Abstract Submitted
for the DNP20 Meeting of
The American Physical Society

Direct measurement of 13N(alpha,p)16O using MUSIC HESHANI JAYATISSA, KARL ERNST REHM, RASHI TALWAR, Argonne National Laboratory, KALLE AURANEN, University of Jyvaskyla, MELINA AVILA, Argonne National Laboratory, JIE CHEN, Michigan State Universitty, CLAYTON DICKERSON, CALEM HOFFMAN, BENJAMIN KAY, Argonne National Laboratory, SEAN KUVIN, Los Alamos National Laboratory, DANIEL SANTIAGO-GONZALEZ, CHENG-LIE JIANG, RICHARD PARDO, Argonne National Laboratory, CLAUDIO UGALDE, University of Illinois at Chicago, JACK WINKELBAUER, Los Alamos National Laboratory, SERGIO ALMARAZ-CALDERON, Florida State University — The ^{13}N(α,p)^{16}O reaction has been recently found to have a significant impact in the estimated yields of ^{13}C during the ingestion of hydrogen into the helium shell of massive stars during the shock propagation of a core-collapse supernovae. The rate of this reaction determines the amount of ^{13}N that can β-decay, producing ^{13}C. The reaction rate of the inverse reaction ^{16}O(p,α)^{13}N also plays a role in the creation of ^{12}C by oxygen burning at high proton abundances via ^{16}O(p,α)^{13}N(γ,p)^{12}C, which in turn affects the abundances of argon and calcium in type Ia supernovae nucleosynthesis. There are only very few experimental data available for the ^{13}N(α,p)^{16}O reaction and the rate of this reaction is not well-constrained. A direct measurement of the ^{13}N(α,p)^{16}O reaction was performed using a 30 MeV secondary beam of ^{13}N beam from the Argonne In-Flight Radioactive Ion Separator (RAISOR) and the active-target detector MUSIC at Argonne National Laboratory.

Heshani Jayatissa
Argonne National Laboratory

Date submitted: 26 Jun 2020 Electronic form version 1.4