

Abstract Submitted
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T(t,2n)⁴He Neutron Spectrum from Inertial Confinement Implosions DENNIS MCNABB, LLNL, ANDY BACHER, Indiana Univ., CARL BRUNE, Ohio Univ., JAC CAGGIANO, LLNL, MARIA GATU-JOHNSON, MIT, DAN SAYRE, LLNL, ICF STELLAR RATES TEAM — Measurements of the T(t,2n)⁴He reaction (TT) have been conducted using high-purity tritium, gas-filled capsules in ICF implosions at the NIF and OMEGA facilities. Neutron spectra were measured using two instruments: the neutron-time-of-flight (nTOF) and the Magnetic Recoil Spectrometer. The nTOF spectra represent a significant improvement in energy resolution and statistics over previous measurements, and afford the first definitive observation of a small, narrow peak starting at the 9.44 MeV endpoint resulting from sequential decay through the ground state of ⁵He at low reaction energies $E_{\text{cm}} < 100$ keV. However, most of the TT reaction produces a broad neutron spectrum from 0-9.5 MeV. To describe the spectrum, an R-matrix model that accounts for interferences from fermion symmetry and intermediate states has been developed. This model can describe the entire spectrum via sequential decay through $l=1$ states in ⁵He, which differs from previous interpretations. Work is in collaboration with V. Yu Glebov, R. Hatarik, D. L. Bleuel, D. T. Casey, C. J. Cerjan, M. J. Eckart, R. J. Fortner, J. A. Frenje, G. P. Grim, C. Hagmann, J. P. Knauer, J. L. Kline, J. M. McNaney, J. M. Mintz, M. J. Moran, A. Nikroo, T. Phillips, J. E. Pino, B. A. Remington, D. P. Rowley, D. H. Schneider, V. A. Smalyuk, W. Stoeffl, R. E. Tipton, S. V. Weber, C. B. Yeamans, C. K. Li, M. J.-E. Manuel, D. D. Meyerhofer, R. D. Petrasso, P. B. Radha, T. C. Sangster, N. Sinenian, F. H. Seguin, and A. B. Zylstra.

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