Queen Mary University of London

Micron Semiconductor Ltd

Case Study: Applications of Novel Thin Silicone Detectors

STFC Innovation Fund

This project was funded by STFC through the Impact Accelerator Account administered by the Innovation Fund. The Innovation Fund aims to facilitate the acceleration of research along the pathway to impact or knowledge exchange. The fund provides flexible support (e.g. develop prototypes, establish new collaborations and enable secondments) for a wide variety of projects from across QMUL.

The Partnership

Dr Adrian Bevan and Dr Theo Kreouzis brought their complementary research expertise together to work with Micron Semiconductors Ltd to develop novel thin silicon detectors. Dr Bevan's research focuses on semiconductor detector development in the context of the ATLAS Inner Tracker Upgrade. ATLAS is a particle physics experiment at the Large Hadron Collider (LHC) at CERN. Dr Theo Kreouzis' research interests are in the field of charge transport in organic semiconductors and characterisation of Field Effect Transistors.

The Idea

The aim of this project was to undertake research and development with a company to develop novel silicon detectors.

By focussing on development of curved silicon detectors, this would open up potential uses. They could potentially wrap around beam pipes, targeting the ultimate goal of zero mass support structure.

Industrial applications could include cylindrical sensors for X-ray crystallography (sensors that can be used to understand the structure of viruses, DNA and crystalline materials), and those devices can be adapted to survey pipes in nuclear reactors.

The Outputs

- First prototypes of curved silicon detectors developed
- Prototypes were developed with defined characteristics
- Preliminary research hae allowed understanding of properties and problems, including assembly, impact areas and surface defects
- Potential future applications in scientific cameras and telescopes
- Further collaborations with companies planned

Partner quote:

"This funding has enabled us to explore the feasibility of making a new type of particle detector. Our work could lead to improved scientific instruments and new industrial devices."

Dr Adrian Bevan, QMUL

Science & Technology Facilities Council