PPGP(E) 2018 Review
IoP HEPP 2019 Town Meeting

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Outline

1. **PPGP(E) 2018 Review Process**
2. Panel Recommendations
3. Panel's Analysis

PPGP(E) Membership

Professor Jocelyn Monroe	RHUL	Dark Matter
Professor Daniela Bortoletto	Oxford	ATLAS, Mu3e
Professor Oliver Buchmueller	ICL	CMS
Dr Justin Evans	Manchester	Neutrinos
Professor Nick Evans	Southampton	Theory Panel Chair
Dr Christos Leonidopoulos	Edinburgh	ATLAS
Professor Ryan Nichol	UCL	Neutrinos
Dr Helen O'Keeffe	Lancaster	Neutrinos
Professor Jonas Rademacker	Bristol	LHCb, Neutrinos
Professor Paul Soler	Glasgow	LHCb, Neutrinos
Professor Robert Thorne	UCL	Theory Core Member
Professor Joost Vossebeld	Liverpool	ATLAS, Mu3e

Introduction

- Review experimental particle physics programme
  - All institutional groups
    - Academic research time
    - Core posts (key, underpinning skills)
    - Responsive posts (exploitation, M&O)
    - R&D
    - SRFs
  - All experiments in exploitation phase

- Main changes in this round:
  - responsive posts were anonymized
  - 10-20 international reviews per proposal (by research area)

Finances

- 2018 planning guideline was for flat cash
  - Approximately £20M/yr, fixed to 2012 level
  - Ring fence for ATLAS, CMS, LHCb Upgrades of ~30% of core FTE

- **expected** a 10% reduction in posts/experiments w.r.t. 2015 round
  - e.g. 2015 round was flat cash
    - 12% reduction in core posts w.r.t. 2012
    - 5% reduction in responsive w.r.t. 2012
  - since 2008: >30% cut in the PPGP(E) CG in real terms

- **unexpected** Sept. surprise: indirects increased >20% w.r.t. 2015
  - since 2008: university indirects have increased >200%.

Bottom line: the panel could not recommend a balanced programme that fits within the budget envelope.

Review Process

- Started in February 2018
- One/two caretakers per experiment
- Two/three introducers for each institute
  - meet with PIs + 3 group members in May clarification meetings
  - lead panel discussion
- International referees pre-approached by panel members reviewed group proposals by science area
  - each group received 2-4 reviews per science area x 3-5 areas = up to 20 reviews for a big group.
- Experimental review meeting in April
- Grant review meeting in June/July
- 2 additional Panel meetings in September on costing, de-scoping

Assessment

- Proposals judged against standard STFC criteria
  - scientific excellence, international competitiveness, strategic value
  - sustainability of key construction groups
  - productivity, leadership, suitability
  - impact
- Academic, core, responsive posts graded
- Considered balance of programme across experiments, groups
- Note: criteria did not include cost per post
  - September surprise: FEC/FTE has large variation across groups

Comments

- Things that worked well:
  - Anonymizing the responsive posts worked well
    - some evidence for "_1" vs "_2" bias in outcomes, solve with non-numeric naming convention next time
  - Introducer meetings with group representatives in Swindon provided the panel with a good level of information (not ~worse than site visits)
  - International peer review worked much better than previously
  - Scoring worked well
- Things that didn't work well:
  - Financial planning was a challenge (September surprise!)
  - Institutional/experiment conflicts of interest were a challenge
    - solution is international panel members

