Abstract Submitted
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Positron Radiography of Ignition-Relevant ICF Capsules[1] JACKSON WILLIAMS, HUI CHEN, JOHN FIELD, NINO LANDEN, DAVID STROZZI, Lawrence Livermore Natl Lab — X-ray [1] and neutron [2] radiography are currently used to infer residual ICF shell and fuel asymmetries and areal density nonuniformities near and at peak compression that can impede ignition. Charged particles offer an alternative probe source that, in principle, are capable of radiographing the shell shape and areal density at arbitrary times, even in the presence of large x-ray self-emission. Laser-generated positrons are evaluated as a source to radiograph ICF capsules where current ultraintense laser facilities are capable of producing 2×10^{12} relativistic positrons in a narrow energy bandwidth and short duration. Monte Carlo simulations suggest that both the areal density and shell radius can be reconstructed for ignition-relevant capsules conditions between 0.002-2 g/cm^2, and that this technique might be better suited to direct-drive. [1] R. Tommasini, et al. Development of Compton radiography of inertial confinement fusion implosions. Phys. Plasmas, 18(5):056309, 2011. [2] C. B. Yeamans, D. L. Bleuel, and L. A. Bernstein. Enhanced NIF neutron activation diagnostics. Rev. Sci. Instrum., 83(10):10D315, 2012.

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