RCNP EXPERIMENT E247

PROPOSAL FOR EXPERIMENT AT RCNP

September 22, 2004

TITLE:
Spin-dependent momentum distribution of $\vec{d}$-$\vec{p}$ cluster in $^3\vec{\mathrm{He}}$ studied via the proton induced exclusive knockout reactions

SPOKESPERSON:

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EXPERIMENTAL GROUP:

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Yoshiyuki Takahashi	Department of Physics, University of Tokyo	M1
Vladimir P. Ladygin	Laboratory of High Energies, JINR	Res.

RUNNING TIME:	Installation time without beam	5 days(for each beam time)
	Detector Setup	1 day
	Data runs	9 days
BEAM LINE:		Ring : WS course
BEAM REQUIREMENTS:	Type of particle	polarized p
	Beam energy	400 MeV
	Beam intensity	$\leq$ 100 nA
	Any other requirements	halo-free, small emittance
BUDGET:	Experimental expenses	600,000 yen

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SUMMARY OF THE PROPOSAL

The spin-dependent momentum distribution of three nucleon bound state (^{3}He) can provide information of the tensor force and/or the three body force in nuclei. To extract the spin-dependent momentum distribution of $\vec{d}$-$\vec{p}$ cluster in $^3\vec{\mathrm{He}}$, the polarization correlation measurements for the $^3\vec{\mathrm{He}}(\vec{p}, 2p)^2$H and $^3\vec{\mathrm{He}}(\vec{p}, pd)^1$H reactions are proposed. In the experiment the spin-exchange type polarized ^{3}He target developed at RCNP is used. By making full use of the double-arm spectrograph at RCNP, the high missing mass resolution measurement will be achieved. This will be the first direct determination of the proton and the deuteron polarizations in d-p cluster in $^3\vec{\mathrm{He}}$ at finite momentum.