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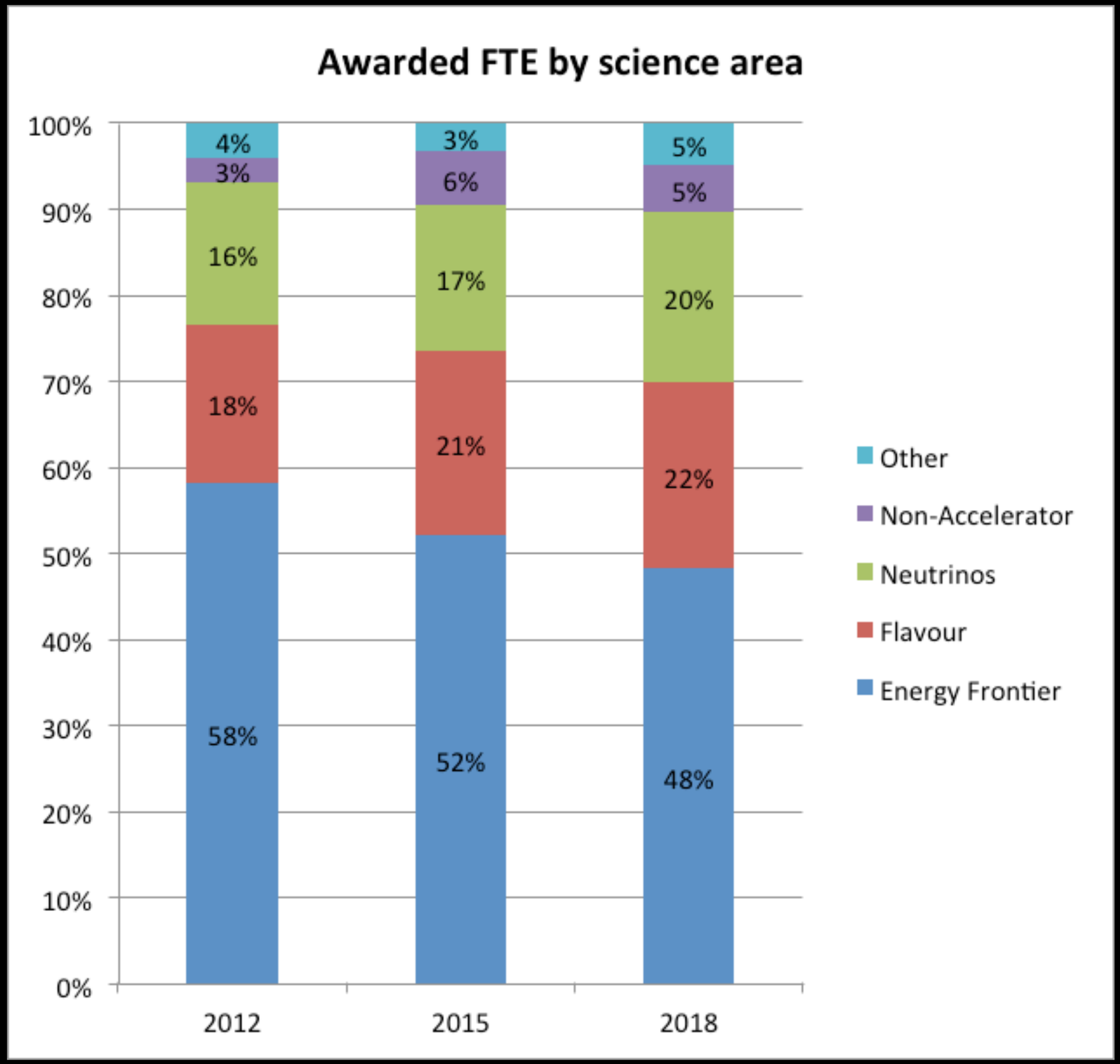
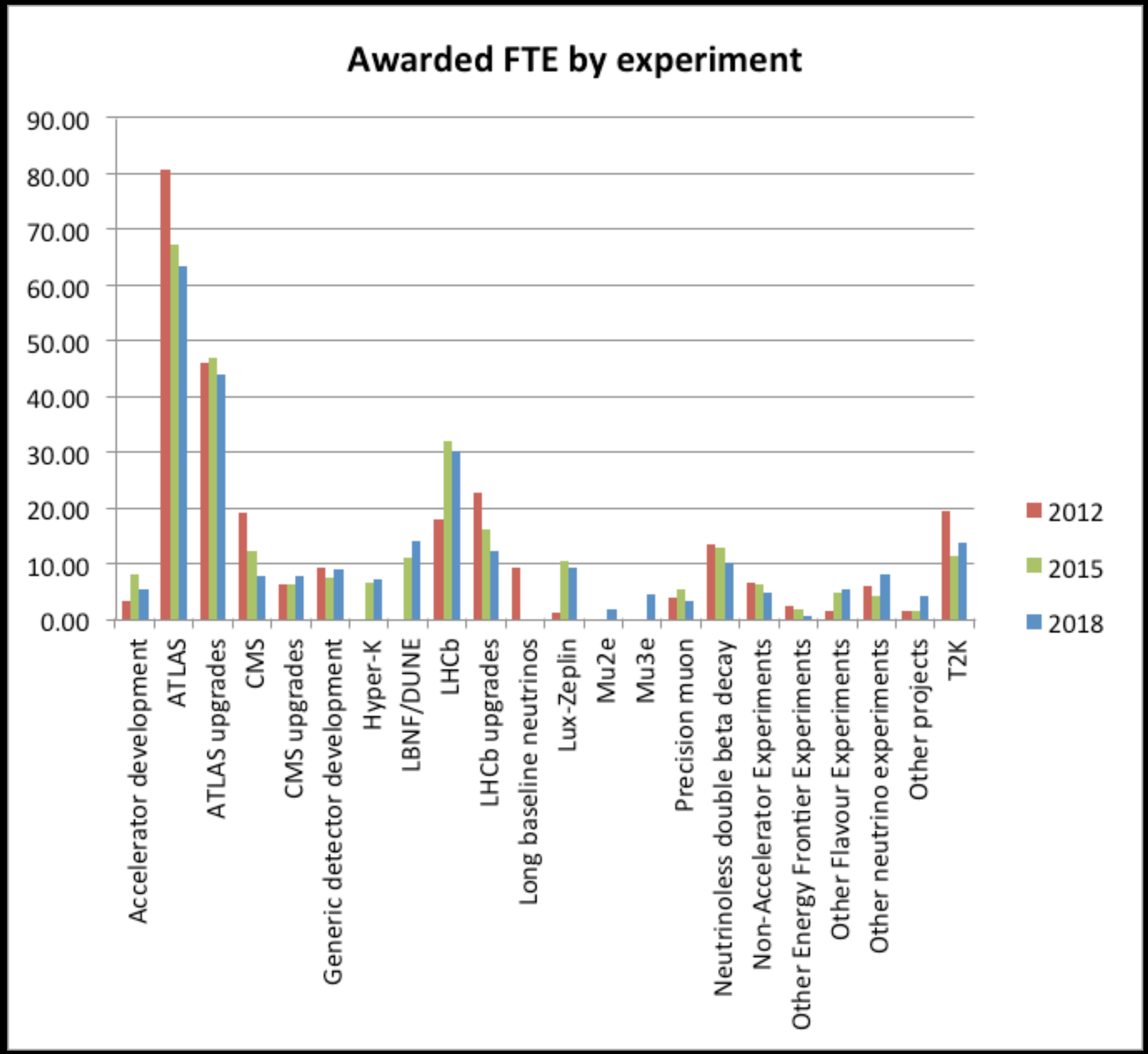
Science Areas



