



Arachnid Project

4th SuperB Collaboration meeting, Elba, 2nd June 2012

F. Wilson on behalf of Arachnid members:

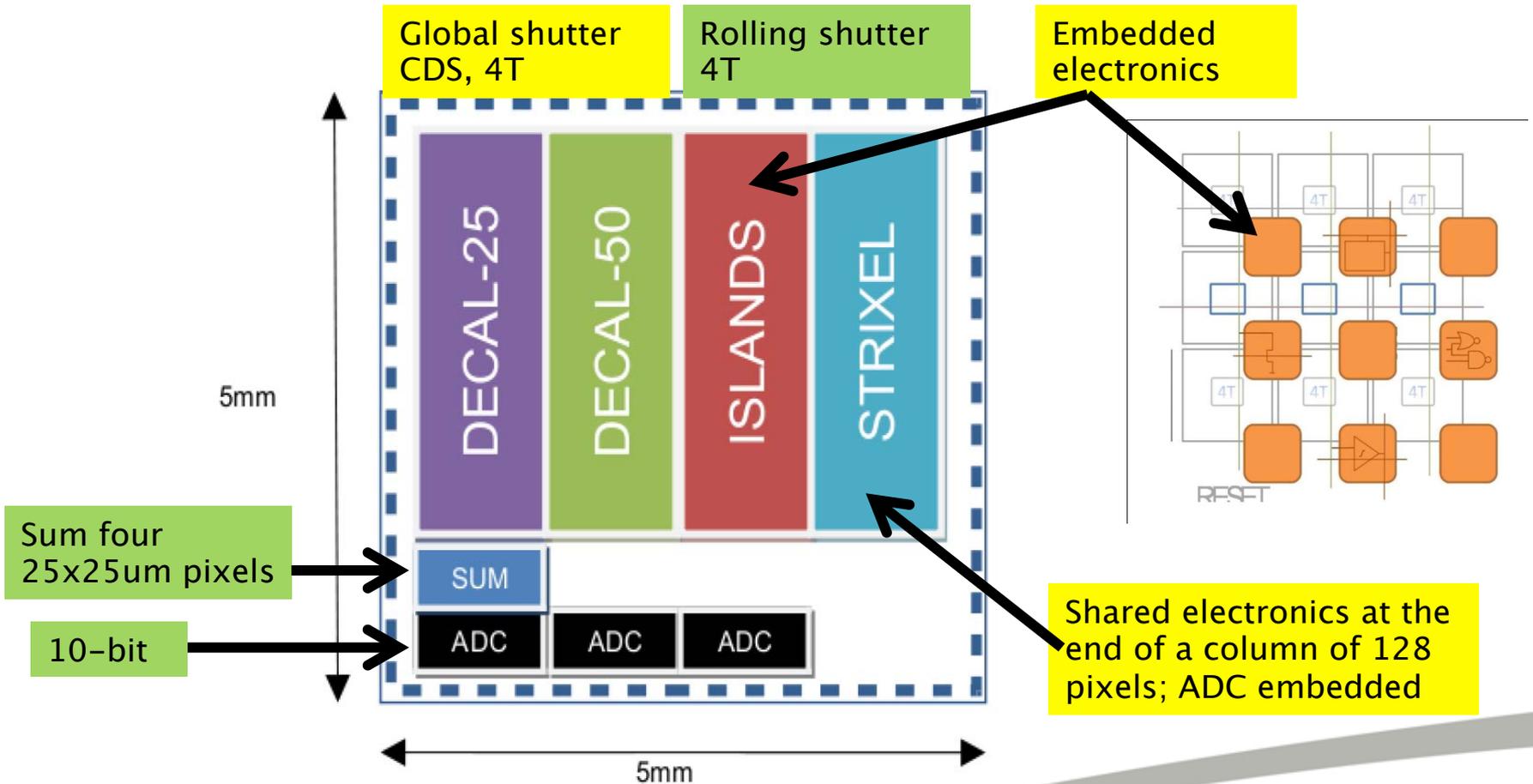
Birmingham, Bristol, QMUL, STFC - RAL, STFC - Daresbury

