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Neutron Spectra Measured with Time-of-Flight Detectors at the National Ignition Facility J.P. KNAUER, V.YU. GLEBOV, C. STOECKL, T.C. SANGSTER, D.D. MEYERHOFER, Laboratory for Laser Energetics, U. of Rochester, J.A. CAGGIANO, M.J. MORAN, R. HATARIK, J.M. MCNANEY, S. FRIEDRICH, E.J. BOND, M.J. ECKART, LLNL, S.J. PADALINO, SUNY Geneseo, J.D. KILKENNY, General Atomics — Neutron time-of-fight (nTOF) instruments are used to provide data on the performance of National Ignition Facility fusion experiments. nTOF detectors are used to measure the total neutron emission, temperature of the fuel, time of peak emission (bang time), and areal density of the compressed fuel (ρR). These instruments are precision diagnostics with sufficient dynamic range and high signal-to-noise so that the neutron spectrum from inertial confinement fusion implosions can be measured. This talk will focus on data from the scintillation detectors located at 20 m. Analysis techniques using both time-domain and energy-domain data are discussed. The next-generation detector based on an organic crystal scintillator show that improvements to scintillator decay, recording fidelity, and reduced scattering from the housing improve the precision of the neutron spectral measurement. This work was supported by the U.S. Department of Energy Office of Inertial Confinement Fusion under Cooperative Agreement No. DE-FC52-08NA28302.

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