Developing the Next Generation of Infrared Imaging Sensors

*IOP Top 50 Work Placements Scheme Application*

This work placement project is based on an on-going research and development partnership between the Lancaster University Physics department and Amethyst Research Ltd, a micro high-technology company. The partnership has been rapidly developing a novel infrared detector technology in preparation for its first commercial exploitation. The work placement will give the student first-hand experience of this critical transfer stage between academic research and industry and allow them to contribute to the success of the collaborative work. Furthermore they will see how the physics they are studying can be applied to novel devices and learn valuable professional skills in preparation for their future career, through working with a small company.

**Tittle of vacancy:** Developing the Next Generation of Infrared Imaging Sensors  
**Location:** Lancaster University Physics department, Lancaster. Supervised by Dr Andrew Marshall  
**Duration:** 8 weeks

**Person specification:**  
The candidate should have undergraduate level knowledge of semiconductor/solid state physics and some experience of practical optical and electrical laboratory work. Good team work and communication skills are required to collaborate with and learn from researchers, as well as to discuss objectives and results with Amethyst Research Ltd. An active and motivating interest in applied physics research and development is desirable as is the ability to complete tasks independently once given appropriate training.

**Job description and project proposal:**  
The project will place the successful candidate in an active role within the collaboration between Lancaster University Physics department and Amethyst Research Ltd, developing a novel infrared detector technology. This project is progressing swiftly and the candidate will be able to make a real contribution to continuing this. Following an introduction, orientation and appropriate training, they will perform electrical and optical characterisation on prototype detectors. This will involve measuring the temperature dependence of leakage currents and spectral sensitivity. The work will be engaging, aiming to understand and inform the development of the detectors and not to make repetitive screening tests. Further measurements with extremely low photon fluxes will aim to demonstrate record sensitivity for the most challenging imaging and scientific applications. Throughout the project the candidate will support Dr Marshall in discussions with Amethyst Research Ltd reporting the results and planning the next follow on stages. Lancaster Physics department has a strong track record in hosting summer placements and is well prepared to provide a structured, safe and inspiring placement. The planned project timeline is as follows:

- **Week 1:** Orientation, introduction to the project from Lancaster and Amethyst personnel, training in key experimental measurement techniques  
- **Weeks 2-4:** Experimental work measuring samples  
- **Week 5:** Review of findings meeting with Amethyst and further training for additional experiments  
- **Week 6-7:** Ultra low photon flux measurements  
- **Week 8:** Final reporting and discussions with Amethyst, presentation to the Lancaster research group and reflection on the new skills obtained (research and experimental skills, communication and teamwork skills, business awareness and product development).

Dr A. Marshall  
05/03/14