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Measurement of the fusion excitation function for ^{19}O + ^{12}C at near barrier energies[1] VARINDERJIT SINGH, T.K. STEINBACH, J. VADAS, B.B. WIGGINS, S. HUDAN, R.T. DESOUZA, Indiana Univ - Bloomington, L.T. BABY, V. TRIPATHI, S.A. KUVIN, I. WIEDENHOVER, Florida State University
— Fusion of neutron-rich light nuclei in the outer crust of an accreting neutron star has been proposed as responsible for triggering X-ray super-bursts. The underlying hypothesis in this proposition is that the fusion of neutron-rich nuclei is enhanced as compared to stable nuclei. To investigate this hypothesis, an experiment has been performed to measure the fusion excitation function for ^{18}O and ^{19}O nuclei incident on a ^{12}C target. A beam of ^{19}O was produced by the ^{18}O(d,p) reaction at Florida State University and separated using the RESOLUT mass spectrometer. The resulting ^{19}O beam bombarded a 100 μg/cm^2 ^{12}C target at an intensity of 2-4 x 10^3 p/s. Evaporation residues resulting from the de-excitation of the fusion product were distinguished by measuring their energy and time-of-flight. Using silicon detectors, micro-channel plate detectors, and an ionization chamber, evaporation residues were detected in the angular range $\theta_{lab} \leq 23^\circ$ with high efficiency. Initial experimental results including measurement of the fusion cross-section to approximately the 100 mb level will be presented. The measured excitation function will be compared to theoretical predictions.

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