Abstract Submitted
for the APR16 Meeting of
The American Physical Society

Measuring the Fusion Cross-Section of ^{18}O + ^{12}C with Low-Intensity Beams near and below the Coulomb barrier[1] TRACY STEINBACH, JUSTIN VADAS, VARINDERJIT SINGH, SYLVIE HUDAN, ROMUALDO DESOUZA, Indiana Univ - Bloomington, LAGY BABY, SEAN KUVIN, INGO WIEDENHOVER, Florida State University, SAIT UMAR, VOLKER OBERACKER, Vanderbilt University — Fusion between neutron-rich light nuclei in the crust of an accreting neutron star has been proposed as a heat source that triggers an X-ray superburst. To explore the probability of such fusion events and examine their decay characteristics an experimental program using beams of neutron-rich light nuclei has been initiated. The evaporation residues (ERs) that result from the fusion of ^{18}O and ^{12}C nuclei, are directly measured and distinguished from unreacted beam particles on the basis of their energy and TOF. Using an experimental setup developed for the measurement with low-intensity ($<10^5$ ions/s) radioactive beams the fusion excitation function for ^{18}O+^{12}C has been measured in the sub-barrier domain down to the 820 μb level. The measured fusion excitation function is compared to the prediction of a density constrained TDHF model. In addition to the measured cross-section, the measured ER angular distributions provide insight into the relative importance of the different de-excitation channels. These ER angular distributions are compared to the predictions of a statistical model code, EVAPOR revealing an under-prediction of the de-excitation channels associated with α emission. The de-excitation channels associated with proton emission following fusion will also be investigated.

[1]Supported by the US DOE under Grant No. DEFG02-88ER-40404

Tracy Steinbach
Indiana Univ - Bloomington

Date submitted: 06 Jan 2016 Electronic form version 1.4