Quantum Sensing for Subatomic Physics
Arthur B. McDonald Canadian Institute for Astroparticle Physics
Department of Physics, Engineering Physics & Astronomy
Queen's University

Job posting – Postdoctoral Fellow

Quantum Sensing for Experimental Nuclear and Neutrino Physics

The Department of Physics, Engineering Physics & Astronomy at Queen's University and the Arthur B. McDonald Institute invite applications for a Postdoctoral Fellow position in the Quantum Sensing for Subatomic Physics (QSSP) program. The successful candidate will develop the local technical capability for the experimental BeEST program at Queen's, and help lead the program.

This position offers a rare opportunity for an ambitious early-career researcher to take on genuine scientific leadership in a large international collaboration, while helping establish a new experimental platform from the ground up for future phases of the experiment. The successful candidate will play a central role in commissioning and operating a bespoke dilution-refrigerator system for implanted-isotope measurements with superconducting tunnel junction (STJ) detectors. They will help shape the technical direction and early scientific agenda of the BeEST program at Queen's while contributing to the growth of a broader rare-isotope quantum-sensing effort associated with the Arthur B. McDonald Institute.

Research activities will include leading aspects of the experimental program related to cryogenic infrastructure, detector integration, commissioning, calibration, and data collection; developing and optimizing superconducting detector systems for precision recoil spectroscopy; planning and participating in rare-isotope implantation campaigns at external facilities; and advancing analysis methods and spectral modeling for electron-capture decay measurements. The successful candidate will also contribute to manuscripts, conference presentations, technical reports, proposals, and collaboration coordination, and will assist in mentoring graduate and undergraduate trainees involved in the project.

This is intended as a leadership postdoctoral appointment for both technical development and data analysis rather than a purely supporting role. The successful applicant will be expected to take substantial ownership of the experimental effort, drive progress on the new Queen's platform, and help define its scientific trajectory. Although the immediate focus is the next-generation BeEST program based on 7Be, the platform is being developed with a broader vision in mind, including future measurements with additional isotopes and new precision observables relevant to neutrino physics, fundamental symmetries, and quantum sensing.

The position will be based in Kingston, Ontario, Canada at Queen's University, with close ties to the Arthur B. McDonald Institute and strong connections to external partner laboratories including TRIUMF and SNOLAB in Canada, and PNNL, LLNL, and FRIB in the US. It is especially well suited to candidates who are excited by a mix of hands-on experimental development, discovery-oriented measurement, and long-term program building.

We recognize that research impact can be demonstrated in a variety of ways and welcome applications from candidates with diverse training paths and experiences in experimental nuclear physics, neutrino physics, low-temperature detector physics, quantum sensing, or closely related areas.

Required Qualifications:

- Ph.D. in experimental nuclear or particle physics, quantum sensing, applied physics, or a closely related area, by the time of appointment.
- Experience with cryogenic detectors (sub-Kelvin) including low-temperature instrumentation/wiring, dilution-refrigerators, and micro/nano-scale devices.
- Experience with data acquisition, signal processing, and precision data analysis.
- Experience working in collaborative experimental environments involving multiple institutions or external user facilities.

Preferred Experience:

- Experience with nuclear, particle, astroparticle, or rare-event experiments.
- Experience with detector development, characterization, or laboratory commissioning.

Application instructions:

All individuals interested in this position must submit:

- a full CV including list of publications,

- a research interests statement, and
- a cover letter

to Prof. Kyle Leach (Spokesperson of the BeEST collaboration) at kyle.leach@queensu.ca with the subject line "Postdoctoral Fellow – BeEST at Queen's" by the closing date. In the CV, the candidate should also provide a list of three references who may be contacted for short-listed candidates.

Closing date: July 30, or until position is filled.

Expected start date: January 1, 2027. There is also flexibility for both earlier or later at the availability of the successful candidate. The successful candidate will be required to demonstrate eligibility to work in Canada.

Salary: $75,000/year, commensurate with experience.

Term: Two (2) years, with the possibility of an extension for a third

This is a full-time position. Some flexibility in scheduling will be required to accommodate cryogenic operations, detector commissioning, experimental campaigns, and coordination with external facilities and collaborators. Accommodations will be considered where they can be realized. Employment as a Postdoctoral Fellow at Queen's University would make you a member of the bargaining unit represented by the Public Service Alliance of Canada ("PSAC") Local 901, Unit 2. This job is posted in accordance with the Collective Agreement.

Diversity Statement

Scientific research, education, and diversity of inquiry can only flourish if all participants are fully supported to contribute, realize their potential, and express themselves freely. The Department and Queen's University recognize that opportunities for full participation have not been granted universally, and that barriers to participation exist today in the discipline. Motivated by scientific excellence, fairness, and respect, we must create an inclusive, equitable, and welcoming environment that fosters a sense of belonging in the Department and the University community.

All members of the Department, including faculty, staff, and students, are expected to create and maintain a kind and welcoming working and learning community. This responsibility is especially acute for those in positions of power, who must lead by example and be mindful of unequal dynamics that can arise from hierarchy or social privilege. Discussions, conflict, and feedback should be conducted in a respectful way. It is everyone's responsibility to respect the rights of freedom of expression, academic

freedom and freedom of research, and provide an environment free from prohibited discrimination and harassment, consistent with Queen's University policies.

We recognize the challenges faced by Indigenous Persons, Racialized Persons, Women, Persons with Disabilities invisible or apparent, members of the 2SLGBTQ+ Community, and other equity-deserving groups in the Department. We must strive to improve accessibility, well-being, and mental health support. We aim to develop new ways to support, engage with, and learn from Indigenous Peoples in our research, learning, and teaching. We commit to identifying and correcting biases and systemic inequities in our activities and structures, including those which reflect or have their basis in harmful colonial ideologies, and to improve recruitment and retention of members of underrepresented groups. We commit to an ongoing conversation that includes all voices. We invite everyone to contribute to that dialogue, and share with us their lived experience in this Department.

Accessibility Statement

The University is committed to the principles of the Accessibility for Ontarians with Disabilities Act (AODA). As such, we strive to make our recruitment, assessment and selection processes as accessible as possible and provide accommodations as required for applicants with disabilities. If you require any accommodations at any point during the application and hiring process, please contact hradmin@queensu.ca.