RCNP EXPERIMENT E154

PROPOSAL FOR EXPERIMENT AT RCNP

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Study of three-body force via the measurement of spin correlation coefficients $C_y^{y',y'}$ and $C^{y',y'}$ in p+d elastic scattering.

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RUNNING TIME:

Test running time for experiment	4 days
Data runs	6 days

BEAM LINE: Ring : WS course

BEAM REQUIREMENTS:

Type of particle	polarized p
Beam energy	400 MeV
Beam intensity	500 nA

BUDGET:

Experimental expenses	6,500,000 yen
Travel plans	14 participants should be supported by RCNP

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SPOKESPERSON: Atsushi Tamii

SUMMARY OF THE PROPOSAL

Three-nucleon (3N) effect in 3N state is of particular interest in nuclear physics. The 3N state can be exactly described by Faddeev equation with nucleon-nucleon (NN) interaction. 3N force effect can, therefore, be extracted by comparing precise experimental results and rigorous theoretical calculations using modern NN interactions. It has been found that discrepancy between the experimental data of *pd* elastic cross sections at intermediate energies and Faddeev calculations can be well reproduced by incorporating 3N force in the Faddeev calculation. But there still remains discrepancies in spin observables. The fact may imply defects in the spin dependence of the 3N force. 3N force effect is expected to be larger at higher energies, but experimental data are scarce at proton energies above 200 MeV especially for various spin observables.

We propose to measure three-spin correlation coefficient $C_{y(p)}^{y'(p),y'(d)}$ and two-spin correlation coefficient $C^{y'(p),y'(d)}$ in *pd* elastic scattering at $E_p = 400$ MeV together with other spin observables $A_{y(p)}$, $P_{y(p)}$, $P_{y(d)}$, $K_{y(p)}^{y'(p)}$ and $K_{y(p)}^{y'(d)}$. The data will be taken in an angular range where the observables are expected to be most sensitive to the 3N force effect. These data provide important information on the 3N force in 3N systems at high energy (E_p=400 MeV).