RCNP EXPERIMENT E345

PROPOSAL FOR EXPERIMENT AT RCNP

13 July 2009

TITLE:

Double differential cross section of fragment production on light and medium nuclei from proton induced reactions in intermediate energy range

SPOKESPERSON:

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EXPERIMENTAL GROUP:

Full Name	Institution	Title or Position
Toshiya SANAMI	High Energy Accelerator Research Organization	(Assistant Professor)
Hiroshi IWASE	High Energy Accelerator Research Organization	(Assistant Professor)
Masayuki HAGIWARA	High Energy Accelerator Research Organization	(Assistant Professor)
Daiki SATO	Japan Atomic Energy Agency	(Researcher)
Satoshi KUNIEDA	Japan Atomic Energy Agency	(Researcher)
Hiroshi YASHIMA	Research Reactor Institute, Kyoto Univ.	(Assistant Professor)
Yosuke IWAMOTO	Japan Atomic Energy Agency	(Researcher)
Atsushi TAMII	Research Center for Nuclear Physics, Osaka Univ.	(AP)
Mamoru BABA	Cyclotron Radioisotope Center, Tohoku University	(P)

RUNNING TIME:	Installation time without beam	1.5 days(for each beam time)
	Data runs	3 days
BEAM LINE:		Ring : ENN course
BEAM REQUIREMENTS:	Type of particle	p
	Beam energy	140,210,280 MeV
	Beam intensity	$\leq$ 50 nA
	Any other requirements	halo-free, small emittance
BUDGET:	Experimental expenses	300,000 yen
	(To prepare stuffs to mount our scattering chamber and detectors on the ENN course.)	
	Traveling expenses	392,160 yen
	(We can reduce the traveling expenses if our beam time is connected to the other related experiments (D.Sato et al, Y.Iwamoto et al and H.Iwase et al[E323]))	

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SUMMARY OF THE PROPOSAL

The scope of this program is data taking of double differential cross section (DDX) of fragment production from a few hundred MeV proton induced reaction. The data are required to calculate local energy deposition process of intermediate energy nucleon through nuclear reactions. The data are also important to evaluate predictability of reaction models implemented in multi-particle transport calculation codes, PHITS, MARS, Fluka, Geant etc, which are already used under the plenty of situations, such as medical treatment, semiconductor device design, micro dosimetry, and so on. In this program, we use an experimental set up that is already developed for the fragment measurement using Bragg Curve Counter (BCC) with applying modifications to measure fragments their entire energy range. Using this system, the systematic DDX data of fragment production will be obtained for Ep=140, 210, 280 MeV, at 30, 60 .90 and 135 emission angles, for 6 different target nuclei within several days of beam time.