

PROPOSAL FOR EXPERIMENT AT RCNP

6 July 2004

TITLE:**Elastic proton scattering to deduce neutron skin thicknesses in lead isotopes****SPOKESPERSON:**

Full Name Harutaka Sakaguchi
 Institution Department of Physics, Graduate School of Science, Kyoto University
 Title or Position Associate Professor
 Address Kitashirakawa-Oiwake, Sakyo, Kyoto 606-8502
 Phone number +81-75-753-3854
 FAX number +81-75-753-3795
 E-mail sakaguchi@nh.scphys.kyoto-u.ac.jp

EXPERIMENTAL GROUP:

Name	Institution	Title or Position
T. Murakami	Department of Physics, Kyoto University	(A)
M. Yosoi	Department of Physics, Kyoto University	(A)
Y. Yasuda	Department of Physics, Kyoto University	(D3)
Y. Terashima	Department of Physics, Kyoto University	(D2)
S. Kishi	Department of Physics, Kyoto University	(D1)
J. Zenihiro	Department of Physics, Kyoto University	(M2)
Y. Nakatsugawa	Department of Physics, Kyoto University	(M2)
T. Suda	RIKEN	(Senior Scientist)
T. Ohnishi	RIKEN	(Special Postdoctoral Researcher)
H. Takeda	RIKEN	(Contract Researcher)
M. Itoh	RCNP	(COE)
M. Uchida	RCNP	(Research Fellow)
H.P. Yoshida	RCNP	(Research Fellow)

RUNNING TIME: Installation time without beam 1.5 days(for each beam time)
 Development of device 0.5 days
 Data runs 5.0 days

BEAM LINE: Ring : WS course

BEAM REQUIREMENTS: Type of particle polarized p
 Beam energy 300 MeV
 Beam intensity 500 nA
 Any other requirements energy resolution ≤ 160 keV

halo-free, small emittance

BUDGET: Experimental expenses 2,000,000 yen

TITLE:**Elastic proton scattering to deduce neutron skin thicknesses in lead isotopes****SPOKESPERSON:** H. Sakaguchi**SUMMARY OF THE PROPOSAL**

We are proposing to measure elastic proton scattering off lead isotopes to deduce neutron density distributions. Since there are enough precise data for charge distributions for lead isotopes, we can easily deduce neutron density distributions from proton elastic scattering data, by combining with the charge distribution data.

Recently the asymmetry term in the EOS attracts many researchers, because it reflects different approaches to calculate the nuclear incompressibilities and the neutron skin thickness is sensitive to the asymmetry term. From the experience of analysis of tin isotopes we are now in a position to deduce neutron density distributions and the neutron root mean square radius precisely with the accuracy of about 0.02 fm, which is enough to pin down the correct EOS's and discern correct effective interactions.