RCNP EXPERIMENT E260

PROPOSAL FOR EXPERIMENT AT RCNP

20 January 2005

TITLE:
Further development of the high-resolution (^{3}He,t) probe and the application to detailed studies of nuclear structure and the (^{3}He,t) reaction mechanism

Spokesperson: R.G.T. Zegers, National Superconducting Cyclotron Laboratory, Department of Physics, Michigan State University, East Lansing, 48824 MI, USA and the Joint Institute for Nuclear Physics (JINA)

Co-spokespersons: Y. Fujita, Osaka University, Toyonaka, Osaka 560-0043, Japan.
Y. Shimbara, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan

with: M. Fujiwara, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047 and Advanced Science Research Center, JAERI,Tokai, Osaka 567, Ibaraki 319-1195, Japan.
K. Hatanaka, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.
M. Yosoi, Department of Physics, Kyoto University, Japan.
K. Nakanishi, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan
K. Kawase, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.
M. Itoh, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.
H. Matsubara, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.

A. Tamii, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.
Y. Tameshige, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.
Y. Sakemi, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.
K. Fujita, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.
Y. Shimizu, Research Center for Nuclear Physics, Osaka University, Ibaraki, Osaka 567-0047, Japan.
H. Fujita, iThemba LABS, P.O. Box 722, Somerset West 7129, South Africa.
D. Bazin, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, 48824 MI, USA and the Joint Institute for Nuclear Physics (JINA)
A. Cole, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, 48824 MI, USA and the Joint Institute for Nuclear Physics (JINA)
W. Hitt, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, 48824 MI, USA and the Joint Institute for Nuclear Physics (JINA)
S. Austin, National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, 48824 MI, USA and the Joint Institute for Nuclear Physics (JINA)
M. Howard, Department of Physics, Ohio State University, Columbus, OH 43210.
C. Simenel National Superconducting Cyclotron Laboratory, Michigan State University, East Lansing, 48824 MI, USA, the Joint Institute for Nuclear Physics (JINA) and DSM/DAPNIA CEA SACLAY, F-91191 Gif-sur-Yvette, France.

RCNP EXPERIMENT E260

TITLE:
Further development of the high-resolution (^{3}He,t) probe and the application to detailed studies of nuclear structure and the (^{3}He,t) reaction mechanism

SPOKESPERSON: R.G.T. Zegers, Y. Fujita and Y. Shimbara

SUMMARY OF THE PROPOSAL

In recent years, the capability to perform detailed studies using the (^{3}He,t) reaction has significantly improved at RCNP: high resolution experiments using dispersion-matching techniques have been developed and, in achromatic mode, development of raytracing has resulted in extraction of accurate angular differential cross sections. We will perform an experiment with the goal to combine these two to capabilities and use that to perform a detailed study of the (^{3}He,t) reaction mechanism at 140 MeV/nucleon on a variety of nuclei (^{26}Mg, ^{58}Ni) that are important for the understanding of nuclear structure, astrophysical applications and serve as benchmarks for (t,^{3}He) experiments performed at similar beam energies (115-125 MeV/nucleon) at the National Superconduction Cyclotron Laboratory at Michigan State university.