E427

RCNP EXPERIMENT E

PROPOSAL FOR EXPERIMENT AT RCNP

12 February 2014

TITLE:

Investigation of the Giant Monopole Resonance in ^{90,92}Zr and ^{92}Mo: Testing the Validity of Recently Reported Nuclear Structure Effects on GMR Strength

SPOKESPERSON:

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EXPERIMENTAL GROUP:

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RUNNING TIME:

Installation time without beam	2 days
Setup and beam tuning time	1.3 days
Data runs	4.7 days

BEAM LINE: Ring : WS course

BEAM REQUIREMENTS:

Type of particle	$^{4}He^{++}$
Beam energy	400 MeV
Beam intensity	$\leq 1 - 40$ nA
Any other requirements	energy resolution
	halo-free, small emittance

BUDGET: Experimental expenses 1,500,000 yen for enriched targets.
Travel expenses for participants should be supported by RCNP.

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SPOKESPERSON: Masatoshi ITOH
Umesh Garg

SUMMARY OF THE PROPOSAL

We request beam time to measure the Isoscalar Giant Monopole Resonance (ISGMR) in ^{90}Zr, ^{92}Zr, and ^{92}Mo. The primary aim behind these measurements is to test the validity of very intriguing results recently reported by the Texas A & M group. In their measurements, the energies of the ISGMR for ^{92}Zr and ^{92}Mo have been observed to be 1.22 and 2.80 MeV, respectively, higher than for ^{90}Zr, suggesting a significant nuclear structure contribution to the energy of the ISGMR in these nuclei. Among other things, this has a large effect on the compression modulus of the nucleus with the values extracted for ^{92}Zr and ^{92}Mo being 27 and 56 MeV, respectively, higher than that predicted with HF-base RPA. Such an effect has not been observed in any other nuclei so far, and it is imperative that these results be tested/verified with the state-of-the-art measurements possible at RCNP.