Abstract Submitted
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A new method to study the resonances in the 12C+12C fusion reaction[1] ADAM ALONGI, University of Notre Dame — The $^{12}C + ^{12}C$ nuclear fusion reaction is an important part of the reaction processes which power large stars and create heavier elements. The fused nuclei form an excited ^{24}Mg nucleus which can decay by emitting a proton, neutron, or alpha particle as well as gamma rays. The proton channel was experimentally studied at lab energies of 8.2MeV using a thick target. Preliminary data analysis showed that the Q-value spectrum of the p1 channel is broader than the other proton channel, indicating the existence of a resonance at lower energy. To understand the abnormal shape of the Q-value spectrum, a detailed simulation using the Geant4 code was developed to reproduce the experimental results. By comparing the simulation results with the observed Q-value spectrum, the parameters of the resonance in the p1 channel are determined. This new technique will provide a more efficient way to search for resonances in the $^{12}C + ^{12}C$ fusion reaction at lower energies.

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