SEMINAR NOTICE

Department of Physics and Engineering Physics University of Saskatchewan

PLACE:	Physics 103
TIME:	3:30-4:30 p.m.
DATE:	Tuesday October 3rd, 2023
TOPIC:	Quantum Magnetometry for UltraCold Neutron EDM Measurements
SPEAKER:	Dr. Michael Bradley, Department Head Physics and Engineering Physics

Abstract:

The discovery of a non-zero Electric Dipole Moment (EDM) of the neutron would represent a violation of CP symmetry and would herald new physics beyond the Standard Model. Neutron EDM experiments work by measuring the free precession of the neutron spin in a $\sim 1 \,\mu\text{T}$ magnetic field, with an additional applied electric field E. A non-zero neutron EDM would result in a measurable change in precession frequency when the polarity of the applied electric field is reversed. Use of a strong field (E > 10 kV/cm) allows a high-precision test for small values of the neutron EDM, which allows a tight bound to be put on this important parameter. Because of the high-precision required, it is crucial to ensure homogeneity and stability of the 1 µT applied magnetic field across the experimental volume. This is therefore monitored using an array of sensitive magnetometers of different types. Because of the critical nature of magnetic field measurements to this important physics problem, additional magnetic field measurement techniques are being sought, to provide assurance that systematic errors have not been overlooked. In this talk I will discuss new diamond NV- centre quantum magnetometers being developed at the University of Saskatchewan, and how they will contribute to the TUCAN (TRIUMF UltraCold Advanced Neutron) experiment located at TRIUMF, Canada's national particle accelerator centre in Vancouver.