Abstract Submitted
for the DPP19 Meeting of
The American Physical Society

Broadband Smoothing of Laser Pulses for Imprint Reduction in Direct-Drive Inertial Confinement Fusion[1] JOHN WILSON, VALERI GONCHAROV, CHRISTOPHE DORRER, ALEX SHVYDKY, JOHN PALASTRO, Laboratory for Laser Energetics at the University of Rochester — In direct-drive inertial confinement fusion, an ensemble of laser beams irradiates a spherical capsule of deuterium–tritium fuel encased in a thin outer ablator. Early in the drive, intense speckles within the beams locally heat the ablation surface imprinting small-scale density nonuniformities. Ultimately, this imprint can severely limit the fusion yield by seeding hydrodynamic instabilities that cause the capsule to break up during compression. Broadbandwidth lasers can mitigate imprint with rapidly moving speckle patterns that smooth the intensity profile faster than the ablation surface can hydrodynamically evolve. Here we explore the efficacy of imprintmitigation techniques enabled by broadbandwidth lasers.

[1]This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0003856.

John Wilson
SUNY Geneseo

Date submitted: 02 Jul 2019 Electronic form version 1.4