Experiments



Balance of Programme Comments

- Energy Frontier:
  - ATLAS, CMS and Upgrades represent half the programme
  - reduced by 4%, reflecting diversification of the programme
  - no support for future collider R&D beyond academic time

- Flavour Physics:
  - LHCb and upgrade, NA62
    - growth area: +1%, maintained volume

- Neutrino Physics:
  - oscillation physics: many more projects than before
    - T2K + DUNE, SBND, Hyper-K, NoVA posts funded
    - growth area: +3%, reflects shifts in academic time
  - neutrinoless double beta decay: reduced by 2 FTE w.r.t. 2015
    - decreased academic time, reduced funding reflects this

Balance of Programme Comments

- Muon Physics:
  - growth area: g-2, mu2e, mu3e (+ COMET)
  - increased support reflects growth in academic time

- Dark Matter:
  - LZ, DarkSide (+DEAP, ADMX, NEWS, Cygnus)
  - growth in academic time, ~maintained funding

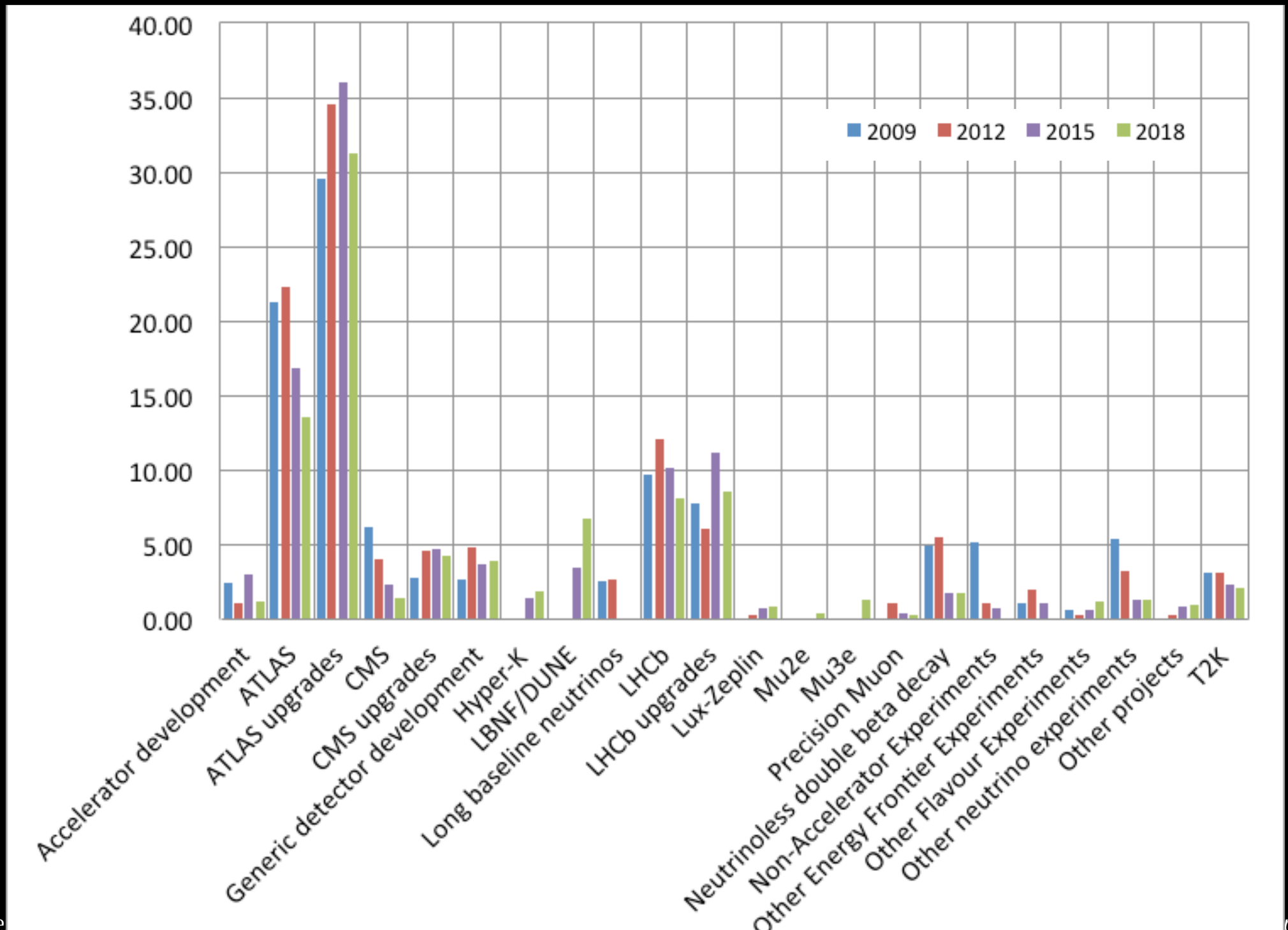
- EDM:
  - eEDM: excellent science, but supported only with core effort
  - nEDM: no support awarded, for the first time

