RCNP EXPERIMENT E340

PROPOSAL FOR EXPERIMENT AT RCNP

10 July 2009

TITLE: Investigation of the Giant Monopole Resonance in the Lead Isotopes: Testing the MEM Effect on Nuclear Incompressibility

SPOKESPERSONS:

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EXPERIMENTAL GROUPS:

University of Notre Dame, USA - Research Center for Nuclear Physics, Japan - Konan University, Japan - Tohoku University, Japan - Kyoto University, Japan - Tokyo Institute of Technology, Japan - IPN, Orsay, France - KVI, Groningen, The Netherlands.

RUNNING TIME:

Total running time not including beam preparation	6 days
BEAM LINE:	Grand Raiden

BEAM REQUIREMENTS:

Type of particle	^{4}He
Beam energy	400 MeV
Beam intensity	2 nA–30 nA
Other requirements	beam must be halo-free
	highest stability over the running period is required

BUDGET:

Purchase of enriched targets 500,000 Yen for ^{204}Pb, ^{206}Pb, ^{208}Pb isotopes

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SUMMARY OF THE PROPOSAL

We request beam time to measure the Giant Monopole Resonance (GMR) in the Lead isotopes, ^{204}Pb, ^{206}Pb, and ^{208}Pb. The primary aim behind these measurements is to test an intriguing idea put forward recently regarding nuclear incompressibility in doubly-magic nuclei: In analogy with nuclear masses, it has been suggested that there would be an effect of mutually-enhanced magicity (MEM) in the K_A and, hence, in the energies of the GMR's in doubly-magic nuclei with respect to the nearby isotopes. We believe it is imperative (and urgent) to perform precise systematic measurements of the centroid energies of the GMR in ^{204}Pb, ^{206}Pb, and ^{208}Pb in order to test the MEM effect on nuclear incompressibility.