

Opportunities for graduate students in Quantum Sensing and Quantum Device Engineering

Prof. Laraoui at the University of Nebraska-Lincoln is hiring graduate students to join the [Quantum Sensing & Defect Discovery and Spectroscopy Lab](#). His primary research focuses on developing new quantum materials based on atomic-defects in diamond, wide bandgap semiconductors, and two-dimensional (2D) materials, for applications in quantum sensing, nanoscale metrology, quantum photonics, and quantum information processing.

Two projects are available:

1. Develop and study hybrid spin qubits-nanomagnetic systems for scalable quantum information processing networks.
2. Develop quantum sensing technology to perform micro/nano-scale magnetic resonance imaging of a wide range of solid-state and bio materials.

These research activities are mainly experimental and involve:

- ❖ Optimizing and setting optical and magneto-optical experiments in quantum sensing at a wide range of experimental conditions (e.g., low-temperatures down to 1.6 K).
- ❖ Quantum protocols: pulse control, optical initialisation and readout, magnetic field control, etc.
- ❖ Interfacing experiments to collect data using Labview, Python or other programming languages.
- ❖ Materials and device nanofabrication: EBL, DWL, thin film evaporation/sputtering, RIE/ICP etching, focused ion beam (FIB), etc.
- ❖ Materials and device characterization: AFM, TEM, SEM, Raman, UV-VIS optical spectroscopy, VSM, SQUID, etc.

Motivated students interested in learning new laboratory skills in solid-state physics, quantum optics, and nanomaterials science are encouraged to contact Dr. Laraoui at alaraoui2@unl.edu. In your email, please include your academic resume (CV) with a motivation letter. Ideally students should have a Bachelor or Masters in Condensed Matter Physics, Physics, Electrical Engineering, Materials Engineering, or other related fields. Ideally, interested applicants have at least one of the following skills: basic/advanced background in programming (LabView, Python, Matlab...), data analysis (Mathematica, Matlab, OriginLab,...), design (CAD, solidworks...), MW/RF electronics, nanofabrication, sample characterization, and performing experiments in optics and magnetism.

Students will have the opportunity to get trained at National labs such as Sandia National Labs in Albuquerque, NM and at Argonne National Lab in Lemont, IL, attend national (APS and MRS Meetings) and international conferences, etc.

More information about Dr. Laraoui's research can be found at <https://engineering.unl.edu/laraoui/>

For information about the application process to enroll in a PhD in Materials Engineering::

<https://engineering.unl.edu/graduate-programs/phd-materials-engineering/>

A very competitive research assistantship (> \$30,000/year) with health-insurance benefits and tuition support are offered.