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Neutron-induced reactions relevant for Inertial-Cofinement Fusion Experiments MELISSA BOSWELL, MATHEW DEVLIN, NIKOLAOS FOTIADIS, FRANK MERRILL, RONALD NELSON, Los Alamos National Laboratory, ANTON TONCHEV, Livermore National Laboratory — The typical ignition experiment at the National Ignition Facility ablatively implodes a plastic capsule filled with DT fuel, generating a high flux of 14-MeV neutrons from the d(t,n)α reaction. There is some spread in the energy of these primary 14-MeV neutrons, which is mainly attributable to Doppler shifting from the relative thermal motion of the burning DT fuel. Neutrons created during this reaction have 5-10% chance of scattering before escaping the fuel assembly, losing some fraction of their energy in the scattering process. Neutrons emerging with an energy greater than the reaction energy are generated by a two-step process where neutrons first transfer momentum to a deuteron or tritium ion, these enhanced energy ions then fuse in flight to produce higher energy neutrons; some of these neutrons have energies in excess of 30 MeV. Measuring the fluencies of both the low- and high-energy neutrons is a powerful mechanism for studying the properties of the fuel assembly, and the various parameters important to inertial confinement fusion. We have developed a number of tools to measure the spectral characteristics of the NIF neutron spectrum. Most of these methods rely on exploiting the energy dependence of (n,γ), (n,2n), (n,3n) and (n,p) reactions on a variety o

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