SYMMETRY OF BERYLLIUM CAPSULE IMPLOSION AT THE NATIONAL IGNITION FACILITY

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We will present results of the beryllium experimental campaign on the implosion symmetry properties of beryllium capsules at the National Ignition Facility. These experiments measure both the inflight and core self- emission implosion symmetry. The inflight symmetry of the ablator before stagnation is measured using a backlight imaging [1] techniques. A copper backlighter was used to measure the transmissions (or backlit absorption) of the copper doped beryllium shells. Images of the x-ray emission from the core around bang time provide a measure the symmetry near peak compression [2]. Both pieces of information about the 2D symmetry is used to infer the drive and velocity uniformity enabling us to adjust the properties of the incident laser, mainly the time dependent ratio of the inner beam cone power to the outer laser beam powers, to achieve proper symmetry of the implosion. Results from these experiments show inner beam propagation is not degraded compared to similar implosions with CH ablators and is corroborated by laser backscatter measurements. Variations in the shape compared with implosions using CH ablators also provides information about the cross beam energy transfer used to adjust the equatorial shape and thus infer information about the differences in plasma conditions near the laser entrance holes. Experimental results and modelling of the implosion shape for beryllium capsules will be presented along with comparisons relative to CH ablators.

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[1] J. R. Rygg, et al., Phys. Rev. Lett. 112, 195001 (2014).
[2] G. A. Kyrala, Rev Sci Instr 81,10E316(2010), and Phys. Plasmas 18, 056307 (2011).