RCNP EXPERIMENT E193

PROPOSAL OF EXPERIMENT AT RCNP

15 Jan. 2002

Measurements of particle production cross sections for 400-MeV proton induced reactions on heavy nuclei

SPOKESPERSONS:

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RUNNING TIME :	Beam preparation and beam tuning	1.0 days
	Data runs	2.0 days

BEAM LINE : ES course

BEAM REQUIREMENTS :	Type of particle	p
	Beam energy	392 MeV
	Beam intensity	1 nA

BUDGET : Travel Expenses 1,000,000 yen

SCHEDULE : June 2002

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SUMMARY OF THE PROPOSAL

A measurement of particle production cross sections is proposed for nuclear data evaluations in designing a spallation neutron source that is utilized for new accelerator-driven technologies. In our previous works, proton-production cross-sections were measured for 392-MeV (p,p'x) reactions at RCNP. The energy distributions were compared with the quantum molecular dynamics model (QMD) and the intra-nuclear cascade model (INC). The QMD model calculation gives satisfactory accounts to energy and angular distributions for light target nuclei, ^{12}C, ^{27}Al and ^{91}Nb. However, considerable disagreements were seen for a heavier target ^{197}Au. Since heavy nuclei, such as lead and bismuth, are candidates of spallation target material, the discrepancy for high-Z targets is a serious problem to design target/blanket configurations. It is important to carry out similar measurements for particle production cross sections on lead and bismuth. In the proposed experiment, complete energy spectra will be measured for 392-MeV proton-induced reactions on targets, ^{208}Pb and ^{209}Bi, and determine energy-angle double differential cross sections. Validity of theoretical models will be investigated.