# Discussion Session on the "Future of Heavy Flavour Physics in the UK"

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# History

Recap:

- Aug 2006: VG&TG asked to consult the UK particle physics community to come forward with a strategy for a “Future Programme of Flavour Physics in the UK”

- Oct-Nov 2006: 1 day meeting with community, preparations of report and presentations to PPAP and Science Committee.

  All documentation can be found on:

  http://indico.cern.ch/conferenceDisplay.py?confId=6347&view=cdsagenda&detailLevel=contribution

- Jan 2007: Informal feedback received from Science Committee and circulated to the community. (Formal feedback was not received.)

- Mar 2007: SFF request for PRD (seedcorn) funding turned down by PPARC
  - “likely eventual cost ... was high and unrealistic”
  - “seen by Science Committee as lower priority than neutrino factory or ILC”

- Apr 2007: PPARC is history.....

# Review of UK Participation in Future Flavour Physics Facilities

## EXECUTIVE SUMMARY

- The UK heavy flavour community recognises an extremely strong scientific need for UK participation in a heavy flavour physics research programme up to and beyond 2011.
- The main experimental focus for this activity is the LHCb experiment and a Super Flavour Factory (SFF).
- A science led strategy suggests that it is premature to prioritise between an upgrade of LHCb and participation in an SFF until first results from the LHC are known (~2009-2010).
- Although the scientific loss will be great; the community cannot foresee UK participation in a future kaon physics programme at this time, given limited resources.

# Flavour Physics under the STFC

Developments since the PPARC "Future of Flavour Physics" review:

- STFC formed
  - STFC new committee structure and review processes
  - Science Committee (PPARC) replaced with PPAN (STFC)
- SFF CDR finalised
- LHCb Upgrade WG formed
- "Flavour Physics in the LHC era" workshop finished and CERN yellow report in final stages of preparation

# STFC Physics

## STFC's remit covers that of PPARC + nuclear + CCLRC

- projects will be part of a much broader spectrum of activities
- need to make case in a wider forum

## Strong emphasis on scientific excellence

| | | |
|---|---|---|
| Adventurous | not | "solid" |
| Doing new things | not | doing the same thing with smaller errors |
| Leading a project | not | joining a project |
| Focused on excellence | not | doing a bit of everything |

## Start of STFC era represents a new opportunity and a challenge

- review of scientific opportunities likely to arise within next ~15 years
- programmatic review of current projects and programmes

## Strategy will inform a detailed STFC scientific investment plan

- limited resources ... they will not be afraid to say "no"

# Next Steps.... some thoughts

Main concerns of Science Committee seemed to be

- Physics case was not clear and accessible to non-particle physicists (e.g. Astronomers and Nuclear physicists)
- The UK flavour community needs to work as a single coherent community
- Synergies between projects (e.g. accelerators, ATLAS/CMS upgrades) not evident
- There appear to be some lingering misconceptions regarding timescales and costs

All of these concerns can be addressed.

# Next Steps.... proposal

UK flavour community may be best placed to submit a Statement of Intent to PPAN as a single community outlining a

"Programme of R&D for Future Flavour Physics"

which must include

- The Science Case (most important!)
- Outline of experiments, timescales and likely costs

