

Abstract Submitted
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T-T Neutron Spectrum from Inertial Confinement Implosions

JOSEPH CAGGIANO, Lawrence Livermore National Laboratory, MARIA GATU JOHNSON, MIT, ANDREW BACHER, Indiana University Bloomington, DENNIS MCNABB, Lawrence Livermore National Laboratory — Measurements of the $T(2n,)^4\text{He}$ reaction (TT) have been conducted using high-purity tritium, gas-filled capsules in inertial confinement fusion (ICF) implosions. At the OMEGA laser facility, TT neutron spectra were measured using two instruments: the neutron-time-of-flight (nTOF) facility and the Magnetic Recoil Spectrometer (MRS) facility. The resolutions of these systems were improved for nTOF by using a crystal with much faster decay time and for MRS by using a thinner, more uniform CD2 recoil foil. Measurements at c.m. energies of 10-30 keV can be used to study the TT three-body reaction mechanism near astrophysical energies. With both nTOF and MRS, we observe a small, narrow peak starting at the 9.44 MeV endpoint, corresponding to the $n + ^5\text{He}$ (g.s.) reaction channel. Most of the TT reaction proceeds through other reaction channels which produce broad, continuous neutron spectra in the range 0 - 9.5 MeV. Implications for ICF experiments at the National Ignition Facility will be discussed. Work in collaboration with J. A. Frenje, D. T. Casey, M. J.-E. Manuel, N. Sinenian, A. B. Zylstra, F. H. Seguin, C. K. Li, R. D. Petrasso, V. Yu Glebov, P. B. Radha, D. D. Meyerhofer, T. C. Sangster, P. A. Amendt, R. Hatarik, D. B. Sayre, J. R. Rygg, H. W. Herrmann and Y. H. Kim.

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