

Discussion

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Future UK Silicon Vertex & Tracker R&D Workshop

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Introduction

- Thanks everyone for preparing the material and engaging in the discussions.
- There is a lot of work going on, expertise, interests in all aspects on solid state detectors.
- There are many different physics interests and the community participates in a number of experiments (ongoing and forming/future collaborations).
- This is all very good but ...

Can we converge on a common R&D programme towards an e+e- collider to do something new and lead?

Time to seize the opportunity is next 5 years.

Some points from the discussions so far

- New way of working is needed in detector development following **changes in the silicon industry (cost, complexity, legal agreements)**.
 - IP development is a must going forward.
 - Reduced number of prototypes.
 - Work in international collaborations, but carve out our own niche within it.
 - Exploit RAL relationship with TJ.
- We recognise a lot of UK effort in **MAPS** but w/o leadership (apart from RD50 CMOS development).
- **3D stacking** is an interesting opportunity (for leadership).
- LGAD developments with **Micron and Te2v** are good to get them involved with ATLAS and CMS timing layers but no UK innovation or leadership
 - Also no UK participation in ATLAS and CMS timing layers.
 - Te2v can offer large production volume (compared to other LGAD producers).

Some points from the discussions so far

- Monolithic **LGAD with TJ** could be innovative wrt what is going on elsewhere.
- UK interest and involvement in **TimeSpot** (3D sensor + 28 nm ASIC) but no UK industry involvement and no leadership.
- Diamond sensors: combination of **ElementSix + Oxford capability for 3D diamond** = unique worldwide.
- Development of IP blocks in 65 or 28 nm for a **standardised DAQ approach** seem a natural way forward based on the considerations on CMOS industry.
- Not to forget RD50 type activities
 - Radiation hardness studies
 - New materials

Some questions to guide the discussion

- What challenge(s) do we want to address?
 - High precision, low power, radiation-hardness, ... ? All of them at once?
- What opportunities are there to **do something new and lead** in addressing these challenges?
 - **Now is the time to make suggestions...**
 - Define our niche(s).
- Do we want to develop a complete detector solution where we design the tracker/vertex from sensor to counting room?
- It needs to be big enough that we can go away and ask for sustained funding.

Funding

- What route?
 - Infrastructure fund
 - Is a network of labs really an infrastructure? How would this proposal compete with others put forward by STFC and other councils?
 - STFC funded projects on IF are “physical stuff to do an experiment”, see LHCb and EIC.
 - Core programmes
 - Would take away money from other experiments but what else is there we want to do (that is not what we are discussing here, LC or FCC)? Nobody speaks up.
 - Also IF now seems to be the way to pay for construction so core programmes could pay for this. We still need to transition to this new way of operation.
- It seems core programmes seems the way to go (nobody objects)
- We need to get this to Science Board → SOI to science board directly?

Funding

- There might be opportunities with the money that might not go into Horizon, but we do not know anything about this.
- Why is it important do the R&D now and not in ~3 year?
 - We loose opportunity to do something new and lead.
 - Cannot engage with the ECFA roadmap implementation (note here the exercise was led by UK people...).
- **Make the case for “R&D money now” at PPAP meeting on 21-22 September.**
- What we discuss in this workshop fits into the “Strategic R&D theme” of the strategy document.
 - We would need to plan something that takes a few £M from the budget proposed in the document.

Next steps

- Laura and Jens will capture the main points of discussion and outcome of this workshop in a short document.
- We will need to start working on a proposal to be turned into what is needed once we know how funding can be obtained.
 - SOI to science board, other, ...
- We will probably need to keep the discussion open, i.e. further meetings.
- More?