

Abstract Submitted
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Monte Carlo Simulation of Neutron Background Sources in the Measurement of the $^{12}\text{C}(\alpha,\gamma)^{16}\text{O}$ Reaction Rate¹ KEVIN GULLIKSON, Illinois Institute of Technology, CLAUDIO UGALDE², Argonne National Laboratory — The $^{12}\text{C}(\alpha,\gamma)^{16}\text{O}$ reaction rate strongly affects the relative abundances of chemical elements, as well as when core collapse supernovae occur. In a proposed experiment, a water-filled bubble chamber will be used to measure the reverse reaction rate. A potential background source is photoneutrons from the γ -ray beam collimator entering the bubble chamber and generating a false signal. To minimize this effect, a Monte Carlo simulation has been performed to compare the number of photoneutrons created in lead, copper, and aluminum collimators. The simulation also compared the effectiveness of concrete, polyethylene, and water neutron shields. It was found that 30 cm of copper would be an effective collimator, and 30-40 cm of polyethylene a satisfactory neutron shield.

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