

January 2025

## Postdoctoral Research Associate in Superconducting Materials Synthesis and X-ray Characterization for Quantum Devices

SLAC National Accelerator Laboratory is seeking a Postdoctoral Research Associate to investigate materials for superconducting quantum devices. The postdoc will work closely with staff at the SLAC National Accelerator Laboratory and Stanford Synchrotron Radiation Lightsource (SSRL), as well as the research group of Prof. David Schuster at Stanford University, to study superconducting materials and their performance in quantum information circuits using advanced synthesis techniques and x-ray beamlines to characterize those materials.

SLAC and Stanford are collaborating to utilize a range of deposition techniques (e.g. molecular beam epitaxy, magnetron sputtering, double-angle evaporation) to synthesize superconductor/insulator/superconductor trilayers for Josephson tunnel junctions, an integral part of circuits used for quantum information processing. The postdoc will participate in thin film synthesis activities and drive subsequent studies of those films using x-ray beamlines at SSRL. X-ray techniques include reflectivity (XRR), grazing-incidence diffraction (GIXRD), grazing-incidence absorption spectroscopy (GIXAS), among others. The postdoc will coordinate research activities with the broader collaboration, including those performing materials simulations, device fabrication, and cryogenic measurements. The overarching goal of the project is to connect materials properties to quantum device performance, linking signatures of structural or chemical defects to device metrics such as coherence time or quality factor.

The candidate must have experience with x-ray or electron-beam techniques for characterizing materials, either scattering or spectroscopic, and should be familiar with thin-film synthesis methods listed above. The candidate should have strong programming skills for data analysis, and will be expected to engage with the broader team and community through publication and presentation of key results.

### **Required Qualifications:**

- Ph.D. in Physics, Applied Physics, Materials Science, or similar
- Experience with x-ray and/or electron-beam characterization techniques
- Experience with thin film synthesis techniques such as evaporation and sputtering
- Proficiency in programming (Python preferred) for data analysis
- Exceptional communication skills and ability to work well in a research and development team
- Strong conceptual and problem-solving skills as well as the ability to identify and recommend solutions
- Excellent organizational skills and the ability to synthesize complex technical and scientific information
- Strong written communication skills to articulate priority research directions and research results to the wider scientific community

Applicants should submit a cover letter, a curriculum vitae, and a list of references to Dr. Paul Welander ([welander@slac.stanford.edu](mailto:welander@slac.stanford.edu)).