



Department of Physics and Astronomy
Presents

Prairie University Physics Seminar Series

What's So Cool About Ultracold Neutrons ?



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Thursday March 15th, 2018
1:40 pm, Room C640, U Hall

Lecture abstract:

Ultracold neutrons are neutrons that have been cooled below 3 mK. At this temperature, they travel at a speed less than ~29 km/hr and exhibit the peculiar behavior of being able to be stored in magnetic, material, and gravitational bottles for periods ranging up to their beta-decay lifetime (~15 min). They present a new avenue for performing fundamental neutron experiments such as: searching for a non-zero neutron electric dipole moment (nEDM), precise measurement of the neutron lifetime, and precision measurements of neutron beta decay correlation coefficients to name a few. These measurements have important consequences for extensions to the standard model of particle physics which could help explain the baryon asymmetry of our universe.

Work has been ongoing for almost a decade to install a UCN source in Canada at TRIUMF, Canada's Particle Accelerator Center, to perform a world competitive nEDM measurement. In the fall of 2017, the TUCAN collaboration (TRIUMF UltraCold Advanced Neutron Source) produced the first UCN in Canada with a prototype spallation based UCN source. Here spallation neutrons are cooled by deuterium ice and superfluid helium cryogenic convertors. This source will be used to perform UCN focused R&D in preparation for the installation of a higher throughput superfluid helium based UCN source and nEDM experiment. I will present recent results from the prototype UCN source at TRIUMF and some of the nEDM subsystem work being done at the University of Winnipeg

EVERYONE IS WELCOME