CHERWELL Chip Reminder

- CMOS MAPS
- Low power, low noise, small inactive area
- Rolling Shutter, Correlated Double Sampling (CDS) and 4T architecture
- Control and readout electronics distributed in active area
- Power pulsing (CLIC/ILC)
- Binary and digital readout
- On-board 10-bit ADCs



CHERWELL demonstrator



Progress since March

- Now have initial firmware for CHERWELL chip.
- Now have readout software for system using in-house USB-DAQ.
- Investigating replacing USB-DAQ with commercial version (Opal Kelly).
- The 3 variations of the chip (standard and high-res) are now bonded onto the carrier board (CoB) and available at 4 institutes for testing.
- Hired designer for next generation of chip.
- Started Fe⁵⁵ testing.

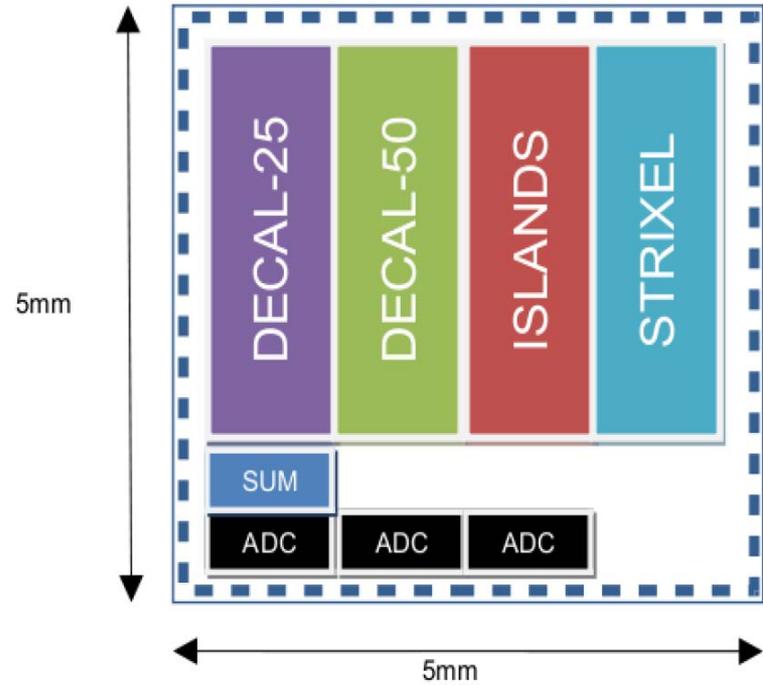
Current firmware status

- Rolling Shutter control and external ADC readout of Cherwell and Strixel parts.
- Rolling Shutter control and internal ADC readout of Cherwell, Strixel, and DECAL parts.
- Global shutter implemented but not fully tested.

