

E393

PROPOSAL FOR EXPERIMENT AT RCNP

January 23, 2012

The BRILLIANT Project

— Toward the Realization of Missing-Mass Spectroscopy with Implanted Target —

SPOKESPERSONS:

Full Name Atsushi Tamii
 Institution Research Center for Nuclear Physics, Osaka University,
 Position Associate Professor
 Address 10-1, Mihogaoka, Ibaraki, Osaka 567-0047, Japan
 E-mail tamii@rcnp.osaka-u.ac.jp

Full Name Tatsushi Shima
 Institution Research Center for Nuclear Physics, Osaka University,
 Position Assistant Professor
 Address 10-1, Mihogaoka, Ibaraki, Osaka 567-0047, Japan
 E-mail shima@rcnp.osaka-u.ac.jp

EXPERIMENTAL GROUP:

Name	Institution	Title or Position
N. Aoi	RCNP, Osaka Univ., Japan	Professor
H. Fujita	Dep. of Physics, Osaka Univ., Japan	Research Fellow
Y. Fujita	Dep. of Physics, Osaka Univ., Japan	Associate Professor
K. Hatanaka	RCNP, Osaka Univ., Japan	Professor
T. Hashimoto	RCNP, Osaka Univ., Japan	Assistant Professor
T. Kawabata	Dep. of Physics, Kyoto Univ., Japan	Associate Professor
Y. Maeda	Dep. of Physics, Miyazaki Univ., Japan	Assistant Professor
K. Miki	RCNP, Osaka Univ., Japan	Post-Doctor
T. Itoh	Niigata Univ., Japan	M2
H.J. Ong	RCNP, Osaka Univ., Japan	Assistant Professor
H. Sakaguchi	RCNP, Osaka Univ., Japan	Research Fellow
Y. Shimbara	Niigata Univ., Japan	Assistant Professor
T. Suzuki	RCNP, Osaka Univ., Japan	Assistant Professor
T. Yamamoto	RCNP, Osaka Univ., Japan	M1

RUNNING TIME:	Data runs	8.0 days
BEAM LINE:		Ring : EN,WS,(ENN) course
BEAM REQUIREMENTS:	Type of particle:	e.g. p, ³ He, ⁷ Be, Ni, Ca
	Beam energy:	e.g. p(65 MeV/U), ³ He(140), Ni(6)
	Beam intensity	100–1000 pA
	Any other requirements	halo-free, small emittance
BUDGET:		
	Experimental expenses	5,000,000 yen

The BRILLIANT Project

— Toward the Realization of Missing-Mass Spectroscopy with Implanted Target —

SPOKESPERSON: Atsushi Tamii and Tatsushi Shima**SUMMARY OF THE PROPOSAL**

We propose a project to develop a new system to realize measurement of light-ion reactions on unstable nucleus targets with normal kinematics, named the BRILLIANT project. In the final goal of the system, unstable nuclei with a half life of larger than a minute are produced on-line and are implanted in a host material. The target is simultaneously bombarded by a light-ion beam for making reactions. The ejectiles are analyzed by spectrometers. The system is quite unique and opens possibility for various researches on high-resolution measurement of excited states for unstable nuclei. The method is complementary to the experimental techniques usually used for unstable nucleus beams.

As a first step of the project, we plan to construct a target implantation system, which mainly consists of host target foils (enriched ^{12}C), a position sensitive detector, and a collimator. The system will be used as a prototype to make R&D and feasibility tests of implantation and reaction detection.