Abstract Submitted
for the DNP11 Meeting of
The American Physical Society

First use of HELIOS at forward laboratory angles B.P. KAY, York, M. ALCORTA, B.B. BACK, J.A. CLARK, C.R. HOFFMAN, K.E. REHM, J.P. SCHIFFER, S. ZHU, Argonne, C.M. DEIBEL, JINA/Argonne — The HELIOS spectrometer eliminates the problem of kinematic compression when performing transfer reactions in inverse kinematics, typically resulting in a factor of $\sim$3 improvement in excitation-energy resolution over conventional approaches. To date the instrument has been used primarily for (d,p) reaction studies with both stable and radioactive ion beams, where the outgoing protons are detected at backwards laboratory angles. Here we report on the first use of HELIOS with negative- Q-value reactions; the (d,t) and (d,^{3}He) reactions induced by a 14-MeV/u ^{28}Si beam on a CD_2 target. For these reactions, outgoing tritons and ^{3}He ions are detected at forward laboratory angles along with a range of unwanted reactions products. In HELIOS, particle identification by means of the cyclotron period of the outgoing ion allows unique selection of the low-energy branch of ^{3}He or tritons, separating them from the dominant background of protons and alpha particles that arise from fusion-evaporation of the beam with ^{12}C. This work was supported by the US Department of Energy, Office of Nuclear Physics, under Contract No. DE-AC02-06CH11357 and Grant No. DE-FG-2-04ER41320, and NSF Grant No. PHY-08022648, and the UK Science and Technology Facilities Council.

B. P. Kay
York

Date submitted: 30 Jun 2011 Electronic form version 1.4