Abstract Submitted
for the DPP14 Meeting of
The American Physical Society

Fuel–Shell Mix and Pressure Measurements Based on X-Ray Continuum Emission from Isobaric Implosion Cores on OMEGA R. EPSTEIN, F.J. MARSHALL, V.N. GONCHAROV, Laboratory for Laser Energetics, U. of Rochester, R. BETTI, R. NORA, A.R. CHRISTOPHERSON, Fusion Science Center and Laboratory for Laser Energetics, U. of Rochester — At a spectral energy matched to the anticipated hot-spot temperature range, the x-ray emissivity of an imploded target hot spot is dependent almost entirely on pressure. In this way, the hot-spot pressure at the time of peak emission can be inferred from the spatially resolved core emission. The pressure and temperature dependences of the x-ray emissivity and the neutron production rate explain a simple scaling of the total filtered x-ray emission as a power of the total neutron yield for target implosions of similar design over a broad range of shell implosion adiabats. Excess emission from less-stable, low-adiabat implosions (above the level expected from this neutron-yield scaling) attributed to the higher emissivity of shell carbon mixed into the hot spot, indicates "fuel–shell" mix fractions in the 2% to 5% range. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944 and the Office of Fusion Energy Sciences Number DE-FG02-04ER54786.

R. Epstein
Laboratory for Laser Energetics, U. of Rochester

Date submitted: 09 Jul 2014 Electronic form version 1.4