

MONDAY

OCTOBER 5

4:00 P.M.

RM 124 NSH

Measurement of the $^{17}\text{F}(\text{d},\text{n})^{18}\text{Ne}$ reaction using RESONEUT

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The $^{17}\text{F}(\text{p},\gamma)^{18}\text{Ne}$ reaction of astrophysical importance has been studied using the surrogate reaction $^{17}\text{F}(\text{d},\text{n})^{18}\text{Ne}$ in inverse kinematics. The usefulness of this type of approach has been demonstrated in previous experiments at the RESOLUT facility[1]. In this work we have developed a compact neutron detector array, RESONEUT, which is specialized for (d,n) reactions in inverse kinematics. The threshold and efficiency properties of the neutron detectors were characterized using the $^{12}\text{C}(\text{d},\text{n})^{13}\text{N}$ reaction. Spectroscopy of the ^{18}Ne nucleus was accomplished using two methods. The first was by neutron time of flight spectroscopy and the second was by kinematic reconstruction of the unbound compound nucleus by detecting the emitted proton and heavy ion. We compared our results with those obtained from $^{17}\text{F} + \text{p}$ elastic scattering measurements and from the direct $^{17}\text{F}(\text{p},\gamma)$ measurement conducted at Oak Ridge[2,3].

[1] Peplowski et al, PRC 79, 032801 (2009)

[2] Bardayan et al, PRL 83, 45(1999)

[3] Chipps et al, PRL 102, 152502 (2009)