Lakehead UNIVERSITY | Department of Physics

Invites You To Attend Mid-term Presentations by PHYS 4501 students:

JORDAN LOVIS

"Monte Carlo Modelling of Radiation Dose Delivered by a Linac"

Supervisor: Dr. Peter McGhee

Abstract: The goal of radiation therapy is to use ionizing radiation to deliver a lethal dose to cancerous cells, while minimizing that delivered to surrounding tissue. With increasing complexity of patient radiotherapy techniques, more rigorous means of verifying treatment plan calculations are needed. Monte Carlo models of linear accelerators (linacs) provide useful means for determining various quantities of interest such as deposited dose, energy fluence, or even more complicated quantities in which experimental measurement may not even be possible. The aim of the current work is to develop a model of a clinical linac to provide an independent means for evaluation and characterization of dose deposition.

DEVIN VAN ELBURG

"Solid State Radiation Survey Meter for Advanced MRI-Guided Radiotherapy"

Supervisor: Dr. Alla Reznik

Abstract: Cancer treatment with ionizing radiation must be done in a matter that is effective in the dose delivery to the tumour, but also adequate in sparing healthy tissue. Brachytherapy proves to be one of the most non-invasive procedures in cancer treatment. Today, brachytherapy treatment is planned based on Computed Tomography (CT) followed by a computer simulation, and the actual procedure is done blind. There is a growing trend for Magnetic Resonance Imaging (MRI) guidance to control radiotherapy delivery for cancer treatments, especially, brachytherapy, where MRI scanner is combined with High-Dose Rate (HDR) brachytherapy treatment delivery systems. Compared to other imaging modalities, MRI provides much better soft-tissue contrast, which is needed for high precision radiotherapy of cancer targets.

Implementing MRI-guided radiotherapy procedures in a clinical setting requires the satisfaction of many safety precautions including a requirement to survey the MR room for residual radiation once a manual brachytherapy procedure is completed. However, conventional radiation survey meters based on vacuum photomultipliers (PMTs) are no longer usable in MR rooms because they are not MR-compatible. The overall objective of this research is to design, fabricate and evaluate MR-compatible radiation survey meters for MRI-guided brachytherapy. The specific aim of the proposed Honor Bachelor project is to optimize the design of a radiation survey meter based on a magnetic-field-insensitive silicon photomultiplier (SiPM).

DATE: **Tuesday, December 1st, 2015**

TIME: **3:00** PM

Room: **CB 4058**