



Science and  
Technology  
Facilities Council

# PPTAP E&I Session Introduction

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# Introduction

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- TDAQ/electronics and integration areas of PPTAP are somewhat “catch all” areas of the process with relevance to most, if not all, detector areas of PPTAP
- Very early on realised that it made sense to combine these two areas together in discussions resulting in various Electronics and Integration (E&I) discussions over the last couple of months
  - No set definition of whether specific things (eg. powering) fall into electronics or integration, we just treat them as E&I
- The areas approximately map onto the TF7 (electronics) and TF8 (integration) areas of the ECFA process:
  - TF7 symposium - <https://indico.cern.ch/event/1001692/>
  - TF8 symposium - <https://indico.cern.ch/event/999825/>
- Naturally E&I crosses many areas of ECFA/PPTAP and so, we have tried to keep abreast of all of them
  - We may well have missed things out of these areas which should be included
  - Please feel free to shout/email us if this is the case!

# What is Electronics?

- Mirroring the coverage of ECFA TF7:
  - On-detector ASICs and components
  - Links, powering & integration
  - Data processing, control and acquisition

	Front end	L, P & I	Back end	
HL-LHC	●	●	●	
Long-baseline neutrinos	●	●	●	
ee collider	●	●	●	Clear driver / show-stopper for future work
Hadron collider	●	●	●	Important factor for future work - basic R&D needed
Muon collider	●	●	●	Relevant - incremental R&D needed
Other accelerator-based physics	●	●	●	Could be done today - modest R&D needed
HI colliders	●	●	●	Empty: not relevant
Non-accelerator physics	●	●	●	
Test beams, facilities	●	●	●	
Infrastructure and tools	●	●	●	
Collaboration	●	●	●	

# What is Integration?

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- ECFA TF8 covers:
  - Magnets, MDI, Monitoring, Cooling, Lightweight mechanics, Neutrino, Dark Matter, Liquid Calo & Robotics
- PPTAP Integration largely mirrors this but currently with a community driven bend towards cooling, lightweight mechanics, powering and interconnect
  - Is this because this is where UK integration priorities lie or are we missing parts of the UK community?
- ECFA TF8 had specific contributions to discuss [calorimeter](#), [neutrino](#) and [dark matter](#)
  - Expect that UK involvement in such parts will be covered elsewhere within PPTAP but need to ensure that we do not miss anything!
  - Need to use this workshop to make sure we capture everything
- TF8 makes a distinction between Integration R&D topics and engineering challenges and prototyping
  - Need to keep engineering challenges in mind and not forget them as “just engineering”

# Today's Agenda

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- Part I
  - E&I Introduction (Craig/Rob)
    - These slides!
  - UK E&I Workshop Summary (Craig)
    - We already had a kick-off workshop on E&I and a follow-up discussion on this
    - Aim to summarise what was discussed/concluded
    - Not specific R&D technologies but more general E&I matters
  - UK R&D and perspectives – Electronics (Rob)
    - Summary of current and possible future activities in electronics
- Part II
  - UK R&D and perspectives – Integration (Tim Jones)
    - Summary of current and possible future activities in integration
  - UK R&D and perspectives – Interconnect (John Lipp)
    - Summary of current and possible future activities in interconnect
  - UK R&D – Facilities (Jens Dopke)
    - What facilities do we have/need in the UK
    - What facilities do we have/need access to outside the UK
- Other things to be aware of
  - E&I will obviously appear across PPTAP areas so we will continue to follow discussions in other areas to see what synergies/cross over points we can find
  - Note that electronics design tools, foundry access and Europractice will be discussed in the solid state session tomorrow
  - R&D funding discussion from the E&I workshop will be revisited in the final session on Friday

# Reminder of the Aims of this Workshop

1. Gather input from the community to draft the UK roadmap to detector R&D following ECFA symposia consultation phase
2. Highlight common interests between groups and within industry
3. Gather visions of R&D structure in the next years

## Reminder of the community questions posed at the E&I workshop and still relevant for today:

- What are the key technical challenges for the UK in each R&D area?
- What are the organisational / logistical barriers for us?
- How much is all this going to cost? Is it justified?
  - What is the likely UK participation in future projects?
  - What is the length, breadth and scale of R&D activities leading to them?
  - Are there commonalities we can exploit?
  - What demonstrator / exemplar projects should we target, and when?
- How do we ensure and maintain efficiency?
  - Commonalities between projects
  - Reduction of internal design competition
- What happens if we do nothing?
- What is the relationship with industry and other research areas?
- How do we convince people to act on this?
- How do we sustain a community?

# Concluding Remarks

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- We want this to be a community discussion
- Slide contributions are not expected to cover everything
- Please speak your mind, ask questions and shout if anything is being forgotten!
- Follow-up emails to Craig & Rob are also welcome
- Finally, there are a few email lists we have setup for E&I
  - If you have not been receiving emails from us and would like to, please let us know and we can add you
  - The current lists are:
    - BACK-END
    - ASICS-AND-FRONT-END
    - LINKS-POWERING-AND-INTEGRATION