RCNP EXPERIMENT E174

PROPOSAL FOR EXPERIMENT AT RCNP

TITLE: Response of stacked GSO detector to light charged particles
– Measurements of (p,dx) cross sections for nuclear data –

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RUNNING TIME:	Installation time without beam	10 days
	Test running time for experiment	1 day
	Data Runs	1.5 days
	Total beam time	2.5 days

BEAM LINE: ES course

BEAM REQUIREMENT: ^{4}He 400 MeV 1 nA on target

BUDGET: Travel expenses 1,000,000 YEN

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SUMMARY OF THE PROPOSAL

We propose an experiment to measure the response of stacked GSO scintillator detectors to intermediate-energy deuterons. The detectors have been developed to measure charged particle production cross-sections, that is, the nuclear data for applications. In our previous works, proton-production cross-sections were measured with $(p, p'x)$ reactions at 300 and 392 MeV by using the detectors. In these experiments, deuterons were also detected. Provisional energy and angular distributions of the (p, dx) data can not be reproduced by the quantum molecular dynamics model. It is very important to fix the cross sections. In order to obtain energy distributions of deuterons, we have to determine the light output and the peak efficiency of GSO scintillator detectors to intermediate-energy deuterons.

In the experiment, alpha particles will be accelerated and bombard a CD2 target. Pulse height distributions will be measured for mono-energetic deuterons and alphas from elastic $d + \alpha$ scattering. It will allow us to determine the energy spectra of deuterons accurately.