- HEPData:
  - no support awarded, for the first time

Core Posts

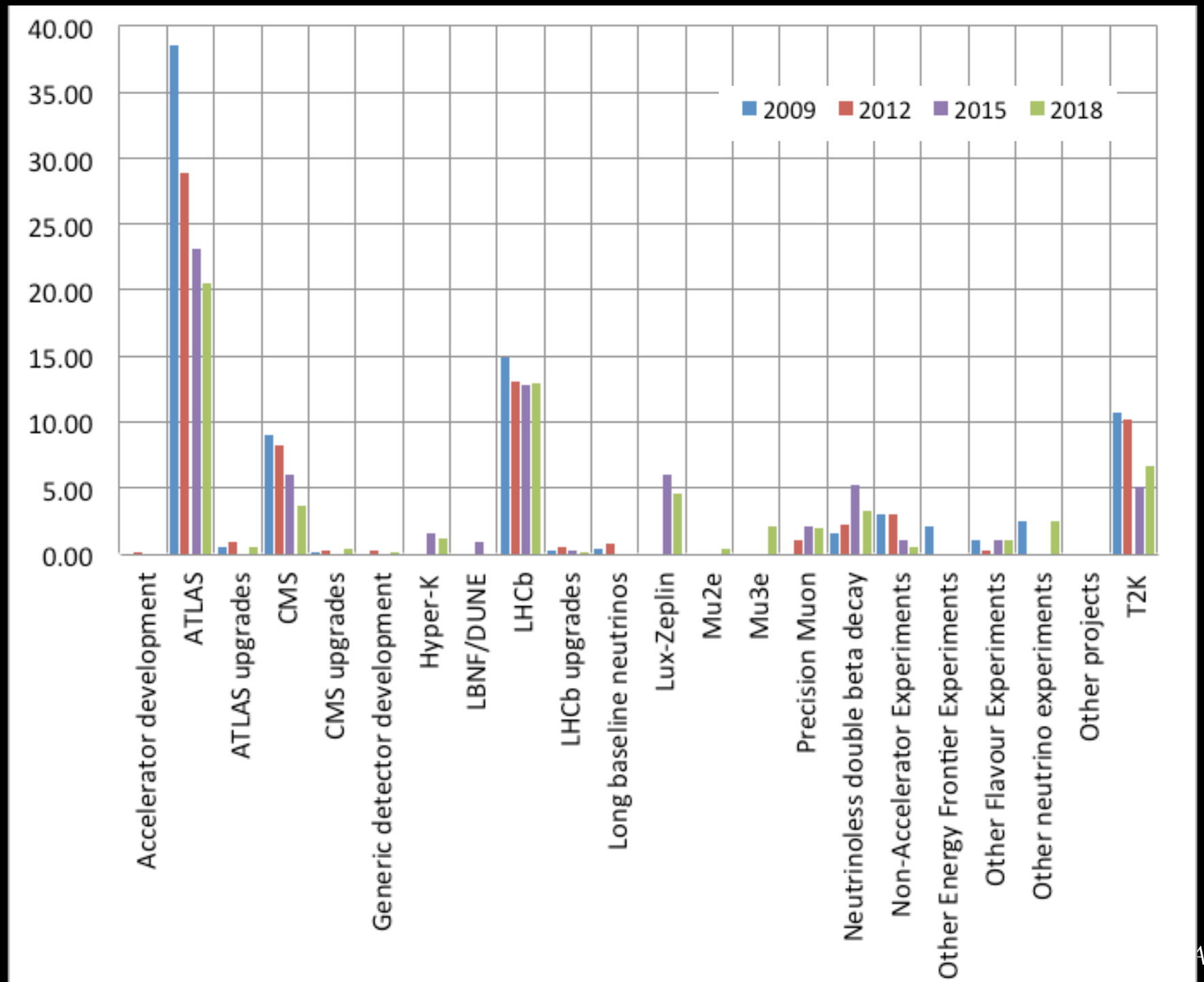
**nb. ring fencing of Upgrade core adds 12 FTE back in (ATLAS, CMS, LHCb)*

