Abstract Submitted
for the APR14 Meeting of
The American Physical Society

Measuring the Fusion Cross-Section of Light Nuclei with Low-Intensity Beams TRACY STEINBACH, Indiana University, KYLE BROWN, Washington University in St. Louis, SYLVIE HUDAN, ROMUALDO DESOUZA, Indiana University — Reactions between neutron-rich light nuclei have been proposed as a heat source in the crust of an accreting neutron star that triggers an X-ray superburst. To explore the probability of such fusion events as well as better understand the fusion dynamics between neutron-rich nuclei, an experimental program to measure the dependence of the fusion cross-section on neutron number has been initiated. Key to these measurements is developing an approach to measure the total fusion cross-section for beams of low-intensity light nuclei ($<10^5$ ions/s) on light targets. Fusion residues resulting from the fusion of oxygen nuclei with ^{12}C at energies near and below the Coulomb barrier are directly measured and distinguished from unreacted beam particles on the basis of their energy and time-of-flight (TOF). The TOF is measured between a microchannel plate (MCP) detector and a segmented Si detector. Two initial problems were charge trapping in the Si detector and slit scattering in the MCP detector. These problems have both been minimized by implementing a gridless MCP detector and a new Si design making the measurement feasible. Supported by the US DOE under Grant No. DEFG02-88ER-40404

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Date submitted: 08 Jan 2014 Electronic form version 1.4