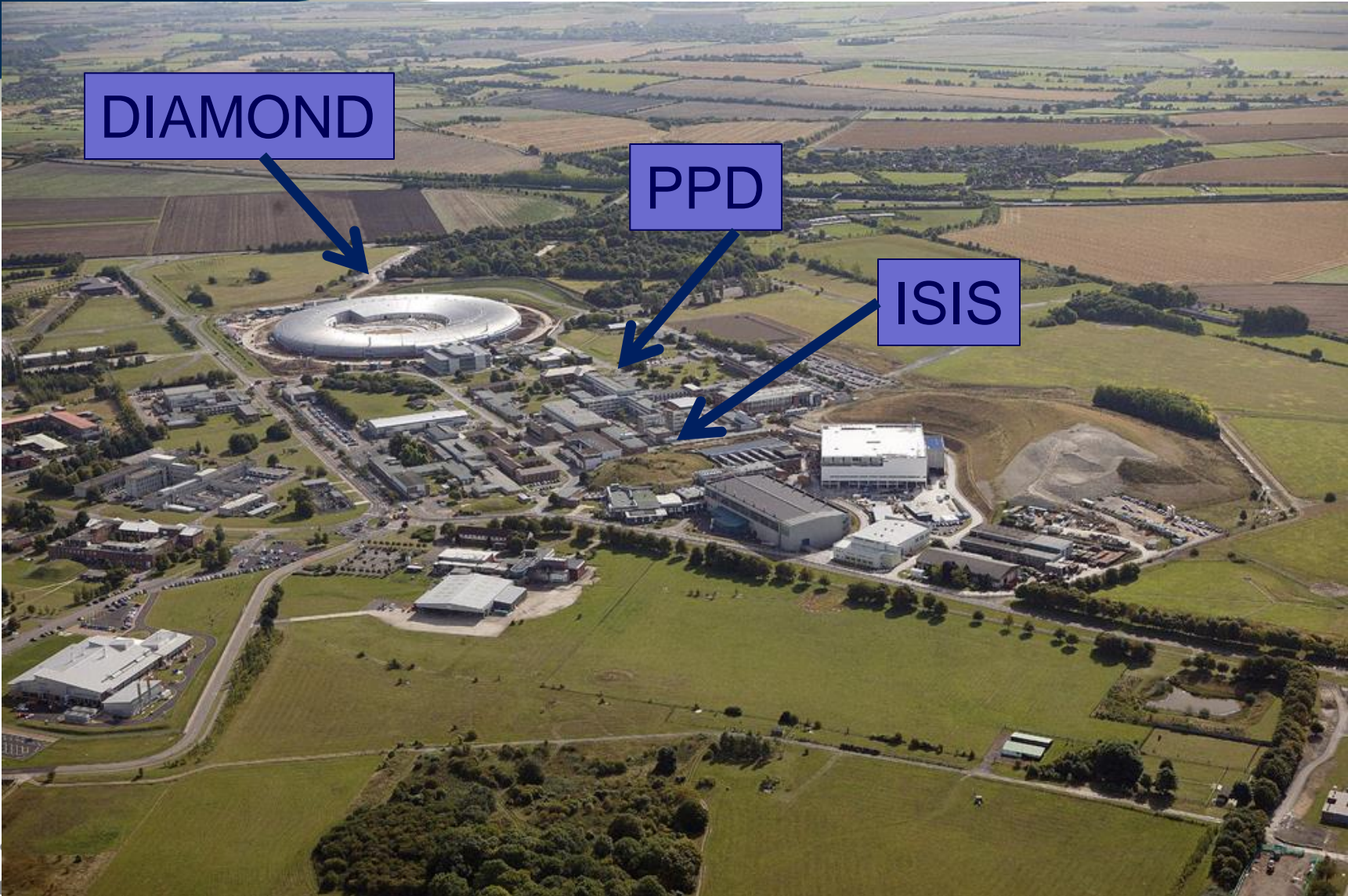


RAL Particle Physics Department –
Brief Report to the Community

Dave Wark
Liverpool Town Meeting
April 10th, 2013



PPD was the founding department in the laboratory



Particle Physics Department

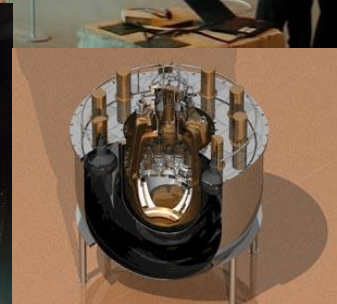
- ~65 people in Particle Physics Department (PPD), ~45 have PhDs, plus engineering, instrumentation, accelerator, and computing in other parts of the laboratories.
- We are like a large university HEP group, except that we concentrate on supporting the rest of the UK community through major equipment build (ATLAS SCT, CMS ECAL Endcaps, T2K electronics) and on support activities that require 24/7/365 availability.
- We provide an 'interface' for the whole PP UK community to specialist skills in other RAL/DL/STFC departments:
 - Technology: electronics, mechanical engineering;
 - Computing: the UK Tier-1 is here, and we are part of the South Grid Tier-2 consortium;
 - Accelerator R&D: ASTEC, which works closely with the Cockcroft and Adams Institutes;
 - Project management and administration: e.g financial tendering
 - Programme support: UKLO, LTA admin, claims, SLA management, organize PPUAC, Cosener's Forum, etc.
