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Improving Uncertainties in the $^{17}\text{O}(\alpha, n)^{20}\text{Ne}$ cross section

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The $^{17}\text{O}(\alpha, n)$ reaction recycles neutrons for the most efficient neutron absorber ($^{16}\text{O}(n, \gamma)^{17}\text{O}$) during both the core He-burning and shell C-burning phases of the weak s-process. In order to improve uncertainties in the reaction rate, we are performing (α, n) and $(\alpha, n'\gamma)$ cross section measurements at the 5U accelerator of the Notre Dame Nuclear Science Laboratory. We will report on a recent measurement that was performed with $\text{LaBr}_3:\text{Ce}$ gamma-ray detectors from the HAGRID array in combination with a deuterated liquid scintillator neutron detector. The employed digital electronics allow for pulse shape discrimination in both detector types, and spectral unfolding is used to obtain neutron energy information from the observed light output spectrum in the liquid scintillation detector.

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