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T(T,4He)2n and 3He(3He,4He)2p Reactions and the Energy Dependence of Their Mechanisms ANDREW BACHER, Indiana University Bloomington, DENNIS MCNABB, Lawrence Livermore Lab, CARL BRUNE, Ohio University, DAN SAYRE, Lawrence Livermore Lab, GERRY HALE, Los Alamos National Lab, JOHAN FRENJE, MARIA GATU JOHNSON, MIT — We have studied the T(T,alpha)2n reaction because it is the charge symmetric analog to the 3He(3He,alpha)2p reaction which completes the most direct mode of the p-p chain in stellar interiors. These reactions lead to three-body final states whose energy spectrum shapes are dominated by the strong nucleon-alpha interaction and the weaker nucleon-nucleon interaction. These experiments were done at OMEGA at the University of Rochester and at the NIF at Lawrence Livermore Lab. We will focus on two features: (1) the excitation energy dependence of the reaction mechanism and (2) the center-of-mass energy dependence of the reaction mechanism. At stellar energies (OMEGA and the NIF) we find that the shape of the neutron spectrum peaks in the middle. The n-alpha 1/2- excited state is about two times stronger than the n-alpha 3/2- ground state. For the 3He+3He reaction (at CalTech), the proton spectrum peaks at the high end. The p-alpha 3/2- state is about two times stronger than the 1/2- state. This difference in the spectrum shape is explained by theoretical models which include the interference between the two identical fermions in the final state. At CalTech we have angular distributions of the 3He+3He reaction from 2 MeV to 18MeV. We see the p-wave strength increasing.

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