

## PROPOSAL FOR EXPERIMENT AT RCNP

September 22, 2004

**TITLE:**

**Spin-dependent momentum distribution of  $\vec{d}-\vec{p}$  cluster in  ${}^3\vec{\text{H}}\text{e}$  studied via the proton induced exclusive knockout reactions**

**SPOKESPERSON:**

Full Name Tomohiro Uesaka  
 Institution Center for Nuclear Study, University of Tokyo  
 Title or Position Lecturer  
 Address 7-3-1 Hongo, Bunkyo, Tokyo  
 Phone number +81-48-464-4030  
 FAX number +81-48-464-4554  
 E-mail uesaka@cns.s.u-tokyo.ac.jp

**EXPERIMENTAL GROUP:**

Full Name	Institution	Title or Position
Tomohiro Uesaka	Center for Nuclear Study, University of Tokyo	L
Takahiro Kawabata	Center for Nuclear Study, University of Tokyo	A
Takashi Wakui	Center for Nuclear Study, University of Tokyo	A
Kenji Suda	Center for Nuclear Study, University of Tokyo	PD
Yukie Maeda	Center for Nuclear Study, University of Tokyo	PD
Yoshiko Sasamoto	Center for Nuclear Study, University of Tokyo	M1
Satoshi Sakaguchi	Center for Nuclear Study, University of Tokyo	M1
Keisuke Itoh	Department of Physics, Saitama University	D1
Kichiji Hatana	RCNP, Osaka University	P
Yasuhiro Sakemi	RCNP, Osaka University	AP
Atsushi Tamii	RCNP, Osaka University	AP
Youhei Shimizu	RCNP, Osaka University	D3
Kunihiro Fujita	RCNP, Osaka University	D2
Yuji Tameshige	RCNP, Osaka University	D1
Hideyuki Sakai	Department of Physics, University of Tokyo	P
Kentaro Yako	Department of Physics, University of Tokyo	A
Takaaki Saito	Department of Physics, University of Tokyo	D3
Hironori Kuboki	Department of Physics, University of Tokyo	D1
Masanori Sasano	Department of Physics, University of Tokyo	M2
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

**TITLE:**

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

**SPOKESPERSON:** Tomohiro Uesaka

**SUMMARY OF THE PROPOSAL**

The spin-dependent momentum distribution of three nucleon bound state ( ${}^3\text{He}$ ) 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  ${}^3\vec{\text{He}}$ , the polarization correlation measurements for the  ${}^3\vec{\text{He}}(\vec{p}, 2p){}^2\text{H}$  and  ${}^3\vec{\text{He}}(\vec{p}, pd){}^1\text{H}$  reactions are proposed. In the experiment the spin-exchange type polarized  ${}^3\text{He}$  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  ${}^3\vec{\text{He}}$  at finite momentum.