

E429

PROPOSAL FOR EXPERIMENT AT RCNP

12 February 2014

TITLE:

Search for double Gamow–Teller giant resonances in ^{48}Ti via the heavy-ion double charge exchange $^{48}\text{Ca}(^{12}\text{C}, ^{12}\text{Be}(0_2^+))$ reaction

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RUNNING TIME: Installation time without beam 5 days
 Detector setup for the DGTGR measurement 2 days
 Data runs 8 days
 TOTAL 10 days

BEAM LINE: Ring : WS course

BEAM REQUIREMENTS: Type of particle ^{12}C
 Beam energy 100 MeV/nucleon
 Beam intensity ≤ 100 pnA
 Any other requirements energy spread ≤ 200 keV,
 halo-free, small emittance

BUDGET: Experimental expenses (^{48}Ca) 2,000 kyen
 travel expenses 400 kyen
 TOTAL 2,400 kyen

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SPOKESPERSON: Motonobu Takaki and Tomohiro Uesaka

SUMMARY OF THE PROPOSAL

We propose to search for double Gamow-Teller resonances in the ^{48}Ti nucleus via the heavy-ion double charge exchange (HIDCX) $^{48}\text{Ca}(^{12}\text{C}, ^{12}\text{Be}(0_2^+))$ reaction at 100 MeV/nucleon. Observation of the DGTGR will provide better understanding of multi-phonon states in the spin-isospin channel and the information on the nuclear structures involved in the $\beta\beta$ -decay process. For clear reaction identification, we detect delayed γ -rays from the isomeric $^{12}\text{Be}(0_2^+)$ state. Experimental feasibility of the method have been confirmed in the test experiment performed in June 2013.