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[P10] Benchmark Experiment for Large Angle Scattering Cross Sections for Tungsten with 14 MeV Neutrons

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Cross sections of large angle scattering reaction in nuclear data are commonly smaller than those of forward scattering when energy of an incident neutron is high. However, in a high intensity neutron field, such as fusion reactor, contribution of cross sections of large angle scattering is not negligible on calculation results. Actually, difference between experimental and calculated values in benchmark experiments for large angle scattering cross sections has been reported until today[1]. In the previous research, the author's group developed a benchmark method for large angle scattering cross sections[2] and carried out experiments with an iron target[3]. In this study, we carried out benchmark experiment for large angle scattering cross section for tungsten and neutron transport calculations in our experimental system with Monte Carlo code, MCNP5. By comparing the experimental values with calculated results, we discussed accuracy of the cross sections of large angle scattering in ENDF/B-7, JEFF-3.3 and JENDL-4. As a result, we found that the cross section data of large angle scattering of tungsten in JEFF-3.3 most agreed with the experimental values. Reference:
[1] S. Ohnishi et al.: New integral experiments for large angle scattering cross section data benchmarking with DT neutron beam at JAEA/FNS, Fusion Engineering and Design, 87, pp. 695-699, (2012)
[2] Naoya HAYASHI, Seiki OHNISHI, Yuki FUJIWARA, Sachie KUSAKA, Fuminobu SATO, Isao MURATA "Optimization of Experimental System Design for Benchmarking of Large Angle Scattering Reaction Cross Section at 14 MeV Using Two Shadow Bars"Plasma and Fusion Research, 13, 2405002, (2018)
[3] Atsuki Yamaguchi, Kazuki Fukui, Yuki Fujiwara, Shingo Tamaki, Sachie Kusaka, Fuminobu Sato, Isao Murata " Benchmark experiment of large-angle scattering reaction cross section of iron at 14 MeV using two shadow bars –Comparison of experimental results with ENDF/B-VIII –" Journal of Nuclear Science and Technology, 58. Pp. 80-86.(2019)
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