

SNOLAB Group Summer Student Employment

APPLICATION DEADLINE: Sunday, March 2nd, 2014

The Particle Astrophysics (Experimental) Group at Queen's has a few openings for student research positions in summer 2014. The group is actively involved in the design, construction, and operation of next-generation experiments that seek to answer fundamental questions in particle physics and astrophysics, including searches for dark matter particles (PICO, DEAP, SuperCDMS), studies of solar and geo-neutrinos, and neutrinoless double-beta decay (SNO+), and investigations into advanced detector technologies (see www.sno.phy.queensu.ca/group/).

Much of our experimental work takes place at SNOLAB, a world-leading, ultra-low background particle astrophysics laboratory located 6800' underground in Vale's Creighton mine, near Sudbury (see www.snolab.ca). Some of the summer research activities could take place at SNOLAB.

The successful candidates will have strong academic records in Physics, Engineering Physics, Chemistry or a related discipline and will have had some relevant experience that demonstrates their potential for research. Students eligible for NSERC USRA or other fellowship support are encouraged to apply.

The following experiments anticipate hiring one or more students this summer. Please send a curriculum vitae and copy of recent transcript by e-mail to the contact for each of the experiments you are interested in.

DEAP-3600 searches for Dark Matter particles using cryogenic liquid argon. Dark Matter particle interactions in the 3600-kg liquid argon target will be searched for by recording light pulses with an array of 255 large-area photomultipliers. Installation of the final DEAP- 3600 detector components will be ongoing throughout summer and fall 2014.

Contact: Mark Boulay (mark.boulay@queensu.ca)

PICO searches for Dark Matter using superheated liquids that undergo phase transitions when recoiling nuclei from WIMP interactions deposit energy in the fluid. These phase transitions are detected using sensitive piezo-electric transducers. One phase of detectors is currently operational underground at SNOLAB while a new phase is being designed and built. Potential summer positions include assisting with the construction of new detectors, analysis of existing detector data, and installation of components underground.

Contact: Tony Noble (potato@snolab.ca)

SNO+ will study fundamental properties of neutrinos using a 780 tonne liquid scintillator target. The experiment is currently under construction at SNOLAB. Potential summer researcher activities include assisting in the preparation of calibration systems and calibration sources, helping to prepare the scintillator purification system, participating in the development of tellurium purification procedures, and operating the detector during commissioning running.

Contact: Alex Wright (awright@physics.queensu.ca)

SuperCDMS employs cryogenic detectors operated at ~40 mK to search for interactions of dark matter particles. SuperCDMS is presently operating at the Soudan Underground Laboratory in Minnesota and at the same time preparing for a next phase of the experiment to be installed at SNOLAB. The Queen's SuperCDMS group is involved in detector R&D work performed at the local detector test facility, data analysis for the operating experiment and Monte Carlo simulations.

Contact: Wolfgang Rau (rau@owl.phy.queensu.ca)

Detector R&D studies of the optical scintillation of inorganic crystals at cryogenic temperatures are being carried out, with the aim of developing a new class of detectors to search for dark matter.

Contact: Philippe Di Stefano (philippe.distefano@gmail.com)