



**University  
of Victoria**

Graduate Studies

Notice of the Final Oral Examination  
for the Degree of Master of Science

of

**MARLA CERVANTES SMITH**

BSc (Universidad Autonoma de Yucatan, 2013)

**“ARIEL Electron to Gamma Converter Design”**

Department of Physics and Astronomy

Monday, September 26, 2016

10:30 A.M.

Elliott Building

Room 105

Supervisory Committee:

Dr. Dean Karlen, Department of Physics and Astronomy, University of Victoria (Co-Supervisor)

Dr. Alexander Gottberg, Department of Physics and Astronomy, UVic (Co-Supervisor)

Dr. Robert Kowalewski, Department of Physics and Astronomy, UVic (Member)

External Examiner:

Dr. Yang Shi, Department of Mechanical Engineering, UVic

Chair of Oral Examination:

Dr. Timothy Iles, Department of Pacific and Asian Studies, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

## **Abstract**

The e-linac beam that will serve the ARIEL Electron Target East (AETE) has an energy range from 30 MeV to 50 MeV with a power up to 100 kW. The beam electrons are to be transformed into photons by means of an electron-to-gamma converter with the purpose of inducing photonuclear reactions in a target to produce exotic isotopes. In the process of conversion, the primary electron beam power deposition in the converter causes a significant increase of the temperature that must be dissipated. The converter performance contributes notably to the overall isotope production and extraction efficiency. This thesis describes the work to optimize and verify the conceptual design of the electron-to-gamma converter through simulations and experimental measurements.