Cherwell CoB

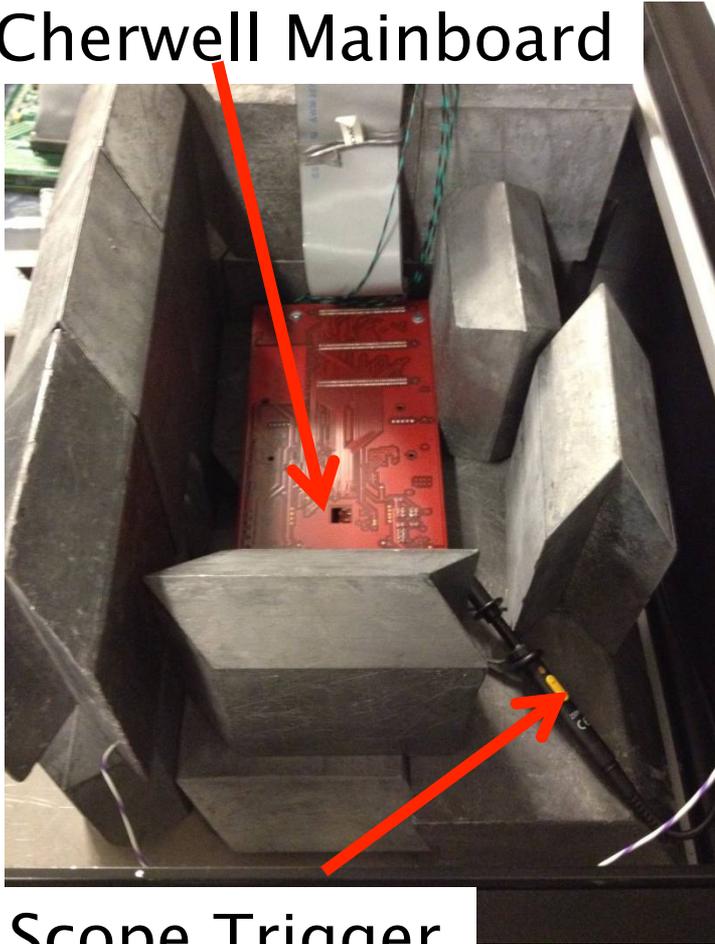


5mm

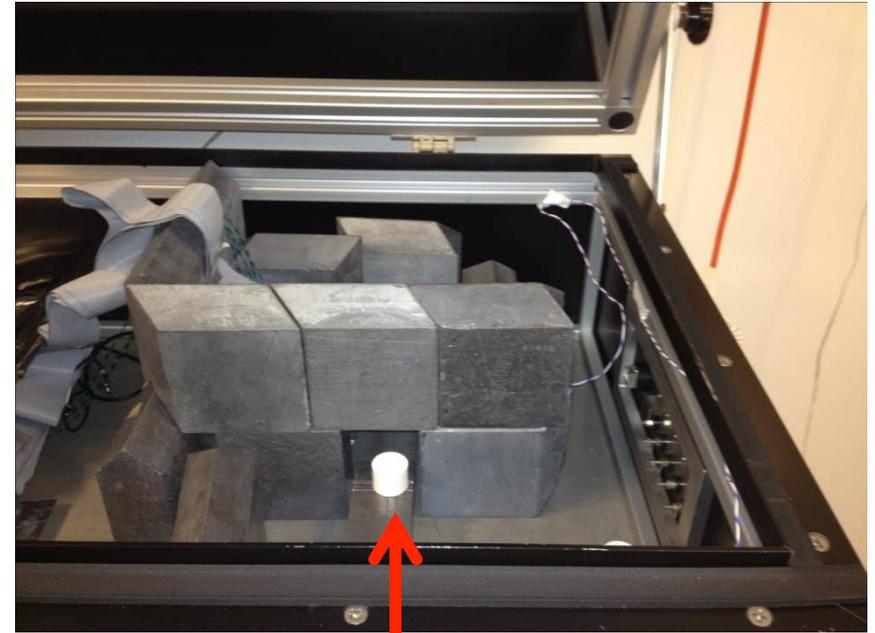


Fe⁵⁵ Testing - May 2012

