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Studying the Energy Levels in ^{19}Ne Above the Proton Threshold

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A direct way to test nova explosion models would be to observe gamma rays created in the ^{18}F , is believed to be the main source of observable 511 keV gamma rays. The main destruction mechanism of ^{18}F is thought to be the $^{18}\text{F}(p,\alpha)^{15}\text{O}$ reaction. Uncertainties in the reaction rate are attributed to uncertainties in the energies, spins, and parities of the nuclear levels in ^{19}Ne above the proton threshold. In an effort to understand these levels the $^{19}\text{F}(^3\text{He},t)^{19}\text{Ne}$ reaction was measured at Argonne National Laboratory using a ^3He beam. Gammasphere ORRUBA¹ Dual Detectors for Experimental Structure Studies (GODDESS) was used to measure gamma rays from the de-excitation of ^{19}Ne in coincidence with the reaction tritons. Preliminary observations will be presented. This research was supported in part by the National Science Foundation Grant Number PHY-1419765, the National Nuclear Security Administration under the Stewardship Science Academic Alliances program through DOE Cooperative Agreement DE-NA002132, and Argonne National Laboratory contract number DE-AC02-06CH11357.

¹Oak Ridge Rutgers University Barrel Array

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