Abstract Submitted
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Direct Measurements of the ^{23}Na(α,p)^{26}Mg reaction cross section at energies relevant for the production of galactic ^{26}Al[1] SERGIO ALMARAZ-CALDERON, Argonne National Laboratory, PETER F. BERTONE, Louisiana State University, MARTIN ALCORTA, K. ERNST REHM, MICHAEL ALBERS, Argonne National Laboratory, CATHERINE M. DEIBEL, Louisiana State University, JOHN P. GREENE, DALE H. HENDERSON, CALEM R. HOFFMAN, Argonne National Laboratory, SCOTT T. MARLEY, Department of Physics, University of Notre Dame, JOHN ROHRER, Argonne National Laboratory — In the convective C/Ne burning shell of massive pre-supernova stars, the ^{23}Na(α,p)^{26}Mg reaction is one of the main sources of protons for the ^{25}Mg(p,γ)^{26}Al reaction, which is the primary direct process for ^{26}Al production in this environment. A recent study found that a factor of 10 increase in the ^{23}Na(α,p)^{26}Mg reaction rate corresponds to a factor of 3 change in the final abundance of ^{26}Al for this particular scenario. No reliable experimental information exists at appropriate astrophysical energies. The recommended rate is based on a statistical model. We have performed a direct measurement of the ^{23}Na(α,p)^{26}Mg reaction cross section using inverse kinematics with a ^{23}Na beam from ATLAS, a cryogenic ^{4}He gas target, and an array of Double Sided Silicon Detectors. Integrated cross sections for the reactions ^{23}Na(α,p$_0$)^{26}Mg and ^{23}Na(α,p$_1$)^{26}Mg* have been extracted for the first time at astrophysically relevant energies(E_{cm} = 1.84 MeV to 2.63 MeV). The corresponding stellar reaction rate has been recalculated and compared with the statistical model recommended rate.

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