

Abstract Submitted
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Improved Waveform Analysis Techniques for Gamma Ray Spectroscopy¹ ERIC LESTER, Cyclotron Institute, Texas A&M University — The evolution of Population III stars has never been directly observed. Indirect techniques may provide crucial constraints on the proposed models of these stars. A planned experiment will study the ${}^7\text{Be}({}^6\text{Li}, \text{d}){}^{11}\text{C}$ reaction to investigate the ${}^7\text{Be}(\alpha, \gamma){}^{11}\text{C}$ reaction rate for its contribution to the hot pp-chain. An important facet of this experiment will be the detection of gamma rays from the decay of states around the alpha threshold in ${}^{11}\text{C}$. The Texas CsI Array for Astrophysical Measurements (TexCAAM) has been created for this purpose, and this work concerns the testing of the device. Offline processing tools for digitized waveforms were developed and tested for potential energy resolution improvements over conventional ADC electronics. Other programs were created to determine angular correlations between successively emitted gamma rays and with an external deuteron signal. This software can be used in future experiments to not only to confirm the population of astrophysically important excited states in the ${}^7\text{Be}({}^6\text{Li}, \text{d}){}^{11}\text{C}$ reaction, but also to constrain the spin and parities of other nuclei of interest. Developing results are presented, including a comparison of the methods developed in this work and conventional ADC techniques.

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