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Performance assessment of the cold-neutron disk-chopper spectrometer at J-PARC

AMATERAS[1] is the disk-chopper type neutron spectrometer for measuring inelastic and quasielastic neutron scattering in the energy range from cold to sub-thermal neutron regions with high efficiency and fine resolution. In 2021, AMATERAS extended the neutron guide to focus neutrons and increase intensity at the sample position. In the opportunity, we evaluated neutron flux at the sample position by measuring gold foil and vanadium plate. The white and monochromatic beams (Ei = 10.5 meV, λ = 2.8 Å) have been measured. The neutron fluxes obtained by measuring gold foil and vanadium plate are consistent with high accuracy in the white and monochromatic beams. Based on a comparison of simulation using McStas [2] with the experimental results, the effectiveness of the gain of flux due to extending the guide will be discussed. In the presentation, the energy resolution of AMATERAS investigated with various chopper conditions will also be shown.

[1] K. Nakajima, S. Ohira-Kawamura, T. Kikuchi, M. Nakamura, R. Kajimoto, Y. Inamura, N. Takahashi, K. Aizawa, K. Suzuya, K. Shibata, T. Nakatani, K. Soyama, R. Maruyama, H. Tanaka, W. Kambara, T. Iwahashi, Y. Itoh, T. Osakabe, S. Wakimoto, K. Kakurai, F. Maekawa, M. Harada, K. Oikawa, R. E. Lechner, F. Mezei, M. Arai, J. Phys. Soc. Jpn. 80 (2011) SB028.
[2] K. Lefmann, K. Nielsen, Neutron News 10 (1999) 20–23.

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