

SEMINAR NOTICE

Department of Physics and Engineering Physics
University of Saskatchewan

SPEAKER: Dr. Morgan Dehnel, Ion Source Research Chair, Selkirk Ion-source Research Centre (SIRC).

TOPIC: *Penning Ion Source Research at SIRC Spanning Medical, Semiconductor and Astrophysics Applications.*

DATE: Tuesday November 18, 2025

TIME: 3:30-4:30 p.m.

PLACE: *Physics 103*

Abstract:

I will start my talk with a little background. I will commence with an initial technology transfer project I was involved with at TRIUMF 1989-1990, where TRIUMF transferred the design of a 30 MeV medical cyclotron to a company which is now known as Advanced Cyclotron Systems Inc. Following that I will touch on my PhD at TRIUMF/UBC in accelerator physics (1990-1995), and then discuss the founding of both D-Pace (1995), and the (SIRC) Selkirk Ion-source Research Centre (2024), which is a collaboration of Selkirk College, TRIUMF, U.Sask., UVic, and D-Pace.

I will then dive into certain commercialization examples that contain discovery science, such as D-Pace's efforts to develop energetic light negative ions for ion implantation through graduate student projects. Next at D-Pace a Penning ion source was developed by a PhD student for producing alpha's for medical cyclotrons, and then this Penning technology was recognized to be useful for multi-charged ions for ion implantation.

In closing, I look at 3 MITACS funded graduate student projects now commencing at the SIRC which utilize the Penning ion source. These are: (i) A project to achieve multi-charged ions of Nitrogen and Aluminum for SiC implantation for Power Electronics, (ii) An investigation of cesium enhanced cathodes to achieve a 20% increase in radioisotope production from medical cyclotrons used to produce PET radioisotopes, and (iii) Development of a Penning source capable of achieving $A/Q = 6$ ions with appropriate beam currents, kinetic energies, beam quality and ion source lifetime for certain TRIUMF Astro-Physics experiments.