

Dr. Erica Caden welcomes applications from students interested in pursuing a M.Sc. in Physics to work on nEXO at the Department of Physics at Laurentian University.

The local Particle Astrophysics Group has strong ties with SNOLAB, a 2-km underground science laboratory in nearby Lively, ON. SNOLAB grew from the Sudbury Neutrino Observatory (SNO), recognized in the 2015 Nobel Prize for Physics. In addition, Laurentian is a founding member of the Arthur B McDonald Canadian Astroparticle Physics Research Institute. Using these resources, we are able to ensure that students receive world-class education, and are well prepared for a future in the academia or industry.

Some of the most outstanding physics problems yet to be understood are the properties of neutrinos. Recent observations have shown that neutrinos have mass, which has implications in several areas from cosmology to elementary particle physics. In particular, this may shed light in the origin of the Universe. Massive neutrinos allow the possibility for these particles to be their own antiparticles. The most sensitive probe to this nature of the neutrino is searching for neutrinoless double beta decay, a hypothetical nuclear decay mode in which two electrons are emitted with zero neutrinos. Many experiments are searching for evidence of this decay, including nEXO, the next generation Enriched Xenon Observatory.

The nEXO concept is a single-phase Time Projection Chamber (TPC) filled with five tonnes of liquid xenon, looking for neutrino-less double beta decay, to be installed in the Cryopit at SNOLAB. Additional physics searches can be performed by instrumenting the water shielding tank, transforming it into an Outer Detector. M.Sc. research projects include design, construction, and installation of the testing facility to support this outer detector.

Masters Thesis work includes a combination of physics analysis, detector operations, and development of hardware techniques on the nEXO project.

Laurentian University is committed to equity in employment and encourages applications from all qualified applicants, including women, aboriginal peoples, members of visible minorities and persons with disabilities.

