

Abstract Submitted
for the HAW14 Meeting of
The American Physical Society

First Measurement of Reaction-in-Flight Neutrons at the National Ignition Facility ANTON TONCHEV, C. CERJAN, D. FORTNER, E. HENRY, D. SHAUGHNESSY, D. SCHNIEDER, W. STOEFFL, M. STOYER, C. YEAMANS, LLNL, M. BOSWELL, T. BREDEWEG, G. GRIM, G. JUNGMAN, M. FOWLER, A. HAYES, A. OBST, R. RUNDBERG, A. SCHULZ, J. WILHELMY, C. WILDE, LANL, M. BHIKE, B. FALLIN, M. GOODEN, C. HOWELL, W. TOENOW, TUNL, LLNL/LANL/TUNL COLLABORATION — The first measurement of reaction-in-flight (RIF) neutrons, also known as tertiary neutrons, has been performed at the National Ignition Facility (NIF) using an activation technique. Thulium foils positioned at 50 cm from the burning deuterium-tritium (DT) capsule have been exposed to the characteristic DT neutron spectrum. The high-energy part of these neutrons with energies above 15.0 MeV can produce ^{167}Tm via the $^{169}\text{Tm}(n,3n)$ reaction. The 208-keV γ -ray, emitted from the decay of ^{167}Tm with a half-life of 9.2 days, has been measured using two clover detectors. The first preliminary result implies that the ratio of RIF neutrons ($E_n > 15.0$ MeV) versus the total neutrons is $1 \times 10^{-4} \pm 3 \times 10^{-5}$. The important implication of these measurements on our knowledge of the charged-particle stopping power in strongly coupled quantum-degenerate plasma will be presented.

Anton Tonchev
Lawrence Livermore Natl Lab

Date submitted: 30 Jun 2014

Electronic form version 1.4