Abstract Submitted
for the DNP19 Meeting of
The American Physical Society

Experimental Challenges for Measuring ^{14}N$(\alpha,\gamma)^{18}$F in Inverse Kinematics SHANE MOYLAN, CHRIS SEYMOUR, MANOEL COUDER, ALEXANDER DOMBOS, LUIS MORALES, GWENAELLE GILARDY, University of Notre Dame, JERRY HINNEFELD, Indiana University South Bend, PATRICIA HUESTIS, MICHAEL KURKOWSKI, DANIEL ROBERTSON, EDWARD STECH, MICHAEL SKULSKI, HAOBO YAN, GEORG BERG, MICHAEL WIESCHER, University of Notre Dame — Recoils from the ^{14}N$(\alpha,\gamma)^{18}$F reaction were recently detected for the first time using the St. George recoil mass separator. This reaction is the first in the ^{14}N$(\alpha,\gamma)^{18}$F$(\beta^{+}\nu)^{18}$O$(\alpha,\gamma)^{22}$Ne(α,n) chain which produces s-process neutrons in TP-AGB, massive helium burning, and carbon burning stars. Recoil mass separation is a technique to study such reactions in inverse kinematics by detection of the recoil nuclei from these reactions. This is effectively done using a helium gas-jet target (HIPPO), an ion optics transport line which includes a Wien filter velocity selector (St. George), and a time-of-flight vs. energy detection system. The recent characterization of the ion optics and reconstruction of the HIPPO helium gas-jet target have allowed for the first detection of ^{18}F recoils. The preliminary results of this commissioning experiment and the experimental challenges of using the recoil separator will be presented, along with the ongoing and proposed improvements to HIPPO that will allow future measurements with St. George.

Shane Moylan
University of Notre Dame

Date submitted: 20 Aug 2019 Electronic form version 1.4