- 151 requested, 91 FTE awarded (cf. 2015: 103 FTE)
  - + ring fence effectively no volume change, shift from M&O to Upgrade



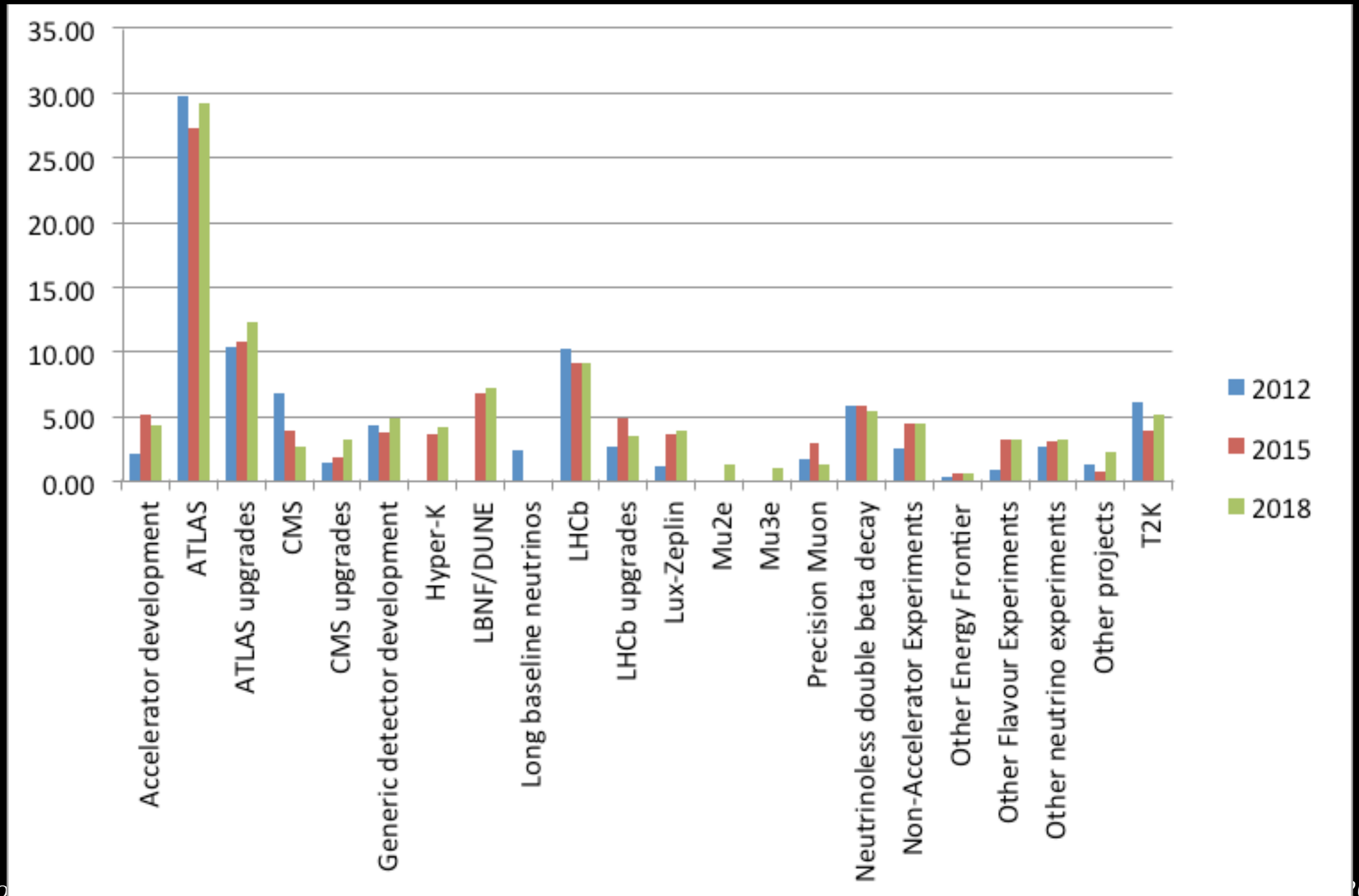
Responsive Posts

- 153 requested, 62 FTE awarded (cf. 2015: 66 FTE)
  - most groups have <1 RA per science area
  - shift from Exploitation to M&O



Academic Time

- Increasing numbers: 218 requesting FEC support, 207 awarded
  - 2015: 206 requested, 192 awarded



