



## **Postdoctoral position in low-temperature UHV AFM/STM to probe multi-terminal quantum devices and 2D materials**

**Description of Position:** The Brar group at the University of Wisconsin – Madison has an immediate opening for a postdoc with expertise in low temperature scanned probe experiments. The postdoc will be responsible for conducting experiments aimed at probing correlated phases in 2D materials under transport conditions, and also experiments that utilize superconducting circuitry to create low-noise scanned Josephson Junctions within a cryogenic STM. The postdoc is expected to work closely with a team of graduate and undergraduate students to create samples, test new measurement schemes, and fabricate superconducting circuits. This position also provides opportunities to collaborate closely with research groups at UW-Madison and international groups who have expertise in superconducting quantum circuitry, 2D materials, and electron hydrodynamics. The overarching goal of these experiments is to visualize material properties that cannot be observed using conventional scanned probe techniques. Specific phenomena that will be investigated using these new techniques include: (1) novel defect states in superconductors, (2) hydrodynamic flow in 2D materials, (3) interlayer excitons, and (4) phase transitions in non-BCS superconductors. These experiments will be conducted on a modified commercial 4.5K UHV SPM system, and the postdoc will also assist in designing and testing a second generation system that operates at lower temperatures. The position is currently vacant and available for an immediate start.

### **Duties and Responsibilities**

- Preparing samples and measuring 2D material devices with multi-probe geometries using cryogenic, UHV SPM.
- Probing superconducting surfaces using superconducting SPM tips.
- Training of graduate students on atomic scale imaging with SPM.
- Assisting in design of a lower temperature SPM system with novel vibrational damping schemes and superconducting circuitry.
- Collaborate with members of the Brar research group on research, publications, and conference presentations.

### **Preferred Skills and Abilities**

- Exceptional skills in high resolution scanning probe techniques in ultrahigh vacuum and cryogenic conditions.
- Experience in designing and troubleshooting SPM systems.
- Experience in surface science preparation and characterization techniques.
- Strong problem solving and organizational skills.
- Excellent communication skills in English.
- Experience with superconducting circuitry.

## **Department of Physics**

**Minimum Education and Experience**

- Completed Ph.D.

**Annual Salary**

- Competitive, commensurate with experience; relocation package available.

**Application Process**

Candidates should submit the following:

- Cover letter.
- Academic Curriculum Vitae including publication list.
- 1 page statement of research motivation and interests.
- Names of three referees

The applications will be reviewed in the order received, and the position will remain open until filled. Inquiries may be sent to Professor Victor W. Brar at [vbrar@wisc.edu](mailto:vbrar@wisc.edu)