

Abstract Submitted
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Proposal for a Combined Time History and Time-Dependent Temperature Diagnostic for the NIF C.R. CHRISTENSEN, Los Alamos National Laboratory — The time history of nuclear burn in an ICF implosion can be inferred from either the fusion product neutrons, or from fusion gamma rays. However, velocity spreading of the neutrons due to the high temperature of the reacting ions (tens of keV) limits the resolution achievable by a diagnostic based on neutrons. Gamma-based diagnostics suffer from the small branching ratio ($\sim 10^{-5}$), and so would probably not have enough dynamic range to see all the features of interest for ICF ignition studies on the NIF. An analytic solution has been obtained that will allow individual determination of burn history and time-dependent temperature, using an array of neutron detectors at a wide range of distances from the implosion. Time resolution achievable depends on the number of detectors used, their response characteristics, their spacing, and nuclear yield and background. Simulations will be presented that demonstrate the utility of this diagnostic for NIF ignition studies.

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