

Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Focal Fluctuations in the Hundred Terawatt Thomson Laser Plasma Accelerator at BELLA¹ KAITLIN DEERING, Cabrillo College, TOBIAS OSTERMAYR, HAI-EN TSAI, WILLIAM WALLACE, CAMERON GEDDES, SAMUEL BARBER, LBNL, JOSEPH NATAL, UCB, FUMIKA ISONO, JEROEN VAN TILBORG, CSABA TOTH, CARL SCHROEDER, ERIC ESAREY, LBNL, HUNDRED TERA-WATT THOMPSON (HTT) TEAM — Fast pointing jitter fluctuations in the focal point of high power laser systems can be detrimental for precision experiments and applications especially where more than one beam is involved. Thomson scattering experiments on narrow energy spread MeV photon beams, with applications including nuclear nonproliferation, utilize two high power lasers with 2.7 and 0.6 J respectively (on target) at 5 Hz and 40 fs. Focal fluctuations are seen at ± 10 μm (peak to valley) and 4 μm RMS on a spot size of 20 μm . We have used a kHz co-propagating laser to look at the fluctuation frequencies of both the electron drive laser and the scatter laser. Fluctuations caused by building and optic vibrations are observed in the 10 - 200 Hz range. This supports identification of pointing jitter sources in the system, the correlation of both, and to inform future plans to actively stabilize the lasers.

¹This work was supported in part by the U.S. Department of Energy, Office of Science, Office of Workforce Development for Teachers and Scientists (WDTS) under the Community College Internship (CCI) program, US DOE NNSA DNN RD and by Sc. HEP under Contract DE-AC02-05CH11231.

Kaitlin Deering
Cabrillo College

Date submitted: 16 Jul 2019

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