Cherwell Mainboard



Scope Trigger

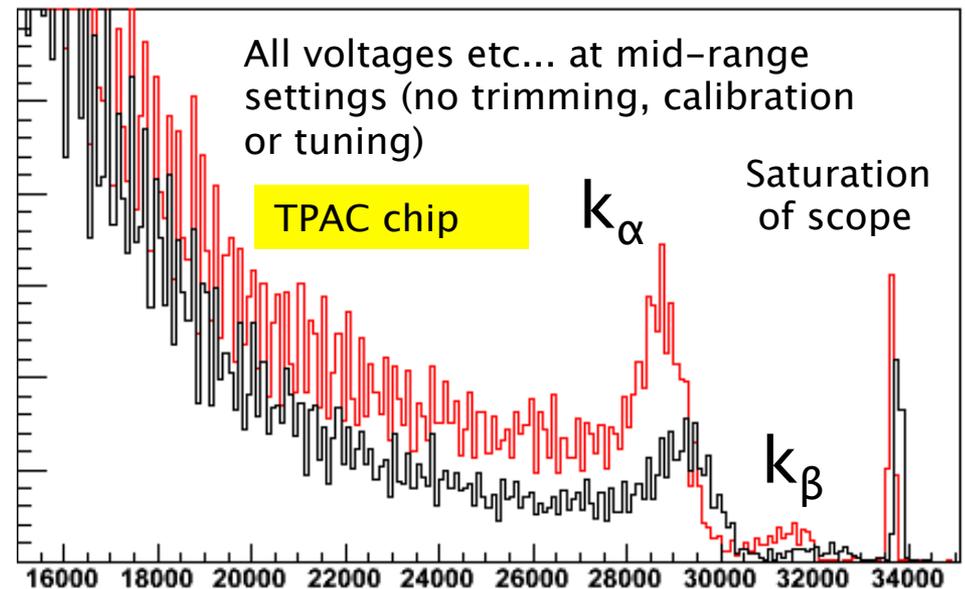
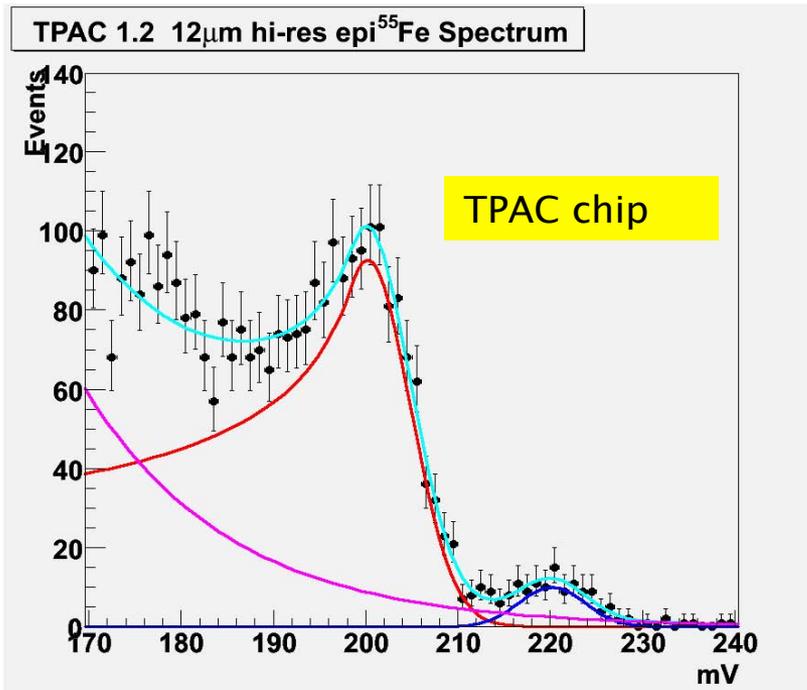


