

UK DRD3 Instrumentation Summer School 2026



Monday, 10 August 2026 - Friday, 21 August 2026

Lady Margaret Hall

Scientific Programme

The summer school will take place over 2 weeks, starting on Monday afternoon and finishing Friday lunchtime

The bulk of the school will consist of a rotation around 2-day topics aiming to cover the lifespan of a detector: from typical structures and layout, to simulation of their fabrication and expected performance, to the design and manufacture of the electronics required to read them out and finally to their operation with ionising radiation

Introduction and student presentations

The school will open with its one and only lecture, running over the full breadth of detector physics that will be tackled during the two weeks

It is expected that participants will prepare a slide summarising their current work and motivation for joining the school

Device fabrication and performance simulations

Two days will be spent carrying out TCAD simulations, including
An introduction to using Synopsis TCAD
Device setup using SDE
Simulation of the electric and weighting potentials, as well as quasi-static and transient simulations (sDevice)
Simulation of the physical fabrication process (sProcess)

Electronics for particle physics

Participants will spend the next two days split between SPICE simulations of electronic behaviour and physical construction and testing of typical circuits. These will include individual detector components such as infrared sensors and charge-sensitive amplifiers

Electrical characterisation of silicon detectors

Split into two parts, this section of the school deals with characterisation of the individual components of a detector system: the electronics/readout and the silicon diodes themselves. A day will be spent in the OPMD lab making hands-on measurements with a manual probe station of capacitance-voltage and current-voltage curves. Handling of thin silicon samples and the machinery of a modern cleanroom will be covered. The other day will be spent measuring transfer functions on more complex readout electronics, including the influence of noise, shielding and response to input signals across a range of frequencies

Signal generation and particle detection

Small-group tutorials will be interspersed with time in the OPMD lab, looking at signal generation in silicon from both massive charged particles and photons. A myriad of effects influencing the generation of electron-hole pairs in semiconductor detectors will be discussed, along with their

typical layout and manufacturing process. Devices with and without gain will be tested in the lab using radioactive sources and laser setups, using both Single Photon Absorption (SPA) and Two Photon Absorption (TPA) systems

Evening lectures

Several evening lectures will be held, with the speakers joining afterwards for dinner in the college. Speakers from both academia and industry are planned, highlighting their experiences both of detector physics and of navigating a career in instrumentation

Accelerator visit

It is hoped to include a weekend visit to the Rutherford Appleton Laboratory, in order to visit nearby accelerator facilities such as the Diamond Light Source and ISIS neutron and muon source