

Vita

Candidate's name: Michael Edward Gill

Universities
Attended: University of New Brunswick (2007)
Bachelors of Science

Acadia University (2010)
Master of Arts

University of New Brunswick (2024)
Masters of Science
Physics

Presentations/Conferences/Publications:

Michael Gill and Benedict Newling, The determination of sucrose content in maple sap using time-domain magnetic resonance, Sugar Tech (2022) 24, 882-889.

Michael E. Gill, Studies on the translator of 1 Esdras with a articular interest in the work of Zipora Talshir (2010) MA thesis, Acadia University.

Michael Gill, "The textual development of the Greek book 1 Esdras" (2011) Canadian Society of Biblical Studies.

Michael Gill, "Avoiding misunderstandings in the classroom pertaining to science and religion" (2007) Atlantic Canadian Association of Science Educators.

Michael Gill, "The Propagation of Electromagnetic Disturbances in the Earth's Plasma Sheet" (2006) Canadian Undergraduate Physics Conference.

Michael Gill, "Methodology of teaching field theory at a high school level" (2005) Atlantic Canadian Association of Science Educators.

Magnetic Resonance Studies on Maple Sap

UNIVERSITY OF NEW BRUNSWICK
THESIS DEFENCE AND EXAMINATION

in Partial Fulfillment
of the Requirement for the Degree of
Master of Science

by

Michael E. Gill

in the Department of Physics

U.N.B., Fredericton, N.B.

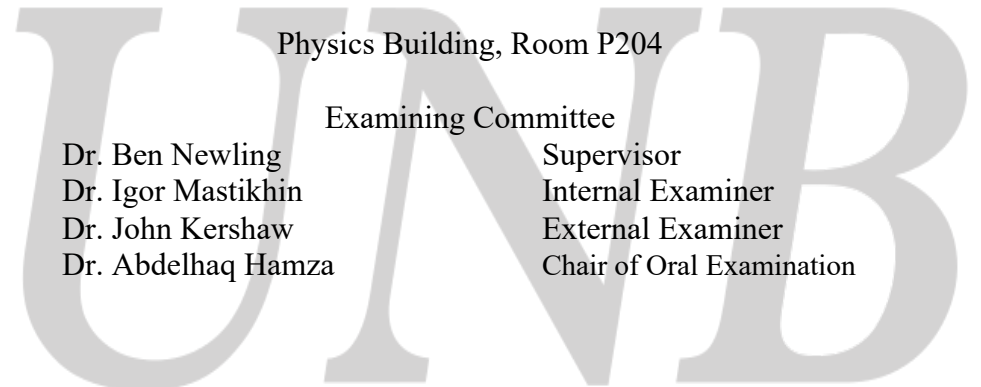
**Friday, July 19th, 2024
2:00 p.m.**

Physics Building, Room P204

Examining Committee

Dr. Ben Newling
Dr. Igor Mastikhin
Dr. John Kershaw
Dr. Abdelhaq Hamza

Supervisor
Internal Examiner
External Examiner
Chair of Oral Examination



Abstract

Maple syrup is an important product to the Canadian economy and to our broader national identity. The sugar concentration of maple sap plays a vital role in the overall profitability of syrup producers. Currently one must damage a tree to extract sap to determine its sugar concentration, and as such, the sap from very young trees cannot be tested. The work of this thesis lays the foundations for non-invasive testing of sugar concentration of maple sap using magnetic resonance. Beginning with extruded sap, magnetic resonance measurements are proposed and assessed then implemented on real sap filled maple wood using portable, handheld sensors within the lab setting. Improvements for the procedures and instrument designs are also discussed.