

M.Sc. Defense
Maren Gamble
DATE: Monday August 16th, 2010
TIME: 1:30 p.m.
PLACE: MacNaughton 222
University of Guelph

THESIS TITLE:

**DEVELOPMENT OF AN EXTERNAL BEAM PIXE MICROPROBE AT THE
UNIVERSITY OF GUELPH**

ABSTRACT:

This work describes the new in-air proton microprobe at the University of Guelph. External microprobes have been successfully implemented by several groups worldwide (for example, [1-3]), but the Guelph external beamline is the only one currently operational in Canada.

The in-air proton microprobe, typically operating at 2.5 MeV uses a Dyer Systems QL-100 quadrupole doublet focussing system. The beam optics parameters have been assessed using ion optics simulations as well as grid shadow patterns. Design elements and characteristics of the probe-forming system will be discussed and preliminary results obtained in vacuum and within a small air-filled chamber will be presented. The air-filled chamber allows necessary detectors to be calibrated and tested in both air and helium environments. The designs for the exit nozzle, the chamber, and the safety system, will also be discussed. Initial PIXE spectra obtained using the OM-DAQ software package are presented here.

EXAMINING COMMITTEE:

Chair: Dr. Robert Wickham

Advisor: Dr. Diane DeKerckhove

Advisory Committee Member(s): Dr. Iain Campbell, Dr. Stefan Kycia