E358

RCNP EXPERIMENT E

PROPOSAL FOR EXPERIMENT AT RCNP

July 13, 2010

TITLE:
Heavy-ion double charge exchange studies for *p*-shell nuclei

SPOKESPERSON:

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RUNNING TIME:

Installation time without beam	5 days
Detector Setup	2 days
Data runs	8 days

BEAM LINE: Ring : WS course

BEAM REQUIREMENTS:

Type of particle	^{18}O
Beam energy	80 MeV/nucleon
Beam intensity	$\leq$ 100 pnA
Any other requirements	energy spread $\leq$ 200 keV, halo-free, small emittance

BUDGET: None

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SUMMARY OF THE PROPOSAL

Measurement of cross section for the double charge exchange (^{18}O,^{18} Ne) reactions from ^{12}C and ^{9}Be targets at 80 MeV/nucleon is proposed. Ground states of ^{18}O and ^{18}Ne are among the same super-multiplet and the transition between them is just double spin-isospin or isospin flips keeping the spatial wavefunction unchanged. As a natural consequence of this, we can expect the transition is simple and its transition amplitude is large. By achieving a high energy resolution of ΔE $\sim$300 keV, we will resolve the ground state and low-lying states. The cross section for the ground and low-lying states will be used to study reaction mechanism of the heavy-ion double charge exchange process.

This is a first step to establish the heavy ion double charge exchange reactions as spectroscopic tools and what will be learned through the proposed experiment will provide us a guide for future SHARAQ experiment which the proponent are planning to perform at RIBF.