Abstract Submitted
for the DNP11 Meeting of
The American Physical Society

First experimental results of the ^{33}S(α,p)^{36}Cl cross section for production in the early Solar System MATTHEW BOWERS, University of Notre Dame, PHILIPPE COLLON, YOAV KASHIV, WILLIAM BAUDER, KAREN CHAMBERLIN, WENTING LU, DANIEL ROBERTSON, CHRISTOPHER SCHMITT — The existence in the early Soalr System (ESS) of the now extinct ^{36}Cl ($t_{1/2} = 3.01 \times 10^5$ yr) has been determined from correlation between isotopic enrichment of its daughter isotope, ^{36}S, and Cl abundance in meteorites. The relatively high inferred initial Solar System ^{36}Cl/Cl ratio strongly suggests that ^{36}Cl was produced in the ESS by bombardment of solar energetic particles on gas and dust in the protoplanetary disc. However, no experimental data are currently available for the relevant production reactions cross sections. Instead, models of ESS production use Hauser-Feshbach approximations. The ^{33}S(α,p)^{36}Cl reaction is calculated to have the largest cross section at bombardment energies < 5 MeV/A. Here we report first results of a measurement of the averaged reaction cross section in the energy range 1.93- 1.95 MeV/A. Our result, 191 ± 33 mb (1σ), is significantly higher than results of previous calculations, 102 and 34 mb.

Matthew Bowers
University of Notre Dame

Date submitted: 01 Jul 2011 Electronic form version 1.4