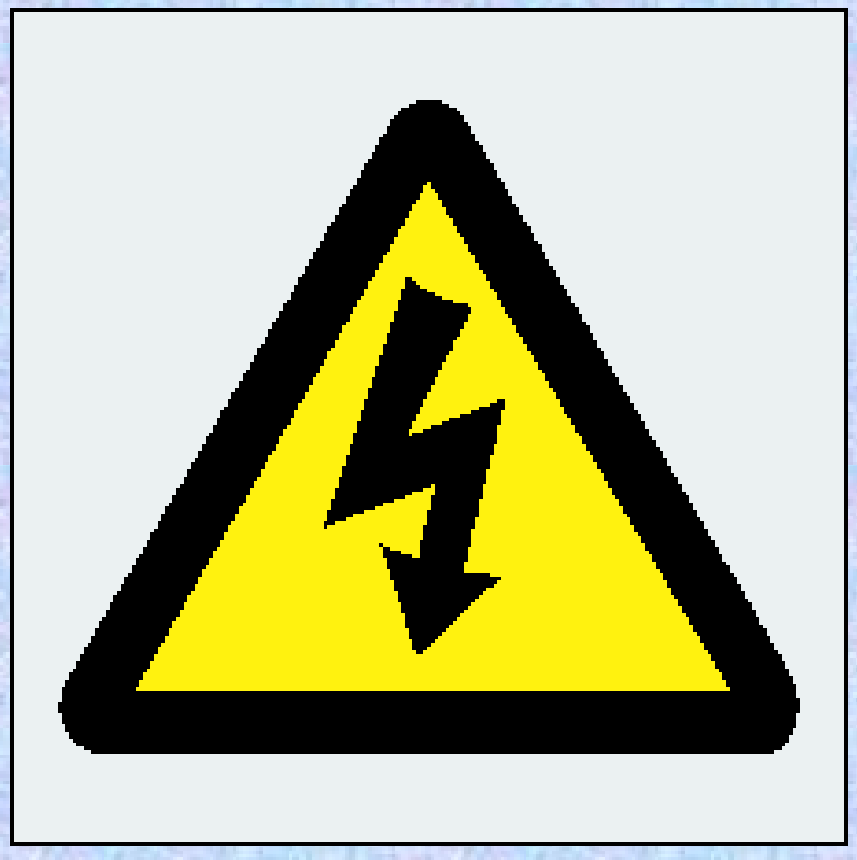
and could also include, eg.,

- Possible workpackages
  - Physics and software (mostly travel)
  - Accelerator specific / SFF specific detector / LHCb specific detector R&D
  - Others ?
- Timelines
  - Submission of R&D proposals for individual workpackages
  - Construction decisions
- Management

# Next Steps.... proposal

- Most importantly....without a convincing and accessible Science Case, the proposal will not be taken further forward
- If acceptable to the community (you).... then maybe a small group of interested parties could draft the best possible "Science Case" in the first instance
- Date of submission and signatories needs to be agreed. However, maybe we should aim for a date of submission to PPAN in Autumn 2007 ??
- The best outcome for a joint SoI to PPAN would be the green light to submit one or more of the workpackages as full proposals to the PPRP
- The worst outcome is that the whole lot gets turned down
- Comments and other suggestions most welcome.....

# BACK UP



# Review of UK Participation in Future Flavour Physics Facilities

EXECUTIVE SUMMARY

“ The UK heavy flavour community recognises an extremely strong scientific need for UK participation in a heavy flavour physics research programme up to and beyond 2011. The main experimental focus for this activity is the LHCb experiment and a Super Flavour Factory (SFF). A science led strategy suggests that it is premature to prioritise between an upgrade of LHCb and participation in an SFF until first results from the LHC are known (~2009-2010). The scope of UK involvement in an SFF will also be clearer during 2008 when an international convergence on a single approved machine and experiment is expected. The science case also suggests that the charm/tau physics programme of an SFF is superior to that of the dedicated facilities; and these should be considered as a lower priority option. Finally, although the scientific loss will be great; the community cannot foresee UK participation in a future kaon physics programme at this time, given limited resources. ”

# Review of UK Participation in Future Flavour Physics Facilities

“ The flavour community therefore strongly recommends that a coherent R&D programme towards participation in an LHCb upgrade and/or an SFF is pursued until ~2009/2010 when a final decision can be made. The LHCb and SFF UK collaborations propose to work as a community and exploit areas of commonality. The total cost of the LHCb and SFF R&D programme is not expected to exceed £2.0M (excluding RG staff). ”

# Informal Feedback from Science Committee

- The community still seemed to be some way away from a set of detailed benchmarks from LHC physics which would determine which of the main future developments would be scientifically more interesting.
- There remained strong scientific reasons for continuing to do heavy flavour research but this had not come across in the strategy. They also had not explained how the proposed future experiments would address specific science questions or why these experiments needed to make their measurements to the proposed accuracies.
- Given the lack of clarity about the key science questions, and how the proposed new facilities might address these, the proposed level of R&D was too high.
- A SFF would be on similar financial and time scales to ILC, sLHC and Neutrino Factory but at a lower scientific priority.
- R&D for the next generation of experiments should not commence until a stronger physics case had been made (although low level travel support for SFF need not be withheld.)