

M.Sc. Defense

Katie Green

DATE: Monday, December 14, 2009

TIME: 10:00 a.m.

**PLACE: MacNaughton Room 222
University of Guelph**

THESIS TITLE:

NUCLEAR STRUCTURE OF ^{112}Cd THROUGH STUDIES OF β DECAY

ABSTRACT:

The cadmium isotopes, especially ^{112}Cd , have been considered exceptional examples of vibrational nuclei. Previous studies of this pivotal nucleus have lacked sensitivity to weak low-energy branches, often the most important transitions to establish collectivity. A high-statistics measurement of the β decay of ^{112}Ag and ^{112}In to ^{112}Cd was performed using the 8π γ -ray spectrometer at the TRIUMF-ISAC facility to determine the detailed nuclear structure of ^{112}Cd . The interacting boson model was used to predict the level energies and electromagnetic transition strengths in ^{112}Cd and compare them with experimental results.

Details of the experimental data at higher energies could not be reproduced in ^{112}Cd , revealing a breakdown of vibrational motion at the 3-phonon level. Thus, there is a possibility that ^{112}Cd does not behave as a vibrational nucleus and the fundamental physics describing its motion is missing.

EXAMINING COMMITTEE:

Chair :	Rob Wickham
Supervisor:	Paul Garrett
Advisory Committee Member:	Carl Svensson