E407

PROPOSAL FOR EXPERIMENT AT RCNP

1 July 2012

TITLE: Spectroscopic Study of the Intruder States in ^{12}Be via Transfer Reaction

SPOKESPERSON:

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EXPERIMENTAL GROUP:

Full Name	**Institution**	**Title or Position**
Jianling Lou	State Key Lab., Peking university	Assistant Professor
Yanin Ye	State Key Lab., Peking university	Professor
Jenny Lee	RIKEN, Nishina Center	Researcher
Dongxing Jiang	State Key Lab., Peking university	Professor
Hui Hua	State Key Lab., Peking university	Associate Professor
Zhihuan Li	State Key Lab., Peking university	Associate Professor
Yucheng Ge	State Key Lab., Peking university	Researcher
Xiangqing Li	State Key Lab., Peking university	Assistant Professor
Qite Li	State Key Lab., Peking university	Assistant Researcher
Zaihong Yang	State Key Lab., Peking university	D3
Yelei Sun	State Key Lab., Peking university	D1
Zhenyang Tian	State Key Lab., Peking university	D1
S. Takeuchi	RIKEN, Nishina Center	Researcher
Hongna Liu	RIKEN, Nishina Center	D1
Jie Chen	State Key Lab., Peking university	M2
He Wang	RIKEN, Nishina center	D3
N. Aoi	RCNP, Osaka University	Professor
T. Hashimoto	RCNP, Osaka University	Assistant Professor
K. Hatanaka	RCNP, Osaka University	Professor
E. Ideguchi	RCNP, Osaka University	Associate Professor
H. J. Ong	RCNP, Osaka University	Assistant Professor
J. Tanaka	RCNP, Osaka University	D1
T. Suzuki	RCNP, Osaka University	Assistant Professor
T. Yamamoto	RCNP, Osaka University	M2

THEORETICAL GROUP:

Full Name	**Institution**	**Title or Position**
Danyang Pang	BeiHang University, China	Assistant Professor

RUNNING TIME:	Installation time without beam	15 days
	Test running time for experiment	1 days
	Data runs	12 days(288 hrs)
	Total beam time	13 days (312 hrs)
BEAM LINE:		Ring : EN course
BEAM REQUIREMENTS:	Type of particle	$^{18}O(6^+)$
	Beam energy	44 MeV/nucleon
	Beam intensity	$\geq$ 1000 enA

BUDGET:

(1) connecting pipe together with converting flanges between the target chamber and hodoscopes chamber. 500 k yen
(2) flanges with cable connectors. 700 k yen
Total budget: 1,200 k yen

♣ Travel and local expenses for the participants from institutes in Japan are to be provided by RCNP.
♣ Local expenses for the Peking group are hoped to be provided by RCNP.

Concerning the similar detection systems and manpower arrangement, it is cost effective to schedule this proposed experiment (if approved) as a campaign run together with the already approved RCNP-E390[1].

RCNP EXPERIMENT E

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SPOKESPERSON: Jianling Lou

SUMMARY OF THE PROPOSAL

The intruder configuration in ^{12}Be ground and low-lying excited states is an important problem currently under hot debating. The present proposed experiment aims at quantitatively investigating the intruder s-wave strength in ^{12}Be, via the highly selective $d(^{11}\mathrm{Be},p)^{12}\mathrm{Be}$ transfer reaction at 20-30 MeV/nucleon. The spectroscopic factor corresponding to intruder s-wave component in each identified bound state of ^{12}Be will be extracted by comparing the transfer cross section with the theoretical calculation. In addition to the coincident measurement of the recoil protons and forward moving ^{12}Be residues, two important issues will be addressed in this experiment: the discrimination of the 0_2^+ and 2^+ energy doublet, which will be solved by detecting the decaying γ-rays from the isomeric 0_2^+ state based on the stop particle method; the absolute calibration of the deuteron contents in the CD_2 target, which will be achieved by simultaneous measuring the d+^{11}Be elastic scattering cross section, especially at small c.m.s angles. These two are the key issues to resolve the current puzzle raised from the previous experiments and answer the criticisms in the literature..