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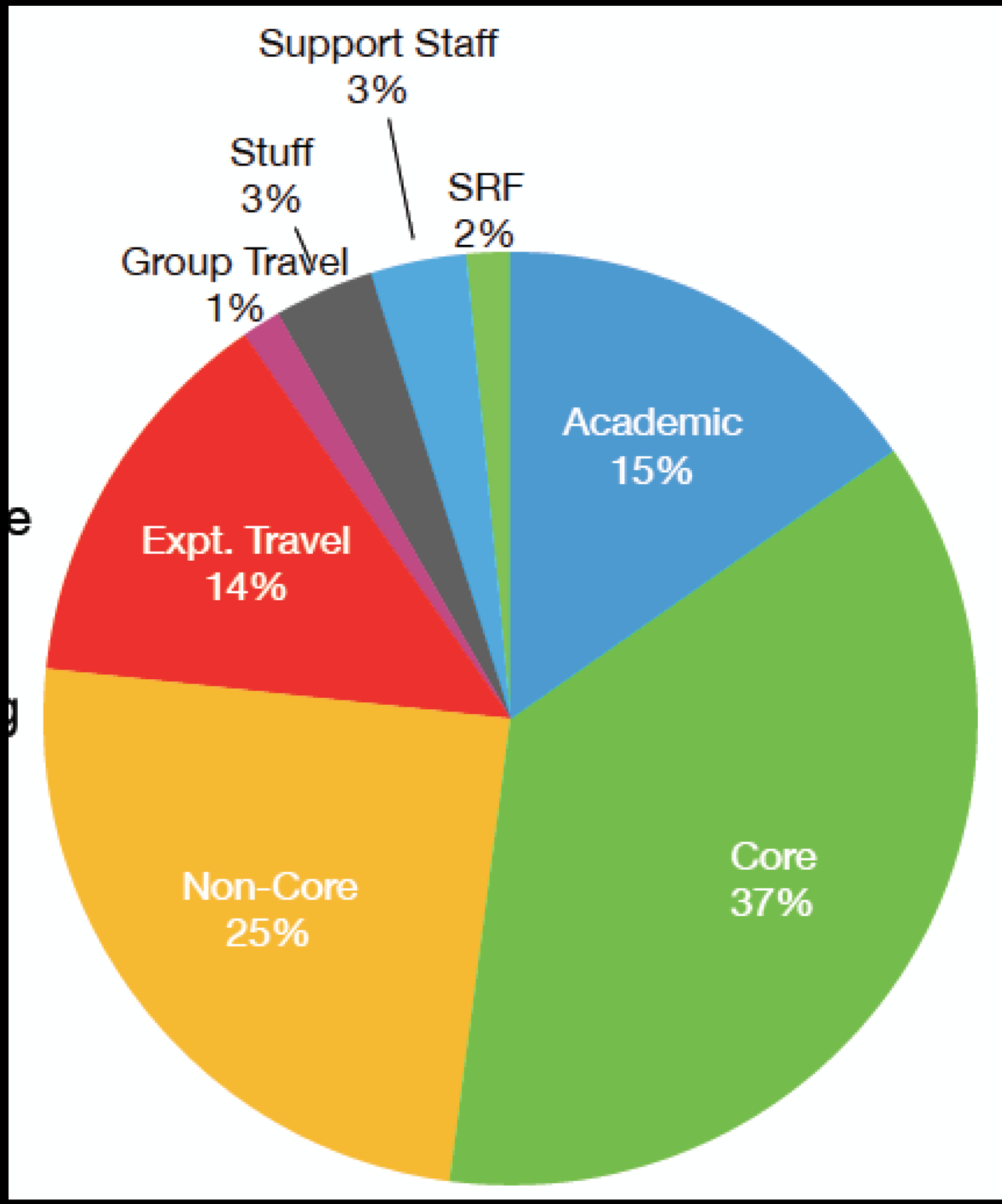
Summary

- breakdown of costs by category in a scenario where academic FEC support is 15% (like 2015)

