Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Mitigation of initial imprinting with diamond ablator HIROKI KATO, KEISUKE SHIGEMORI, YOUICHIROU HIRONAKA, ILE Osaka Univ, HIDENORI TERASAKI, TATSUHIRO SAKAIYA, RYOUTA HOSOGI, Osaka University Graduate School of Science, MITSUO NAKAI, HIROSHI AZECHI, ILE Osaka Univ — In direct drive inertial confinement fusion, where laser light directly irradiates the target, surface perturbations on the target are seeded by initial imprint due to laser irradiation nonuniformity. It is the initial imprint that become the seed of the hydrodynamic instability, and decisive solutions for the mitigation of initial imprinting is required. We focused on material stiffness of ablator as an idea that was effective for mitigation of imprinting and adopted the diamond with low compressibility as an ablator material. In the imprint experiments, the diamond foils were irradiated with a foot pulse at an intensity of $\sim 4.0 \times 10^{12}$W/cm^2 with 1.3 ns width, on which a stationary spatial nonuniformity with sinusoidal shape of 100μm wavelength was imposed by implementing a grid mask. The foils were subsequently accelerated by a uniform main laser pulse of $\sim 1.0 \times 10^{14}$ W/cm^2 and imprinted perturbation were observed to be amplified by Rayleigh-Taylor instability through face-on x-ray backlight measurements. We deduced the equivalent initial surface roughness for the imprinted foil. We verified the mitigation of initial imprinting with diamond from the quantitative evaluation.

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Date submitted: 12 Jul 2014 Electronic form version 1.4