PROPOSAL FOR EXPERIMENT AT RCNP

20 July, 2005

TITLE: ^{3}He+t cluster structure in ^{6}Li

SPOKESPERSON:

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EXPERIMENTAL GROUP:

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Takashi KUDO	Dept. of Physics, Kyushu University	D2
Shun ASAJI	Dept. of Physics, Kyushu University	D2

RUNNING TIME:

Total running time not including beam preparation — 5 days

BEAM LINE:

WS-course, Grand RAIDEN

BEAM REQUIREMENTS:

Type of particle	^{4}He
Beam energy	300 MeV
Beam intensity	$\sim$ 20 nA
Other requirements	Energy resolution $\sim$ 150 keV
	Beam must be halo-free
	Energy stability over experimental run is required

BUDGET:

Experimental expense — 600,000 yen

Travel plans - 12 participants should be supported by RCNP

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SUMMARY OF THE PROPOSAL

The present work aims at the search for the ^{3}He+t clusters structures in ^{6}Li via the ^{3}He(α,p) reaction at 300 MeV. We expect that the S and D states, and P and F resonances should be observed below and above the threshold energy for ^{3}He+t decay in ^{6}Li, respectively. In the previous RCNP experiments we found the ^3P (T=1) resonances of the di-trinucleon-clusters structure in isobaric triplet, ^{6}He, ^{6}Li and ^{6}Be by using the ^{6}Li(^{7}Li,^{7}Be), ^{7}Li(^{3}He,α), and ^{6}Li(^{3}He,t) reactions. In ^{6}Li, the ^1P (T=0) resonance has been also observed. Furthermore, possible signals for the F resonances in ^{6}He and ^{6}Li have been detected. In the present experiment we will determine the excitation energies for the ^{3}He+t multiplet via the stripping reaction, and will establish the di-trinucleon cluster structure.