RCNP EXPERIMENT E310

PROPOSAL FOR EXPERIMENT AT RCNP

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TITLE:

Measurement of elastic neutron-scattering cross sections on carbon, silicon, and lead in intermediate energy region

SPOKESPERSON:

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EXPERIMENTAL GROUP:

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RUNNING TIME:	Installation time without beam	1 day(for each beam time)
	Test running time for experiment	0.5 day
	Data runs	3.5 days
BEAM LINE:		Ring : N0 course
BEAM REQUIREMENTS:	Type of particle	p
	Beam energy	150, 250, 350 MeV
	Beam intensity	$\leq$ 700 nA
	Any other requirements	halo-free, small emittance, beam pulsing
BUDGET:	Traveling expenses	500,000 yen

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SUMMARY OF THE PROPOSAL

Angular differential elastic neutron-scattering cross sections will be measured for carbon, silicon, and lead samples in 150, 250, and 350 MeV neutron incidences. The quasi-monoenergetic neutron beams are produced via $^7Li(p,n)$ reaction. The elastic scattering neutrons are counted by liquid organic scintillators located at corresponding angles with time of flight technique. The absolute cross sections are determined by measuring incident neutron flux with the detectors used for the scattering neutrons.
The obtained data will be dedicated to sophistication of a particle transport analysis with nuclear data. The accurate particle transport analysis leads to establishment of reasonable radiation-protection system in high-energy accelerator facilities. Furthermore, the data for elastic neutron scattering provide a useful knowledge for some areas in basic nuclear physics.
Total requirement of the beam time is 4 days for three proton energies, including a test running to check the experimental procedure.