

PROPOSAL FOR EXPERIMENT AT RCNP

27 July 2015

TITLE:**Measurement of gamma-rays from neutron-oxygen interaction****SPOKESPERSON:**

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EXPERIMENTAL GROUP:

Full Name	Institution	Title or Position
Y. Ashida	Department of Physics, Kyoto University	(M1)
D. Fukuda	Department of Physics, Okayama University	(M2)
A. Konaka	TRIUMF / RCNP, Osaka University	(P)
H. Nagata	Department of Physics, Okayama University	(M1)
H. Nakaya	Department of Physics, Kyoto University	(P)
T. Shima	RCNP, Osaka University	(AP)
T. Shirahige	Department of Physics, Okayama University	(M2)
A. Suzuki	Department of Physics, Kobe University	(AP)
Y. Takeuchi	Department of Physics, Kobe University	(P)
T. Yano	Department of Physics, Kobe University	(AP)

RUNNING TIME: Installation time without beam 2 days
 Data runs 2 days

BEAM LINE: Ring : N0 course

BEAM REQUIREMENTS: Type of particle proton
 Beam energy 80 and 392 MeV
 Beam intensity 10 nA and 100 nA (after frequency division of 1/13)
 Energy resolution ≤ 1 MeV
 Other requirements halo-free, small emittance, beam pulsing time interval of the proton pulse ≤ 800 ns

BUDGET: Experimental expenses 0 yen
 (covered by JSPS KAKENHI Grant Number 26400292, Y.Koshio, Kiban-C, 2014-2016)

TITLE:**Measurement of gamma-rays from neutron-oxygen interaction****SPOKESPERSON:** Yusuke Koshio**SUMMARY OF THE PROPOSAL**

We propose to measure the characteristics of gamma-ray generated by neutron-oxygen interaction using the RCNP monoenergetic neutron beam made by p-Li reaction. It will provide not only the fundamental information about gamma-ray emission from this interaction but also the useful information for neutrino experiments. Recently, the first observation of the neutrino-oxygen neutral current quasi-elastic interaction was reported by T2K experiment. The result in this neutrino interaction also provides important information to several physics fields, such as supernova neutrino detection, dark matter search and so on. In this measurement, the gamma-ray detection from the neutrino interaction is a key issue, however, it is hard to separate from the gamma-rays via the interaction of secondary nucleons to oxygen. This is a main reason of the remaining systematic uncertainty. The quasi-mono energetic neutron beams which is realized in N0 course in RCNP are well suited for the systematic measurement of gamma-ray emission from the neutron-oxygen interaction. The final goal of the experiment is to establish a reliable simulation of this interaction.