**JOB DESCRIPTION**

**Vacancy Ref:** A2642

### Job Title: Senior Research Associate in thin-film-based detector development

**Present Grade:** 7

**Department/College:** Physics

**Directly responsible to:** Dr. Daniel Muenstermann

**Supervisory responsibility for:** Potentially co-supervision of PhD and MPhys students

**Other contacts**

**Internal:**
Dr R J Young, Reader of Quantum Information, Lancaster University

**External:**
Prof. Joaquin Alvarado, BUAP, Puebla, Mexico

### Major Duties:

The position is embedded in the collaborative project “Cost-efficient and radiation-tolerant pixel detectors for ionising radiation based on thin-film technology” that we conduct together with colleagues at two Mexican institutions. The basic idea is to explore whether industrially available thin-film technology (TFT) can be used to produce cost-efficient and radiation-tolerant pixel detectors for ionising radiation to be used in future high-energy physics experiments.

As PDRA in Lancaster, you will be the main responsible for the GaAs part of the project that involves the growth of detector-grade GaAs thin-films on GaAs substrates using MBE techniques, and structuring them using equipment available in our QTC cleanroom. In addition to creating and evaluating resistor- or diode-like detector structures, you will also design, produce and test thin-film-based transistors that would allow us to include the first amplifier stage directly on the GaAs substrate. Characterisation of the structures will be repeated after irradiation to establish the radiation tolerance of the detectors and to gauge their expected performance in future particle physics experiments.

The University has considerable state-of-the-art facilities that you will be expected to use as part of this project, including:

- A fabrication suite and cleanroom. The Lancaster Quantum Technology Centre officially opened in 2014, it contains a fully fitted class 100/1000 cleanrooms with e-beam lithography and plasma etching tools, amongst many others, and a new MBE machine.
- Advanced characterisation laboratories including photoluminescence (high resolution time-resolved, and high field), scanning probe microscopy, X-ray diffraction, SEM, TCT, a probe station for CV/IV measurements, and others.

While you will be the main person advancing the project in Lancaster, academics and researchers both in Lancaster and in Mexico who have significant experience on the particle physics/detector as well as the thin-film technology side will support you. The project involves travel to collaboration workshops in Mexico and to irradiation and beam test campaigns at CERN, and to present our results at international conferences.