

Benchmark experiment for large angle scattering cross section of 14 MeV neutrons.

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The scattering cross section at large angles varies depending on the nuclear data library. To validate these cross sections, we developed a benchmark experimental system and conducted measurements for several elements, including iron and tungsten. For iron, calculations based on the ENDF/B-VIII.0 showed good agreement with the experimental results. In contrast, for tungsten, JENDL-5 and JEFF-3.3 provided better agreement, although all libraries appear to underestimate the experimental values.

Currently, efforts are underway to reduce the statistical uncertainty in benchmark experiments for lithium. To address this issue, a new activation foil was selected. Magnesium was found to be the most suitable candidate for reducing the error; however, it is still insufficient for achieving the precision required for benchmarking. In future work, we plan to develop an improved experimental system by optimizing the materials and configurations of the surrounding components. Using this enhanced setup, benchmark experiments for lithium will be carried out with reduced statistical uncertainties.

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