Fe⁵⁵ source

Resurrecting readout chain

Original results from EUDET testing at DESY 2010

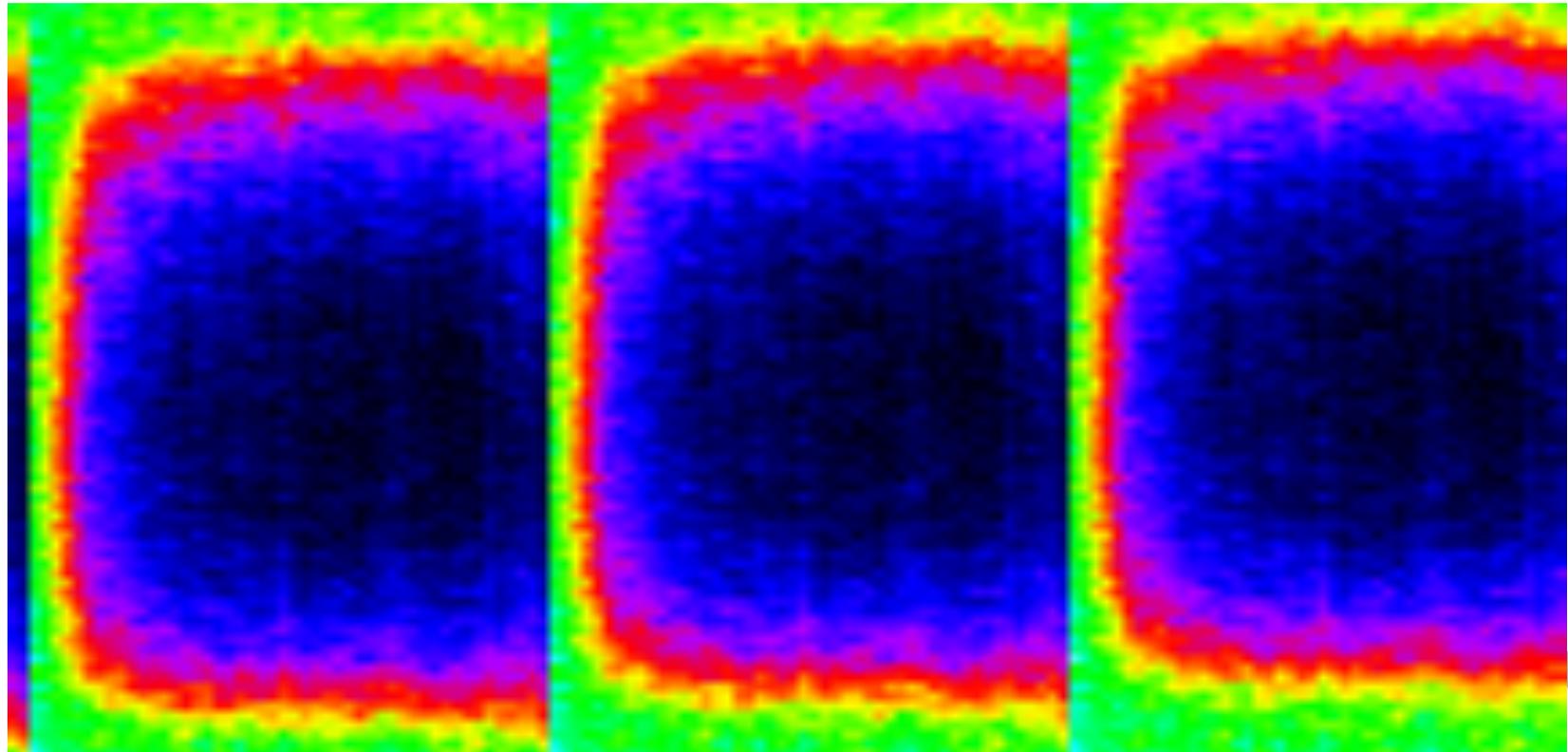
First results with Fe⁵⁵ at QMUL 16th May 2012



First results from CHERWELL chip

Response to room light, 16 May

All voltages etc... at mid-range settings (no trimming, calibration or tuning yet)



