

Abstract Submitted  
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**Elastic and inelastic neutron scattering cross sections for  $^{12}\text{C}$  at  $E_n = 5.9, 6.1, \text{ and } 7.0 \text{ MeV}$** <sup>1</sup> ELIZABETH LYONS, SALLY HICKS, THEODORE MORIN, ELIZABETH DERDEYN, University of Dallas, ERIN PETERS, University of Kentucky — Measurements of neutron elastic and inelastic scattering differential cross sections from  $^{12}\text{C}$  have been performed at incident neutron energies of 5.9, 6.1, and 7.0 MeV. Comparisons of existing experimental cross sections (NNDC) at these incident neutron energies reveal large discrepancies. Accurate measurements of  $^{12}\text{C}$  cross sections are vital to facilitate precise calculations regarding criticality conditions for nuclear reactors, advances in security screening methods, and better understanding astrophysical and nuclear phenomenon. During preliminary measurements of  $^{12}\text{C}$  cross sections at the University of Kentucky Accelerator Laboratory (UKAL), we realized the relative efficiency of the deuterated benzene (main) detector was needed over an unusually large range of neutron energies due to the high Q value of the first excited state of  $^{12}\text{C}$ . Those experiments were repeated during the summer of 2017 to measure *in situ* the relative detector efficiency with better beam conditions and a better understanding of background observed from the  $^2\text{H}(d, n)^3\text{He}$  source reaction. The resulting improved detector efficiency was used in determining the neutron elastic and inelastic scattering cross sections. While the former were found to be in excellent agreement with evaluated cross sections from ENDF, the latter show some discrepancies, especially at 6.1 MeV. Our results will be presented.

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