

Summary of the
“Future UK Silicon Vertex & Tracker R&D Workshop”
Birmingham, September 2022

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UK Strategic R&D on Solid State Detector

25 May 2023, online meeting

Introduction

- The “**Future UK Silicon Vertex & Tracker R&D Workshop**” was held at the University of Birmingham on 7-8 September 2022.
- It was attended by more than 50 people from 17 institutes.
- The agenda of the meeting, including all presentations, can be found at: <https://indico.stfc.ac.uk/e/UKTrackerRnD>
- The outcome of the workshop is summarised in the document attached to the agenda.

The aim of the workshop was to converge on a common strategic R&D programme to develop new solid state detector technologies and attain UK leadership at future collider facilities.

Strategic R&D for vertex and tracking

- The ambition of the UK vertex & tracking community is to work on **flexible, agnostic technological solutions** for **large, low mass, 4D tracking detectors** for future colliders.
 - Including sensor, ASIC, mechanics, cooling, DAQ.
- The community aims at a **large-scale end-to-end demonstrator** to be built in 10 years.
- Technologies for vertex and tracking fit within **DRD3** (Solid State Detectors), **DRD7** (Electronics and On-detector Processing).
- Possible technological solutions were discussed in light of **scope for innovation and leadership at international level**, e.g.:
 - 3D integration, ultimately leading to stacked, reconfigurable, 4D sensors.
 - IP blocks in 28 nm CMOS technology for standardised detector DAQ solutions.

Strategic R&D for vertex and tracking

- The community agreed to prepare a coordinated proposal for submission to a UK Strategic R&D programme to achieve the proposed plan of innovation and leadership.
- The proposed R&D programme will initially focus on addressing challenges of tracking at **e+e- colliders**, but the community recognises the importance of already including aspects of R&D on technologies specific to high radiation environments in view of the **hadron-hadron collider facilities** planned for the further future.
- The proposal should include
 - Exploitation of **synergies** with projects happening on a shorter time scale where there is UK involvement (e.g. LHCb upgrade, EIC).
 - Application of the developed technologies in **neighbouring fields**.
 - Involvement of UK **industry**.
 - Establishment of a **network of specialised infrastructure** for shared use.
 - **Training** (e.g. existing “Advanced UK Instrumentation training” complemented by new initiatives such as hands-on training at research facilities).