

SEM image of a cross section of one of our devices



The  
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# Organic Semiconductor Detectors

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Science and  
Technology  
Facilities Council



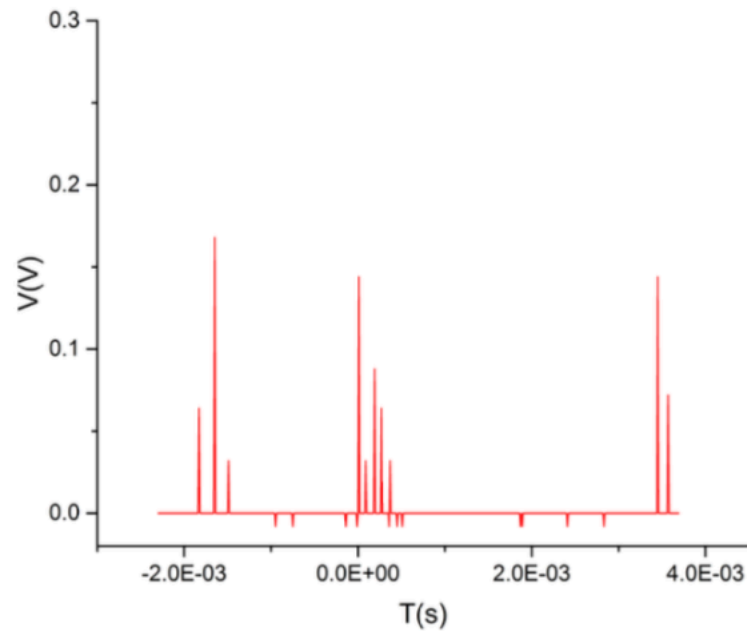
Work Funded by STFC, QMUL and the AWE Ltd.



- Q1) What happens if we take an organic semiconductor LED, like those found in OLED TV's and expose them to radiation
- Q2) What if we then adapt those devices to be sensitive to specific types of radiation
- e.g. can we build a new type of neutron detector that could underpin STFC science and be of interest to industry?

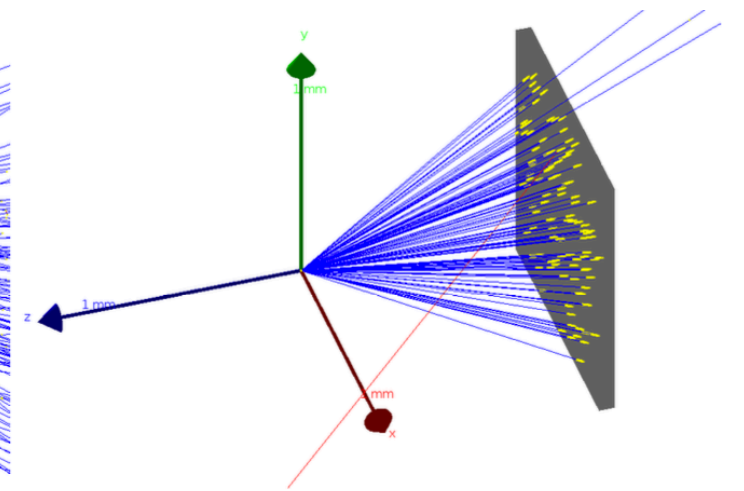
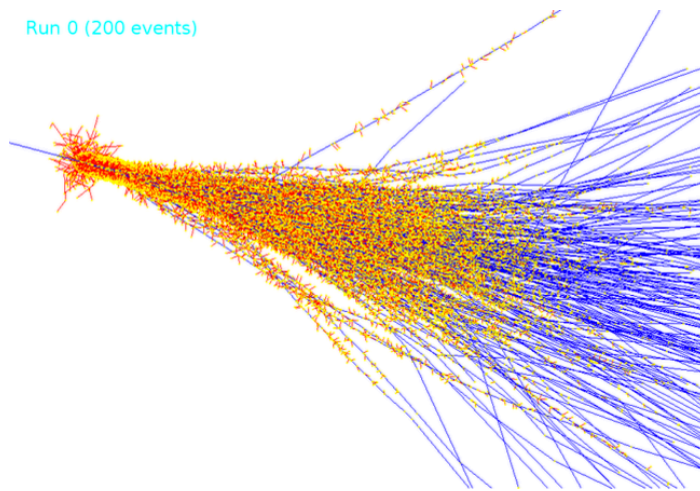
**Start of a cross-disciplinary collaboration between condensed matter and particle physicists**

- PhD student starts working on the project (need raw materials) using diodes
- 10k STFC IAA funding for materials and simulation work to give a crude optimisation of devices



Devices with a 30min lifetime (HV operation)

Run 0 (200 events)



Simulation of  $\alpha$  particles in a diode

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**LabView driven DAQ prototype, roadmap for technology development, market survey**

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**Low Voltage operation of devices validated and UK patent pending.  
First paper with journal - positive referee responses; checking a few things before finalising.**

- QMUL claim device IP.
- AWE IP claim on DAQ and more refined simulation.

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- 5k of funding from STFC NuSec Network to try out transistors
- 50k of Proof of Concept funding from QMUL to build multi channel devices
- 60k of funding from AWE toward another PhD student



# Next steps and outlook

- Technology License Evaluation Agreement with Symetrica
- Testing devices at AWE (leveraging an in-kind contribution of 30k), access to a 450k facility - ***this week***
- Pursuing an NDA with 3M for wearable tech and PPE
- Thinking about “products” to pursue IPS/KTP and specifications for organic electronic neutron veto systems for future particle physics experiments
- Aim to spinout technology targeting product development of thermal neutron CVD diamond detectors with Micron Semiconductor Ltd.
- STFC investment of £30k has leveraged a further £324k (gearing x10)