

PROPOSAL FOR EXPERIMENT AT RCNP

TITLE:

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Determination of the Gamow-Teller unit cross section $\hat{\sigma}_{GT}$ at 300 MeV

SPOKESPERSON:

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EXPERIMENTAL GROUP:

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Kenji Suda	Dep. of Physics, Saitama Univ.	(D3)
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RUNNING TIME: Test running time for setting up experiment 1 day
 overhead 0.5 days
 Data runs 6.5 days

BEAM LINE:

WS course + LAS

BEAM REQUIREMENTS: Type of particle proton
 Beam energy 300 MeV
 Beam intensity 500 nA
 Energy resolution ≤ 0.5 MeV (FWHM) halo-free,
 small emittance

BUDGET: Experimental expenses 1,200,000 yen
 Travel plan 600,000 yen
 Total 1,800,000 yen

TITLE:**Determination of the Gamow-Teller unit cross section $\hat{\sigma}_{\text{GT}}$ at 300 MeV****SPOKESPERSON:** Hideyuki Sakai**SUMMARY OF THE PROPOSAL**

The quenching value Q of the Gamow-Teller (GT) strength plays a key role in spin-isospin physics. Recently we have succeeded to extract the value of $Q = 0.89 \pm 0.04(\text{sta} + \text{MDA}) \pm 0.04(\text{IVSM})$ apart from the systematic uncertainty of the GT unit cross section of $\Delta\hat{\sigma}_{\text{GT}} = \pm 15\%$. We would like to reduce the uncertainty originating from the unit cross section of $\hat{\sigma}_{\text{GT}}$ to improve the reliability for Q .

For this purpose, we propose to determine the $\hat{\sigma}_{\text{GT}}$ values for ^{58}Ni and ^{120}Sn at 300 MeV to an accuracy of 3% (statistical). This allows us to deduce the $\hat{\sigma}_{\text{GT}}$ value for ^{90}Zr in 5% statistical accuracy.

The GT transitions of the $^{58}\text{Ni}, ^{120}\text{Sn}(p, n)$ reactions will be measured at 300 MeV at 0° by using the (n, p) facility with an energy resolution of 700 keV. The $\hat{\sigma}_{\text{GT}}$ value can be obtained by comparing the measured cross sections with the $B(\text{GT})$ values of corresponding states obtained by the $^{58}\text{Ni}, ^{120}\text{Sn}(^3\text{He}, t)$ reactions at 140 MeV/u with an energy resolution of 35 keV.