



UNIVERSITY OF

LIVERPOOL

UK ILC Tracker Meeting Oxford 15 April 2015

A member of the Russell Group



Science & Technology
Facilities Council

Liverpool activities HV-CMOS

Sensor development in HV-CMOS, benefitting from 2 year PRD grant (Matthew Buckland, Gianluigi Casse, Eva Vilella Figueras, Joost Vossebeld)

- Design, test and prototype sensors for a very-low mass pixel tracker.
- Collaboration CERN CLICpix group to develop HV-CMOS for their 65nm CLICPix ASIC. (CERN-L'pool student M. Buckland).
- Signed CLICdp Memorandum of Collaboration this year.
- Engineering run submissions with dedicated LC devices (AMS and Lfoundry) in summer and autumn 2015. Liverpool/KIT co-designed
- Institute lead (GC) on AIDA2020 HV-CMOS hybridisation work package

Liverpool plans/proposal ILC mechanics

Work on low mass tracker mechanics (Tim Jones, Peter Sutcliff, Joost Vossebeld)

- Invest some design effort towards conceptual design
- Key challenge for the proposed ILC trackers is the low mass requirement in combination with large physical sizes:
 - SID
 - ILD
- Simulation work needed to determine requirements on “as-built” alignment accuracy and stability. Lower track density will presumably make in-situ alignment harder.
- Open volume air cooling requires little mass but may be challenging for large volume tracker:
 - Vibrations due to high air velocity requirement
- Proposal to study of a few mechanical solutions to establish mass-stability-cooling performance:
 - Solutions with some form integrated airflow distribution
 - Boxed sections (relatively stiff and possibility of restricted air volumes)
 - T- bars or cylinders with in-built air channels

Possible UK targets for mechanics studies

1. Simulations to establish requirements in terms of
 - Placement accuracy and stability (I)
2. *Survey of sensor technologies to establish power requirements*
 - *Consider different scenarios (integrating over part of bunch train, single bc resolution,..)*
3. Survey of thermo-mechanical solutions and studies of cooling performance in light of conclusions points 1 and 2
4. The above could lead into a conceptual mechanical proposal on which we could do some further work.
 - FEA simulation and small dedicated prototyping for mechanical and thermal studies