@lbl.gov, TMOstermayr@lbl.gov, cgrgeddes@lbl.gov, CBSchroeder@lbl.gov, t_schenkel@lbl.gov, ehesearey@lbl.gov)

We plan to use the BELLA Hundred TW Thompson laser at the Lawrence Berkeley National Laboratory to perform experiments evaluating shock wave propagation in high-energy-density (HED) plasma research. The laser produces betatron oscillations of a laser-wakefield accelerated electron beam to act as an X-ray source for the experiments. The University of Michigan's Center for Radiative Shock Hydrodynamics (CRASH) software is used to simulate shock propagation through a 120-micron-radius water target at the point of impact of the 1-2 J laser pulse. The output from these CRASH simulations is incorporated into an algorithm developed for Phase Contrast Imaging to obtain synthetic images of the shock front at a distance of 490 cm. These images may be compared to the synthetic radiographs of similar phenomena produced by CRASH in earlier experiments in order to capture finer details of the dynamic evolution of shock waves propagating in HED plasma environments.

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