

## **Research Associate**

### **University of Alberta**

### **SC Physics**

Competition No. - **A107851864**

Closing Date - **Nov 01, 2023**

This position is a part of the Association of the Academic Staff of the University of Alberta (AASUA).

In accordance with the Trust/Research Academic Staff Agreement, this position has an approximate appointment of 2 years with a possibility of extension and offers a comprehensive benefits package found at Faculty & Staff Benefits.

**Location** - North Campus Edmonton. This role is in person.

### **Working for the University of Alberta**

**The University of Alberta acknowledges that we are located on Treaty 6 territory, and respects the histories, languages and cultures of First Nations, Metis, Inuit and all First Peoples of Canada, whose presence continues to enrich our vibrant community.**

The University of Alberta is teeming with change makers, community builders, and world shapers who lead with purpose each and every day. We are home to more than 40,000 students in 200+ undergraduate and 500+ graduate programs, over 13,000 faculty and staff, 260,000 alumni worldwide and have been recognized as one of Canada's Greenest Employers for over a decade.

Your work will have a meaningful influence on a fascinating cross section of people—from our students and stakeholders, to our renowned researchers and innovators who are quite literally curing diseases, making discoveries and generating solutions that make the world healthier, safer, stronger, and more just.

### **Working for the Department/Faculty**

The Department of Physics at the University of Alberta has approximately 50 faculty members and 50 postdoctoral fellows and research associates, including a strong experimental physics group.

### **Position**

The Ultracold Quantum Gases Laboratory at the University of Alberta is engaged in several projects related to quantum sensing and quantum computing using neutral atomic gases as a quantum medium on which to develop these emerging technologies. This position requires a person with expertise in atomic physics to work towards several milestones outlined in recently successful grants. These include work towards a rubidium-based, microwave-enhanced atomic magnetometer; using the nonlinear optical properties of a rubidium vapour as a means to create and manipulate quantum optical information; and assisting with the construction, commissioning, and operation of a prototype quantum computing module based on individually optically trapped neutral atoms. This position will contribute to the development of new neutral-atom-based quantum technologies.

### **Duties**

- Guiding research in quantum sensing and quantum computing with neutral atoms
- Meeting milestones in projects related to neutral-atom-based quantum sensing and quantum computing
- Selecting, commissioning, and maintaining scientific equipment including diode lasers, ultrahigh vacuum systems, and digital and analogue electronics
- Day-to-day supervision of graduate and undergraduate students, data acquisition and analysis, the learning of new experimental techniques (aligning optics and working with ultrahigh vacuum systems, primarily), and providing support to students performing data analysis.
- Performing independent data analysis and modelling using tools like MATLAB, Mathematica, and Python
- Preparing manuscripts for peer-reviewed publication based on experimental and theoretical results. Co-author and co-present research papers, presentations, and/or other publications.
- Guiding research directions and making day-to-day decisions about the progress of research in neutral-atom-based quantum sensing and quantum computing

### **Qualifications**

- PhD in atomic and/or optical physics with significant post-doctoral experience in atomic physics.
- Demonstrated experience supervising graduate and undergraduate student thesis research

- Mastery of graduate-level atomic physics and quantum optics concepts, including semiclassical optics (light-matter interactions with classical light and quantum matter) and quantum optics (both matter and light exhibit quantum properties), nonlinear optics, and cavity optomechanical systems
- Demonstrated proficiency with microwave and radiofrequency systems and signal processing
- Demonstrated experience performing experiments with warm and cold neutral atomic gases, including: laser cooling and trapping techniques; quantum degenerate gases; nonlinear optics using atoms; and cavity-mediated warm-atom microwave interactions
- Demonstrated experience handling and building precision ECDL diode laser systems, electro-optic devices, ultrahigh vacuum systems, analog electronics for magnetic field control, RF and microwave test and measurement equipment including vector network analysis and spectrum analyzers, and digital and analog data acquisition systems
- Excellent ability to process and analyze large amounts of data through analytical and statistical means, including image processing, time-domain, and Fourier analyses.
- Demonstrated expertise in programming for theoretical physics simulations and data analysis using physics principles from semiclassical and quantum optics, using mathematical simulation software (such as Mathematica) for these physics simulations.
- Exceptional interpersonal skills necessary to facilitate interactions with a range of users including students, PDFs, PIs, and administrators
- Excellent English-language skills, including ability to write and present scientific results for peer-reviewed venues and international conferences
- Demonstrated experience performing the full range of an experimental physics project, from conception, through experimental design, construction and commissioning of apparatus, data acquisition and analysis, and dissemination

As part of the Temporary Foreign Worker Program requirements, the university must conduct recruitment efforts to hire Canadians and permanent residents before offering a job to a temporary foreign worker. To ensure we remain in compliance with these regulations, please include the appropriate statement in your application "I am a Canadian Citizen/Permanent Resident" or "I am not a Canadian Citizen/Permanent Resident".

All qualified candidates are encouraged to apply; however, Canadians and permanent residents will be given priority.

The University of Alberta is committed to an equitable, diverse, and inclusive workforce. We welcome applications from all qualified persons. We encourage women; First

Nations, Metis and Inuit persons; members of visible minority groups; persons with disabilities; persons of any sexual orientation or gender identity and expression; and all those who may contribute to the further diversification of ideas and the University to apply.

**To apply, please visit: <https://apptrkr.com/4626029>**

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