

## PROPOSAL FOR EXPERIMENT AT RCNP

22 July 2003

**TITLE:**

Measurement of recoil momentum distribution for deep hole states in  $^{40}\text{Ca}(p,2p)$  reaction

**SPOKESPERSON:**

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**EXPERIMENTAL GROUP:**

| Name         | Institution                              | Title or Position |
|--------------|--|-------------------|
| H. Sakaguchi | Department of Physics, Kyoto University  | AP                |
| M. Yosoi     | Department of Physics, Kyoto University  | RA                |
| S. Terashima | Department of Physics, Kyoto University  | D1                |
| S. Kishi     | Department of Physics, Kyoto University  | M2                |
| J. Zenihiro  | Department of Physics, Kyoto University  | M1                |
| T. Noro      | Department of Physics, Kyushu University | P                 |
| T. Wakasa    | Department of Physics, Kyushu University | AP                |
| T. Ishida    | Department of Physics, Kyushu University | D2                |
| S. Asaji     | Department of Physics, Kyushu University | M2                |
| T. Yonemura  | Department of Physics, Kyushu University | M2                |
| K. Hatanaka  | RCNP, Osaka University                   | P                 |
| Y. Sakemi    | RCNP, Osaka University                   | AP                |
| M. Itoh      | RCNP, Osaka University                   | Res. Fell.        |
| M. Uchida    | RCNP, Osaka University                   | Res. Fell.        |
| H.P. Yoshida | RCNP, Osaka University                   | D3                |
| Y. Shimizu   | RCNP, Osaka University                   | D2                |
| K. Fujita    | RCNP, Osaka University                   | D1                |
| Y. Tameshige | RCNP, Osaka University                   | M2                |
| H. Takeda    | RIKEN                                    | Res. Fell.        |
| T. Kawabata  | CNS, Univ. of Tokyo                      | RA                |

**RUNNING TIME:** Installation time without beam 3.0 day  
 Setup and test running time 1.0 day  
 Data runs 15.0 days

**BEAM LINE:** Ring : WS course

**BEAM REQUIREMENTS:** Type of particle polarized proton  
 Beam energy 400 MeV  
 Beam intensity 200 nA

Energy resolution  $\leq 200$  keV  
 halo-free, small emittance

**BUDGET:** Experimental expenses 0.4M yen

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**SPOKESPERSON:** Yusuke YASUDA

**SUMMARY OF THE PROPOSAL**

We are going to measure deep hole states such as the  $1s_{1/2}$  state in  $^{40}\text{Ca}$  in good statistics by  $\text{Ca}(p,2p)$  reaction. This is a continuation of the the experiment RCNP-E168. The aim of our experiment is to study the spectroscopic factor and the width of the deep orbital states of medium and heavy nuclei for understanding the nuclear structure and correlations in deep hole states.

In E168 we have succeeded to obtain a new energy spectrum of deep hole states for each recoil momentum bin by inserting angular tagging counters in front of the dual magnetic spectrograph. In the energy spectrum for nearly zero recoil momentum we can see a clear  $1s_{1/2}$  bump.

In this proposal we are going to improve the statistics by improving the data taking system and try to disentangle the contribution of different orbital states.