Abstract Submitted
for the DNP19 Meeting of
The American Physical Society

Toward Understanding the ^{15}O$(\alpha,\gamma)^{19}$Ne Reaction Rate: α-Transfer Reactions on ^{15}N[1] CATHERINE DEIBEL, GEMMA WILSON, ERIN GOOD, Louisiana State University, AMBER LAUER, Duke University, ALAN CHEN, McMaster University, BIRGER BACK, CALEM HOFFMAN, BEN KAY, RICHARD PARDO, DANIEL SANTIAGO-GONZALEZ, TSZ LEUNG TANG, Argonne National Laboratory, ALAN WUOSMAA, University of Connecticut — The ^{15}O$(\alpha,\gamma)^{19}$Ne reaction is well known to be an important breakout from the hot CNO cycle into the thermonuclear runaway that drives Type I X-Ray Bursts. This reaction rate is dominated by resonant α capture into a state at $E_x = 4.033$ MeV in ^{19}Ne. While there have been a variety of experimental studies aimed at determining this reaction rate, the α width of this resonance remains the dominant uncertainty. Currently, ^{15}O beams of sufficient intensity to study this reaction directly are not available and indirect techniques must be used in order to study the 4.033-MeV state in ^{19}Ne. Measurements of the (^{6}Li,d) and (^{7}Li,t) α-particle transfer reactions on beams of ^{15}N have been performed at the Argonne Tandem LINAC Accelerator System facility at Argonne National Laboratory using the HELIcal Orbit Spectrometer (HELIOS) in order to study the mirror to the 4.033-MeV state, located at 3.908 MeV in ^{19}F. Preliminary results will be shown and implications for the ^{15}O$(\alpha,\gamma)^{19}$Ne reaction rate discussed.

[1]This work was partially supported by the U.S. Department Of Energy, Office of Nuclear Physics under Contract numbers DE-FG02-96ER40978 and DE-AC02-06CH11357. This research used resources of ANL's ATLAS facility, which is a DOE Office of Science User Facility.

Catherine Deibel
Louisiana State University

Date submitted: 01 Jul 2019 Electronic form version 1.4