

Abstract Submitted
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A Pressure Diagnostic Based on X-Ray Continuum Images of Compressed Isobaric Hydrogen Implosion Cores 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, I.E. GOLOVKIN, J.J. MACFARLANE, Prism Computational Sciences — Pressure is the quantity that best characterizes isobaric implosion cores, and it is a key parameter in quantifying their near-ignition performance. At high spectral energy, where the free-free (FF) emission from an imploded hydrogen core is optically thin, the FF emissivity profile can be obtained from an image by Abel inversion. This emissivity, which can be modeled accurately under hot-core conditions, is strongly temperature and density dependent. With a spectral response function matched to the temperature range anticipated for the hot spot at the time of peak emission, however, the imaged intensity becomes a function of the core pressure profile with very weak temperature dependence. In this way, the measured FF emissivity profile becomes a direct measure of the core pressure profile at the time of peak emission, as well as a test of the isobaric assumption. This material is based upon work supported by the Department of Energy National Nuclear Security Administration under Award Number DE-NA0001944.

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