← 5mm →

2nd June 2012

F.Wilson, RAL/STFC

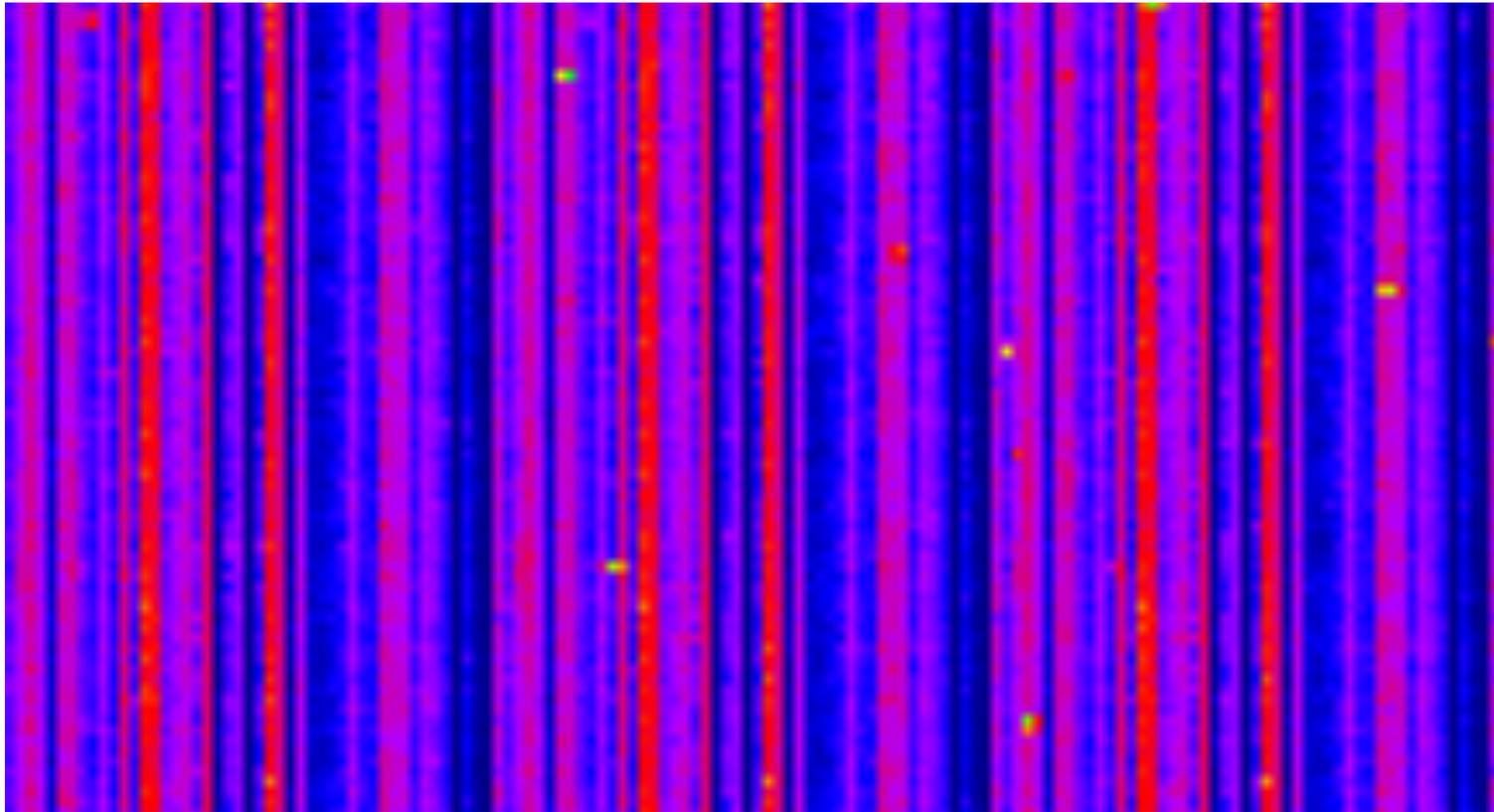


Science & Technology
Facilities Council

First results from CHERWELL chip

Response to Fe⁵⁵ in dark room, 16 May

All voltages etc... at mid-range settings (no trimming, calibration or tuning yet)



← 5mm →

2nd June 2012

F.Wilson, RAL/STFC



Science & Technology
Facilities Council

Current Plans

- We are re-commissioning our 2 IR laser systems (Bristol and RAL).
- Fe⁵⁵ testing at all sites.
- We are re-commissioning our test beam setup (telescope, trigger, power, readout, etc...)
- Test beam at CERN in November.
- Hope to go to DESY before then.
- We are investigating access to a proton source on RAL campus or at Birmingham.
- Aiming for presentation of results at Pixel 2012 (Sep, Japan)

Current Plans

- We are designing a next generation chip.
- It will take on-board the needs of SuperB but ...the chip is targeted at ALICE Inner Tracker upgrade due to:
 - Upgrade and CDR/TDR schedules
 - UK funding
 - UK Nuclear Physics priorities and size of group
- There is good overlap between ALICE and SuperB needs
- Main goals are:
 - Prove radiation hardness
 - Identify power requirements
- Possible Schedule:
 - Hope to design, produce and begin first testing by Spring 2013
- Continue to support SuperB access to CMOS foundry.

Conclusion

- It has taken us some time to get to this stage.
- Testing progress should accelerate from now on.
- Hope to characterize the CHERWELL chip performance over the summer.
- Moving from a demonstrator chip to a new chip design specifically for the needs of Nuclear/Particle Physics.