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The Design, Validation, and Future Plans for a New Neutron Detector at Ohio University[1] KRISTYN BRANDENBURG, Ohio University — Though (α,n) reaction cross sections play a key role in nuclear astrophysics and applications, many are poorly constrained by nuclear experiments and have significant uncertainties in theoretical predictions. Improving this situation will be done in part using a newly developed neutron long counter, HeBGB, at the Ohio University Edwards Accelerator Lab. The detector was designed using MCNP6 to have near constant efficiency in the neutron energy range relevant for core-collapse supernovae and special nuclear materials. Efficiency validation measurements have been performed with HeBGB, which utilize well-characterized reactions with constrained cross sections and known neutron energies. The first measurement planned for HeBGB is ^{27}Al(α,n) near threshold, which dominates the astrophysical rate and has disagreement between theoretical predictions and the only prior measurement in this energy regime. In preparation, various aluminum targets have been tested for purity using RBS, PIXE, and PIGE nuclear reaction analysis techniques. We find that store bought aluminum foils offer higher purity than traditional foil suppliers. In addition to these results, an update will be provided on the validation measurements of the HeBGB long counter.

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