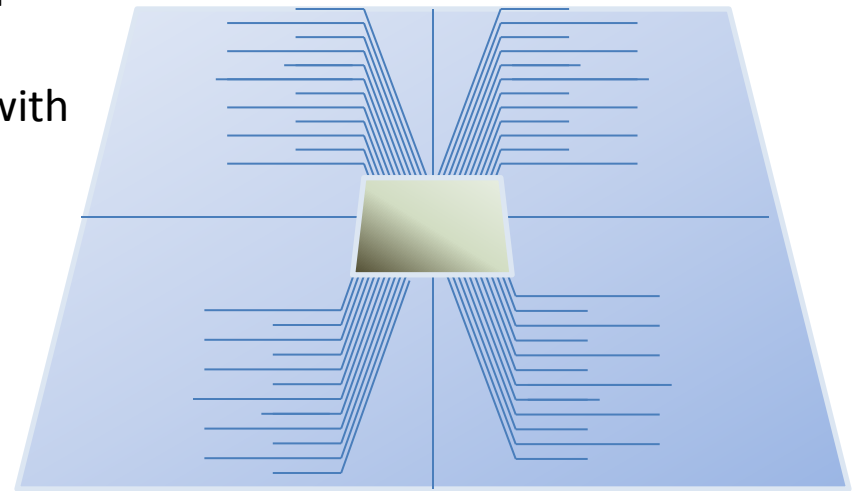


Liverpool

- HV-CMOS sensors
- tracker mechanics

HV-CMOS sensor development

- Funded through 2yr PRD grant (CMOS design engineer + submissions) and 2 university funded half studentships (joint with UNIGE-ATLAS and CERN-CLICdp)
- *For ILC interested to contribute to development of a low mass/low power pixel solution in HV-CMOS (deep N-well CMOS).*
- Specifically we will prototype hybrid HV-CMOS pixel detectors with fan-out lines in the metal layers.
- Develop a large area/large pixel sensor ,(e.g. with pixel sizes adapted to radius), that can be read out by a single small pitch pixel ASIC (CLICPix).
- Low mass
- Good timing performance.
- shallow depletion depth allows significant thinning.
- Work on sensor design & prototyping, testing and TCAD device simulation
- Collaboration CERN CLICdp group on development planar and HV-CMOS sensors for CLICPix and joint TCAD effort
- Collaboration University of Geneva and KIT, Karlsruhe to prototype similar concept for ATLAS upgrade (engineering and MWM runs planned for spring 2015 in 2 technologies). Both institutes interested in CLIC work.



Tracker mechanics

Possible approach to starting UK activities on pixel tracker mechanics

- *Early focus on sensor supports (staves/disks/..)?*
 - *Evaluation of “existing” mechanical support solutions, assuming no need for liquid coolant.*
 - *CF pre-preg. foam sandwiches (ultra thin pre-preg.)*
 - *Ceramic foams*
 - *Space frame (resin injection CF?)*
 - *Comparison of radiation lengths*
 - *Performance under air cooling (measurements & simulation)*

Liverpool can provide:

- some effort on design/FEA,
- infrastructure and some effort for mechanical/thermal testing
- have built/developed various low mass support structures:
 - Foam – CF pre-preg. sandwiches (ATLAS)
 - Space frames (R3B)
 - Small CF half barrels (CDF layer00)
 - LHCb velo paddle (3d moulded)

Questions

- ILD or SID (do we assume the presence of a TPC?)
- Do we focus on central or forward tracker (or both)?
- Desirable to have UK work on layout simulation to compare Si and TPC performance.
- Are there dates we should work towards? Next detector “TDR” dates?
- With whom can we collaborate beyond the UK?
- Define/establish specs for tracking layers in terms of
 - rigidity
 - power/area