

**Posting Date:** Sept 1 2019

**Department of Physics**  
**University of Toronto**  
**JOB POSTING – POSTDOCTORAL FELLOW**

**Area of Research:** Experimental Astroparticle Physics

**Description of duties:** A postdoctoral fellowship position is available in the University of Toronto SuperCDMS group, supported by the Arthur B. McDonald Canadian Astroparticle Physics Research Institute (MI). MI is a hub uniting researchers, theorists, and technical experts within one organization, providing unique opportunities for collaboration in a growing and dynamic network. MI is proud to have 13 partner universities and research institutes across Canada, all of which are key players in the country's past and future innovation in astroparticle physics.

SuperCDMS is a direct-detection experiment that looks for interactions of dark matter in cryogenic germanium and silicon detectors equipped with sensors for the thermal energy of particle interactions. SuperCDMS has an illustrious history of world-leading dark matter results; the next generation of the experiment, featuring novel detector upgrades, is currently being installed in SNOLAB, Canada's premier astroparticle physics facility located 2 km below the surface in the Vale Creighton Mine near Sudbury. The elite international collaboration aims for world-leading sensitivity to a variety of dark matter candidates and masses over the next decade. The chief advantage of SuperCDMS's cryogenic technology is the extremely low detection thresholds achievable, while SNOLAB provides a clean and well-shielded environment optimal for background reduction.

The Toronto group focuses on data acquisition, data quality monitoring, Monte Carlo detector simulation, and data analysis. With the recent opening of the Cryogenic Underground TEST (CUTE) facility to support detector development and characterization, and first operations of SuperCDMS SNOLAB expected next year, the successful applicant will have a significant shift-taking presence at SNOLAB. Shifts may include special runs of prototype devices in the R&D stage at the test facility, as well as commissioning and physics runs of the main SuperCDMS SNOLAB setup. Analysis of test facility data and first physics data will be performed remotely from Toronto, with an emphasis on electron-recoil and dark-absorption searches for sub-GeV dark matter candidates such as dark photons and axion-like particles. In addition to specific searches, the successful applicant will have opportunities to contribute to the refinement of the reconstruction software, and the development and enhancement of the overall data analysis and processing framework as the collaboration's computing needs grow. Remote detector simulation work will include the production of simulated data samples, comparisons of these samples to first data, and maintenance and enhancements for the Monte Carlo software framework. Remote data quality monitoring work will require rapid preliminary assessment and cataloguing, on a frequent and regular basis, of recent runs. Additional duties for the collaboration will consist of organizing meetings, documenting software, and reviewing and authoring internal reports as well as published papers. This is an exciting time to join the collaboration: hands-on involvement with various aspects of the experiment right from the start of SNOLAB data-taking. It is also an exciting time for the dark matter search field in general, with discovery potential for a range of models to finally resolve the longstanding questions at the forefront of modern astroparticle physics.

**Salary:** \$65000/yr

*Please note that should the minimum rates stipulated in the collective agreement fall below the rates stated in this posting, the minimum rates stated in the collective agreement shall prevail.*

**Qualifications:**

- Ph.D. in experimental particle physics or astrophysics, by the time of the appointment.
- Strong record of recent accomplishments in experimental physics.
- Excellent oral and written communication skills as demonstrated by presentations at conferences and a record of publication(s) in peer-reviewed journals.
- Ability to abide by all environmental, safety and health regulations.
- Strong coding skills (particularly Python and C++) and expertise in DAQ systems are preferred.
- Ability to descend the SNOLAB mineshaft and traverse the mine tunnels.

**Application instructions**

All individuals interested in this position must submit a CV, a publication list, and a short statement of research interest to [cliao@physics.utoronto.ca](mailto:cliao@physics.utoronto.ca) with the subject line “Postdoctoral Fellow – Experimental Astroparticle Physics” by the closing date. At least three letters of reference should also be sent directly by the referees to this address by the closing date.

**Closing date:** Review of applications will commence on 1 Nov 2019, and the opportunity will remain available until filled.

**Supervisor:** Prof. Miriam Diamond ([mdiamond@physics.utoronto.ca](mailto:mdiamond@physics.utoronto.ca))

**Expected start date:** Jan 1 2020, flexible

**Travel:** Occasional travel to Sudbury, by automobile or commercial air carrier, will be required. Additional travel to other destinations (domestic and international) for conferences and workshops will be optional.

**Term:** Two (2) years, with the possibility for extension considered on a yearly basis thereafter

**FTE:**

This is a full-time position, and will require flexible scheduling to accommodate evening or overnight shifts for data-taking at SNOLAB.

*The normal hours of work are 40 hours per week for a full-time postdoctoral fellow (pro-rated for those holding a partial appointment) recognizing that the needs of the employee’s research and training and the needs of the supervisor’s research program may require flexibility in the performance of the employee’s duties and hours of work.*

*Employment as a Postdoctoral Fellow at the University of Toronto is covered by the terms of the CUPE 3902 Unit 5 Collective Agreement.*

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*The University of Toronto is strongly committed to diversity within its community and especially welcomes applications from racialized persons / persons of colour, women, Indigenous / Aboriginal People of North America, persons with disabilities, LGBTQ persons, and others who may contribute to the further diversification of ideas.*