$^{10,11}$B($\alpha$,n)$^{13,14}$N cross section measurements

QIAN LIU, University of Notre Dame and JINA, FEBBRARO MICHAEL, Oak Ridge National Laboratory, RICHARD DEBOER, WIESCHER MICHAEL, University of Notre Dame and JINA — $^{10,11}$B($\alpha$,n)$^{13,14}$N have been identified as possible background sources for underground experiments at low $E_\alpha$ energy [1]. These reactions have been studied at University of Notre Dame’s Nuclear Science Laboratory using Santa Anna 5 MV accelerator. $^{11}$B($\alpha$,n)$^{14}$N was measured with a $^3$He counter, and a good R-matrix fit was obtained, which shows our data in agreement with other published data. Measurement of $^{10}$B($\alpha$,n)$^{13}$N was performed down to $E_\alpha = 0.57$MeV, with two deuterated liquid scintillators, EJ315 and EJ301D, and with the help of unfolding technique, neutron energy information can be extracted. EJ301D is a newly-developed neutron detector, with better pulse shape discrimination [2], and has been used to do angular distribution measurements. Additionally, the ($\alpha$, $\alpha_1\gamma$) and ($n$, $p\gamma$) channels have been monitored independently by observation of 718keV $\gamma$ transition in $^{10}$B and 3853keV $\gamma$ transition in $^{13}$C. Preliminary analysis indicates the discovery of a new resonance in low energy region. [1] D.-M.Me et al. NIMA 606, 651(2009). [2] F.D Becchetti et al. NIMA 820, 112(2016).

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