- Panel prioritized retaining posts and programme breadth

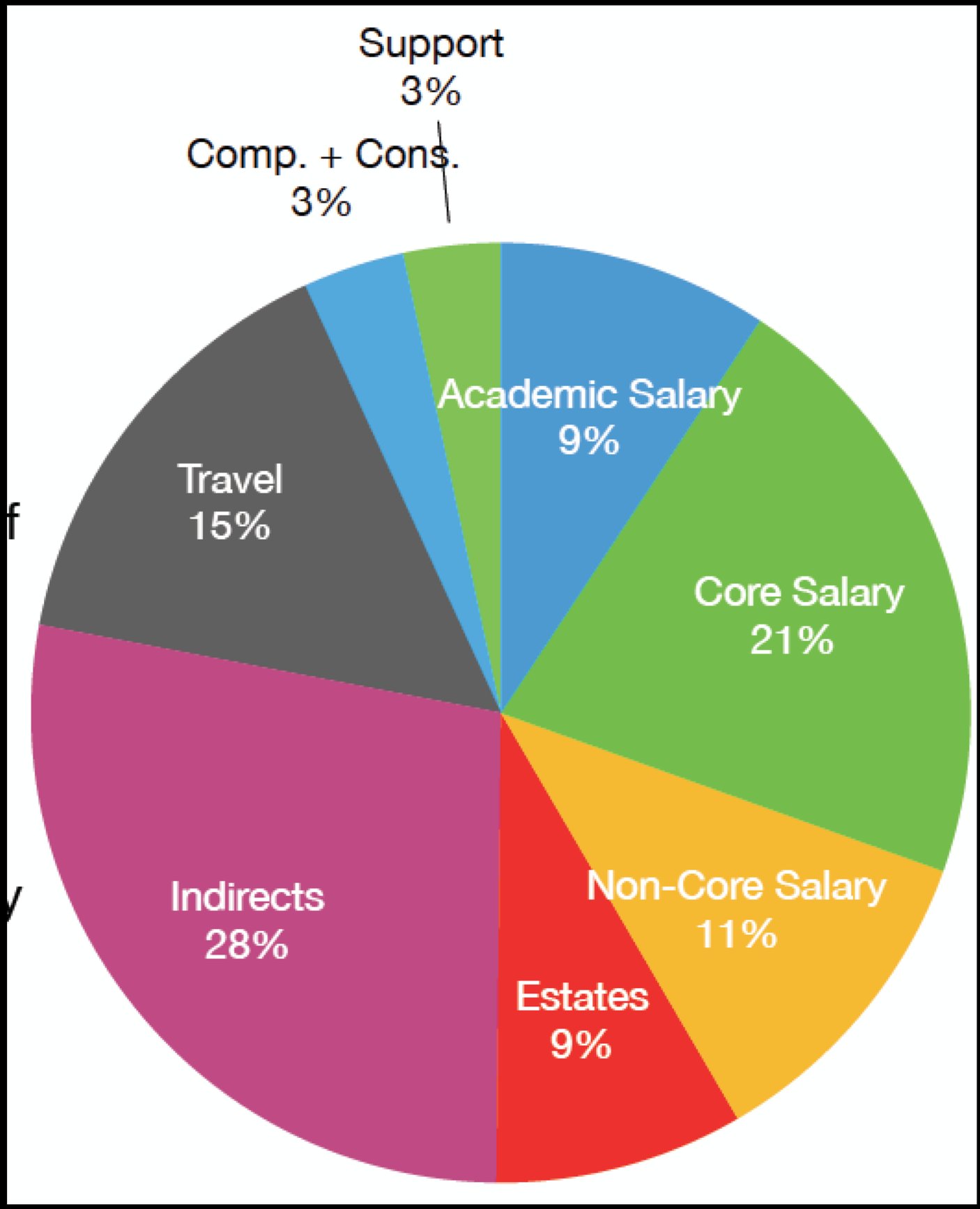
- Panel cut posts by ~5%, experiments by 0-5%, group support by 30-40%, (by moving to guideline travel + consumables per FTE)

This recommended programme was still 4M over budget.



Indirects

- breakdown of costs by category in a scenario where academic time remains at 15% (like 2015)
- indirects & estates split out from salaries
  - 32% of programme spent on core + non-core posts salaries
- 37% of programme spent on university overheads
- 44% of programme spent on university costs (academic time + overheads)



Indirects vs Time

- average indirect cost has increased by 22% since 2015
- 12 institutions have increased by more than 20%, 2 by >40%
- this amounts to another ~10% cut to the volume of the ‘physics’ part of the programme, on top of flat cash 10% cut
- large dynamic range: e.g. factor of 1.63 between institutions in the same city, e.g. ICL/QMUL

September surprise!

Scenarios Presented to Science Board

2018-2015 university costs difference is 4M ~ 50 FTE-years or 17 posts

1. cut 17 posts
   - if implemented, programme would lose 3 experiments
     - panel's view: we started from the BoP1 recommendation to maintain the current balance.
     - We did not conduct a review planning for a 20% cut.
     - Implementing a 20% cut would require losing both science areas and groups.
     - This would require a different review than the one we did.

2. panel's preferred solution:
   maintain spend on 'university costs' at 2015 level
   - implement this by reducing median academic time to 8%
     - although this still rewards institutions for increasing fEC

Comments on Reduced Scenarios

The programme awarded by the panel represents a significant risk in delivery and very challenging loss in Physics exploitation of STFC-funded experiments.

- Multiple experiments the UK has invested MGBP in have 0-1 PDRAs working on physics exploitation.
- The science area of EDMs was just barely funded.
- Neutrinoless double beta decay (2 approved projects) is now <3 PDRAs
- HEPData, which is the way most experiments meet UKRI data requirements, is not funded.
- No funding to two groups, beyond academic fEC for 1 person.

Closing Remarks

- This round was difficult and the panel worked hard to arrive at a least-worst solution.

