PROPOSAL FOR EXPERIMENT AT RCNP

28 May, 2001

TITLE: Study of Isovector Resonances in Nuclei by (^{7}Li,^{7}Be) Reaction
(Updated proposal of E145)

SPOKESPERSON:

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EXPERIMENTAL GROUP:

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Keigo HARA	RCNP, Osaka University	D2
Sydney GALES	IPN, Orsay	Professor
M.B. GREENFIELD	Dept. of Physics, ICU	Professor

RUNNING TIME:

Total running time not including beam preparation — 8 days

BEAM LINE:

WS-course, Grand RAIDEN

BEAM REQUIREMENTS:

Type of particle	^{7}Li^{3+}
Beam energy	65 AMeV
Beam intensity	$\sim$3 nA
Targets	^{6,7}Li, ^{12}C, ^{28}Si, ^{60}Ni, ^{90}Zr, ^{120}Sn, ^{208}Pb
Other requirements	Energy resolution $\sim$ 300 keV
	Beam must be halo-free
	Stability over several days is required

BUDGET:

Experimental expenses: two entrance slits — 500,000 yen
Travel plans - 11 participants should be supported by RCNP

RCNP EXPERIMENT E175

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SUMMARY OF THE PROPOSAL

In the E99 experiment, we confirmed the existence of the isovector electric monopole resonance (IVMR) in ^{60}Ni by using the (^{7}Li,^{7}Be) reaction at 65A MeV. The IVMR was observed at an excitation energy of 20±2 MeV with a width of 10±2 MeV in ^{60}Co, which is an analogue of the T_0+1 isospin component of the IVMR estimated at $E_x \approx$31 MeV in ^{60}Ni. The result is consistent with the previous results using the pion charge-exchange reaction.

In this proposal, we investigate isovector resonances in medium and heavy mass nuclei. The heavy mass nuclei have been investigated by using various probes, such as ($\pi^{\pm}$,π^0), (n,γ), (n,p) and (^{13}C,^{13}N) reactions. However, identification of the isovector electric resonances have not been definitive due to experimental difficulties. We aim at measuring angular distributions of isovector excitations via the (^{7}Li,^{7}Be) reaction at forward scattering angles of $\theta_L \leq 3°$, the shapes of which critically depend on their transferred ΔL.