

E457

PROPOSAL FOR EXPERIMENT AT RCNP

26 February 2015

TITLE:

Measurement of neutron detection efficiencies of the Backward Nucleon Detector (BAND) for use in the approved E443 experiment titled “Understanding the effect of tensor interactions in light nuclei: Studies of proton-neutron and neutron-neutron correlations.”

SPOKESPERSON:

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RUNNING TIME:

Installation time without beam	2 days
Beam tuning, startup for experiment, and change of setup	21 hrs
Data runs	3 hrs

BEAM LINE:

Ring : WS and GRAF course

BEAM REQUIREMENTS:

Type of particle	deuteron
Beam energy	100 MeV/nucleon
Beam intensity	≥ 10 nA

BUDGET REQUESTS:

None.

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SPOKESPERSON: TERASHIMA Satoru, ONG Hooi Jin

SUMMARY OF THE PROPOSAL

Measurement of neutron detection efficiency of the BACKward Nucleon Detector (BAND) for use in the previously approved E443 experiment is proposed. The measurement will be performed at the RCNP WS and Grand RAiden Forward-mode (GRAF) beamline using a 100-MeV/nucleon deuteron beam incident on a CD₂ target. Neutrons with energies ranging from 14.2 MeV to 53.5 MeV produced via the d(d,³He)n reaction will be detected by the BAND detector in coincidence with the ³He counterparts. The scattered ³He particles will be momentum analyzed by the Grand RAIDEN (GR) spectrometer and detected by the GR focal plane detectors. The experiment will be performed with the Grand Raiden spectrometer set at 4.8, 7.2 and 15.9 degrees (for ³He), and (the center of) BAND set at 149.5, 136.5 and 100.5 degrees (for neutrons) respectively.

In view of common interest and many similarities in the setup, we propose to perform the measurement right after the commissioning of the GRAF beamline in Spring 2015.