Abstract Submitted
for the APR05 Meeting of
The American Physical Society

Nuclear Diagnostics of Implosion and Fusion Burn at the National Ignition Facility" CRIS W. BARNES, LARRY J. CASPER, CINDY R. CHRISTENSEN, GARY P. GRIM, JOSEPH M. MACK, JOHN A. OERTEL, DOUGLAS C. WILSON, Los Alamos National Laboratory — The National Ignition Facility will be the most revolutionary scientific facility of the early 21st century. The ability to drive inertial confinement fusion implosions with over 1 MegaJoule of laser energy will lead to tremendous advances in the study of fusion burn, hydrodynamic mix, and other research areas. Diagnostics of the fusion burn will be central to these studies. Los Alamos is leading efforts to develop three main fusion product diagnostic systems for the NIF: a Neutron Imaging System using pinhole-apertures; a burn or reaction history diagnostic that measures the DT fusion gammas using a Gas Cerenkov Detector; and a set of Neutron Scintillators to measure relative fusion yield and ion temperature, possibly with time dependence. All these systems are presently under development using implosions at the OMEGA Laser at the University of Rochester. An overview of the requirements and systems proposed for NIF will be presented. This work was performed under the auspices of the U.S. Department of Energy by the Los Alamos National Laboratory under Contract No. W-7405-ENG-36.

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Date submitted: 14 Jan 2005 Electronic form version 1.4