Contribution ID: **36** Type: **contributed talk**

^{10}B(α,n)^{13}N Cross Section Measurement

Wednesday, 23 May 2018 15:15 (15 minutes)

The main neutron source reactions for the s-process are ^{13}C(α,n)^{16}O and ^{22}Ne(α,n)^{25}Mg. The previous cross section measurements were confined to α-energies higher than the Gamow windows[1]. The ^{10}B(α,n)^{13}N reaction has been sugguested as a possible background neutron source for experiments at underground facilities, like CASPAR, at very low energies. Meanwhile, in the field of applied nuclear physics, the ^{10}B(α,n)^{13}N reaction is of particular interest, since it is identified as a potential diagnostic for the hydrodamical mix of NIF capsule. This reaction has been studied at University of Notre Dame using the Santa Anna 5 MV accelerator, with a newly developed array of deuterated liquid scintillators. An unfolding technique was applied on these detectors to extract neutron spectrum from light response spectrum. The array of neutron detectors has better pulse shape discrimination [2], and has been used to do angular distribution measurements at 12 angles. In addition, the $(\alpha, \alpha_1\gamma)$ and $(\alpha, p_1 23\gamma)$ channels have been monitored independently by a HPGe detector. Preliminary data analysis indicates the discovery of a new resonance in low energy region. An angular distribution analysis will be performed on the differential cross section data to obtain the total cross section.\newline\newline
[1] L. Van Der Zwan and K.W. Geiger, NPA \textbf{216}, 188 (1973). \newline
[2] F.D Becchetti \textit{et al.} NIMA \textbf{820}, 112 (2016). \newline\newline
[1]Research supported by NSF PHY-1430152, and JINA PHY-1419765.

Primary author: LIU, Qian (University of Notre Dame)

Co-authors: AXEL, Boeltzig (University of Notre Dame); VANDE KOLK, Bryant (University of Notre Dame); Mr SEYMOUR, Christopher (University of Notre Dame); Ms GILARDY, Gwenaëlle (Notre Dame); MACON, Kevin (University of Notre Dame); Mr MORALES, Luis (University of Notre Dame); FEBBRARO, Michael (ORNL); Prof. WIESCHER, Michael (University of Notre Dame); Dr DEBOER, Richard J. (University of Notre Dame); MOYLAN, Shane (University of Notre Dame); Dr PAIN, Steven (ORNL); Ms CHEN, Yingying (University of Notre Dame)

Presenter: LIU, Qian (University of Notre Dame)

Session Classification: Session M3