Abstract Submitted
for the HAW09 Meeting of
The American Physical Society

Possible sub-barrier hindrance in the fusion of light nuclei
SPENCER ANGUS THOMAS, XIAODONG TANG, MASAHIRO NOTANI, BRIAN BUCHER, CHI MA, XIAO FANG, LARRY LAMM, University of Notre Dame, CHENG-LIE JIANG, Argonne National Laboratory, Argonne, Illinois 60439
— Fusion reactions between light nuclei have been studied because of the significance of their reactions for a wide variety of stellar burning processes. Since the experimental data are limited to energies higher than those of astrophysical interest, S-factors must be extrapolated using theoretical model calculations. Recently, an unexpected hindrance of heavy-ion fusion cross sections has been observed at sub-barrier energies, which could affect the astrophysically important fusion reactions. To investigate the hindrance effect, we have measured the cross sections for the ^{12}C(^{13}C, p)^{24}Na reaction through measurement of β-decay of ^{24}Na by the $\beta\gamma$-coincidence method. We developed a cosmic-ray veto system required for the low background coincidence measurements. The background suppression achieved with the veto system allowed us to measure the fusion cross sections at extreme sub-barrier energies, below the lowest energies previously studied.

Spencer Angus Thomas
University of Notre Dame

Date submitted: 29 Jul 2009 Electronic form version 1.4