Candidate Information

Position: Research Fellow
School/Department: School of Mathematics and Physics
Reference: 24/112058
Closing Date: Monday 22 July 2024
Salary: £39,922 per annum
Anticipated Interview Date: Friday 9 August 2024
Duration: 12 months

JOB PURPOSE:

The Centre for Quantum Materials Technologies (CQMT) at Queen's University Belfast is seeking a postdoctoral researcher as part of a project that will help unveil transitional states in an antiferroelectric material with strong implications for energy storage. (project ref: https://www.nsf.gov/awardsearch/showAward?AWD_ID=2219476&HistoricalAwards=false). The position will assume responsibility for the delivery of specific research objectives as part of a recently awarded US-Ireland research project, held by the PI. The appointee will work within the PI's team alongside PhD students as well as members of other groups associated with the world-class nanoscale ferroelectrics activity in the Centre. The planned research will be pursued at a fundamental level and will be heavily experimentally focussed.

MAJOR DUTIES:

1. Undertake research under supervision within the specific research project, and as a member of the PIs research team to investigate transitional states in the archetypal antiferroelectric, Lead Zirconate (PZO) thin films.
2. Undertake Atomic Force Microscopy based size reduction (thinning) and tip-based shaping of nanostructures.
3. As part of the project, investigate the structure-property relations in processed ferroic films.
4. Undertake nanoscale functional (electrical) characterisation of PZO thin films using scanning probe-based methods.
5. Carry out data analysis and critical evaluations to correlate parallel studies with TEM experiments undertaken by team members.
6. Ability and willingness to develop/build upon existing scanning probe microscopy infrastructure for investigation of nanoscale functionality.
7. Produce high quality research outputs consistent with project aims and commensurate with career stage. This will include collaborating and co-authoring with PI and project team (as appropriate) on outputs.
8. In consultation with the project team, promote research milestones and outputs at national and international conferences.
9. Carry out undergraduate supervision/demonstrating/teaching duties at a level to be agreed, and to assist with project-related outreach activities as required.
10. Undertake supplementary duties relevant to the success of the project including administrative duties and additional training and development activities as required.

ESSENTIAL CRITERIA:

1. *Degree or equivalent in physics, materials science or other cognate area of relevance to the post.
2. *Hold or about to Hold a PhD (Thesis submitted) in a relevant area (e.g. Physics, Materials Science).
3. * Specific, relevant research experience in advanced scanning probe microscopy-based electrical characterisation techniques of ferroic materials.
4. * Experience in AFM-based milling and thinning of samples.
5. * Experience in Ferroelectric Physics and Domain/Domain wall Phenomena.
6. * Working knowledge of FIB for lamella sample preparation.
7. * Experience operating dedicated SPM holders and SPM software for experiments.
8. *Relevant data analysis experience for High resolution SPM techniques.
9. *Strong publication record commensurate with career stage.

10. *Ability to contribute to broader management and administrative processes.
11. *Sufficient breadth and depth of specialist knowledge in the discipline and of research methods/techniques to work within established research programmes.
12. *Experience in providing support to undergraduate Physics students.
13. *Ability to communicate complex information in English effectively in oral and written format.
14. *Strongly motivated, able to work independently and take ownership of the project.
15. *Able to work as part of a team and assist with day-to-day management of PhD students.

DESIRABLE CRITERIA:

1. *Relevant PhD research experience in scanning probe microscopy of ferroelectrics, antiferroelectrics, functional oxides and/or domain walls.
2. * Experience in novel characterisation techniques such as High-voltage PFM and High-Voltage Kelvin Probe Force Microscopy.
3. * Experience in AFM based milling, layer-by-layer tomography and nanostructuring.
4. * Experience in SPM based electrical characterisation modes such as SSPFM, Local hysteresis mapping and local I-V response mapping.
5. * Working experience of FIB/SEM and nanostructuring/lamella preparation using it.
6. *Advanced knowledge of SPM hardware/software customisation for experiments
7. *Demonstratable advanced knowledge of Ferroic Physics (ferroelectrics or antiferroelectrics)
8. *Experience in training students/other users on scanning probe microscopes.
9. *Dissemination/publication record commensurate with level of experience.
10. *Experience of interaction with undergraduate students in taught laboratory settings (experimental or computational).
11. * Experience of involvement in educational Outreach events, etc.
12. *Practical problem-solving skills, independence of thought and initiative.
13. * Ability to work as part of a team (and be part of collaborations on satellite projects), as well as independently.
14. *Ability to articulate microscopy data to collaborators working on an international project and experience publishing high-level scanning probe microscopy data.
15. *Ability to prepare and give well-timed, coherent and insightful presentations.
16. *Contributed talks at international and local conferences.
17. *Willingness to travel both nationally and internationally as required by the role.