

E451

PROPOSAL FOR EXPERIMENT AT RCNP

26 February 2015

TITLE:**Feasibility study of production of pionic atoms in the (p, ^2He) reaction****SPOKESPERSONS:**

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EXPERIMENTAL GROUP:

Full Name	Institution	Title or Position
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Tatsuya Furuno	Department of Physics, Kyoto University	Graduate Student (D1)
Miho Tsumura	Department of Physics, Kyoto University	Graduate Student (D1)
Motoki Murata	Department of Physics, Kyoto University	Graduate Student (M2)
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Ryugo S. Hayano	Department of Physics, University of Tokyo	Professor
Takahiro Nishi	Department of Physics, University of Tokyo	Graduate Student (D3)
Yoshiki K. Tanaka	Department of Physics, University of Tokyo	Graduate Student (D2)
Yuni N. Watanabe	Department of Physics, University of Tokyo	Graduate Student (M2)
Nori Aoi	RCNP, Osaka University	Professor
Kichiji Hatanaka	RCNP, Osaka University	Professor
Atsushi Tamii	RCNP, Osaka University	Associate Professor
Shunpei Noji	RCNP, Osaka University	Assistant Professor
Chihiro Iwamoto	RCNP, Osaka University	Postdoc
Ryan Tang	RCNP, Osaka University	Postdoc
Azusa Inoue	RCNP, Osaka University	Graduate Student (M2)

RUNNING TIME:	Installation time without beam	1 day
	Beam commissioning	1 day
	Calibration measurements	1.5 days
	(p, ² He) measurements	1.5 days
BEAM LINE:		Ring : WS course
BEAM REQUIREMENTS:	Type of particle	p
	Beam energy	392 MeV
	Beam intensity	~ 100 nA
	Other requirements	energy resolution \lesssim 150 keV halo-free, small emittance
BUDGET:	experimental expenses (target, slit etc.)	500 kyen
	travel expenses	300 kyen

TITLE:**Feasibility study of production of pionic atoms in the (p, ^2He) reaction****SPOKESPERSON:** Hiroyuki FUJIOKA, Takahiro KAWABATA**SUMMARY OF THE PROPOSAL**

The production of deeply-bound pionic atoms by use of the (p, ^2He) reaction is proposed. While a systematic study with the (d, ^3He) reaction is ongoing at RIBF, the (p, ^2He) reaction may provide an alternative way in producing them, which was indicated by an old experiment, RCNP-E29. An intense proton beam will be used in the GRAF mode, and two protons in the final state will be detected by Grand Raiden at 4.5 degrees.

In this proposal, we would like to request beamtime dedicated to feasibility studies, including commissioning of the GR+GRAF system and calibration measurements for determination of the beam energy, and measurements of the (p, ^2He) reaction.