- The panel tried to implement the strong steer from introducer meetings that preserving posts was the highest priority, followed closely by preserving Upgrade and M&O commitments.

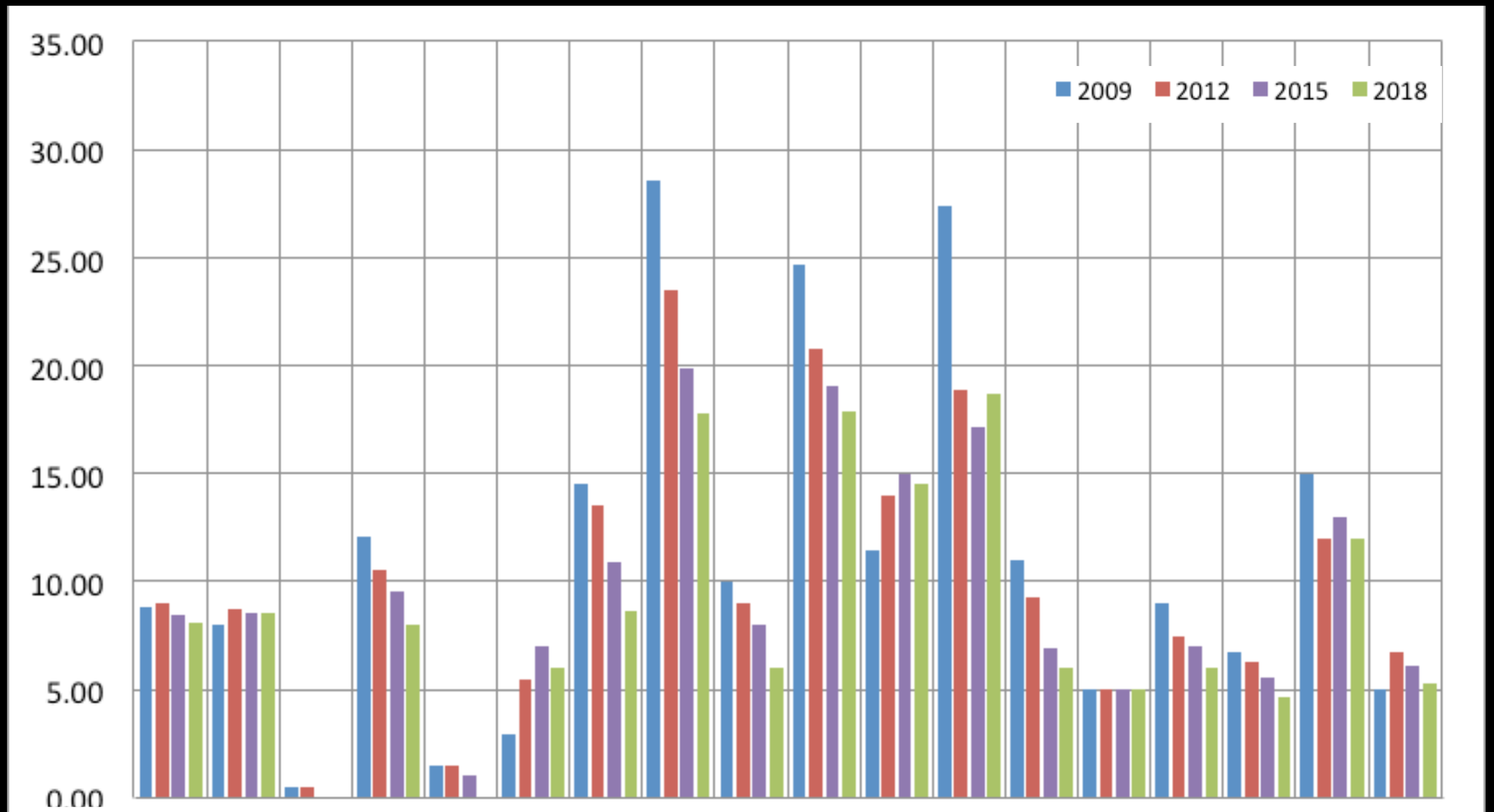
- Growth in University overheads is incentivized by the current process, which does not consider ‘value per research pound’ as a criteria for evaluating posts. Evaluation criteria should be reconsidered.

- The PPGP(E) CG funding has reached the point where we can no longer achieve an optimal or balanced programme.

Additional Material

Institutes

- No award for two groups submitting proposals beyond academic FEC
- small groups (with <15 core+noncore posts) took a larger fractional cut than large groups, after ring-fenced posts added in (not shown below)



Reduced Scenarios

3. to fit within the budget envelope, options were prioritized as:
   1) reduce academic time to 8%
   2) remove M&O for experiments where STFC has not made large capital contributions
   3) reduce experimental travel guideline by 1k/yr
   4) remove all administrative support
   5) partially fund posts in lower band
   6) cut posts

This ranking reflects the strong steer from the introducer meetings that preserving posts, even with partial funding, is the highest priority.