

Newly Proposed Polarized Neutron Chopper Spectrometer at J-PARC

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KEK and Tohoku Univ. are advancing a project to construct a polarization analysis neutron spectrometer in J-PARC. Since there exist just a few polarized neutron spectrometers in pulsed neutron facilities in the world, this spectrometer will be a key instrument to generate breakthroughs in novel material science. Since this project has many technical problems, in particular, feasibility of spin analyzers with a large solid angle, we will move ahead this project in incremental phases. In the first phase, a fan-type supermirror device will be used as the analyzer, meaning that the energy range is focused below $\varepsilon \sim 20$ meV. The second phase, by developing SEOP or MEOP analyzers, we will be able to observe excitations in $Ei \sim 100$ meV region. We also aim at observing in $Ei \sim 300$ meV region in the final phase. For arriving at higher energy regions, with high stability, a SEOP type polarizer will be used from the first stage, which is now developing under collaborations with JAEA. Basic performances as a conventional chopper spectrometer have been estimated: the polarized neutron flux obtained by a SEOP filter is expected to be 1.1×10^5 (n/s/cm²/meV) at 100 meV and energy resolution to be $\Delta\varepsilon/Ei \sim 5\%$ under the optimized condition. One of the characteristic points of this project is “cross correlation method” by which incident beams with many different Ei can be used at once. Thus much enhancement of efficiency will be expected, while resolution and analytic accuracy of profile will be partly lost.