- RAL and Daresbury sites and PPD are, undergoing massive change: much more building over last 5 years than in previous 25.... : Diamond, ISIS Target Station 2, Hartree Centre, new hostel, new main gate, new computer building, new research building, meanwhile PPD has been restructured....



LHCb RICH-2
Mechanical Support

ATLAS Barrel Semi-Conductor Tracker (SCT)
Engineering, Design, Project Management,
Service assembly at RAL

T2K ECAL – Back End Electronics
Largest Modules Constructed at DL



nEDM Experiment
at the ILL

T2K Beam Target

ZEPLIN II
Dark Matter Detector

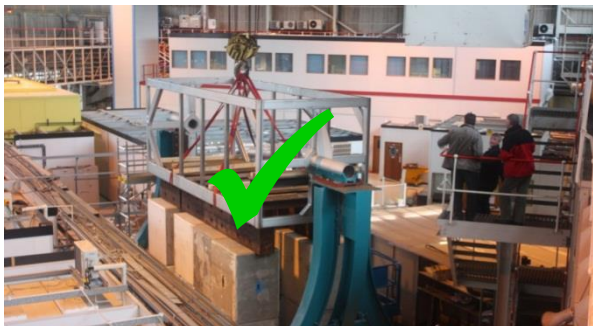


CMS Endcap ECALs
Designed and Built at RAL

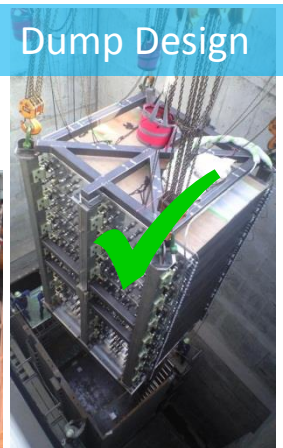
GridPP Tier 1 at RAL

ATLAS Endcap Toroid
Design and Manufacture

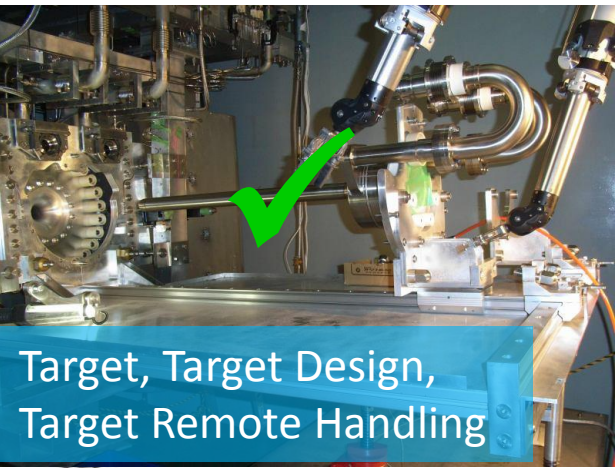
UK Contributions to T2K



Near Detector Basket and Stand



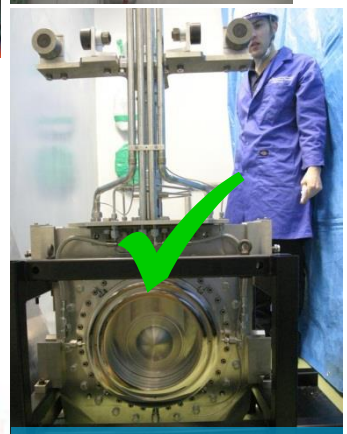
Dump Design



Target, Target Design, Target Remote Handling



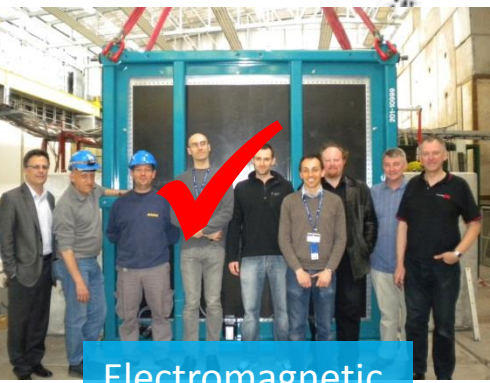
Beam Baffle



Beam Window

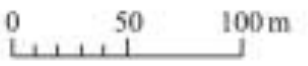


Near Detector Electronics



Electromagnetic Calorimeter!

Every single UK contribution has significant involvement from RAL/DL and hence PPD!

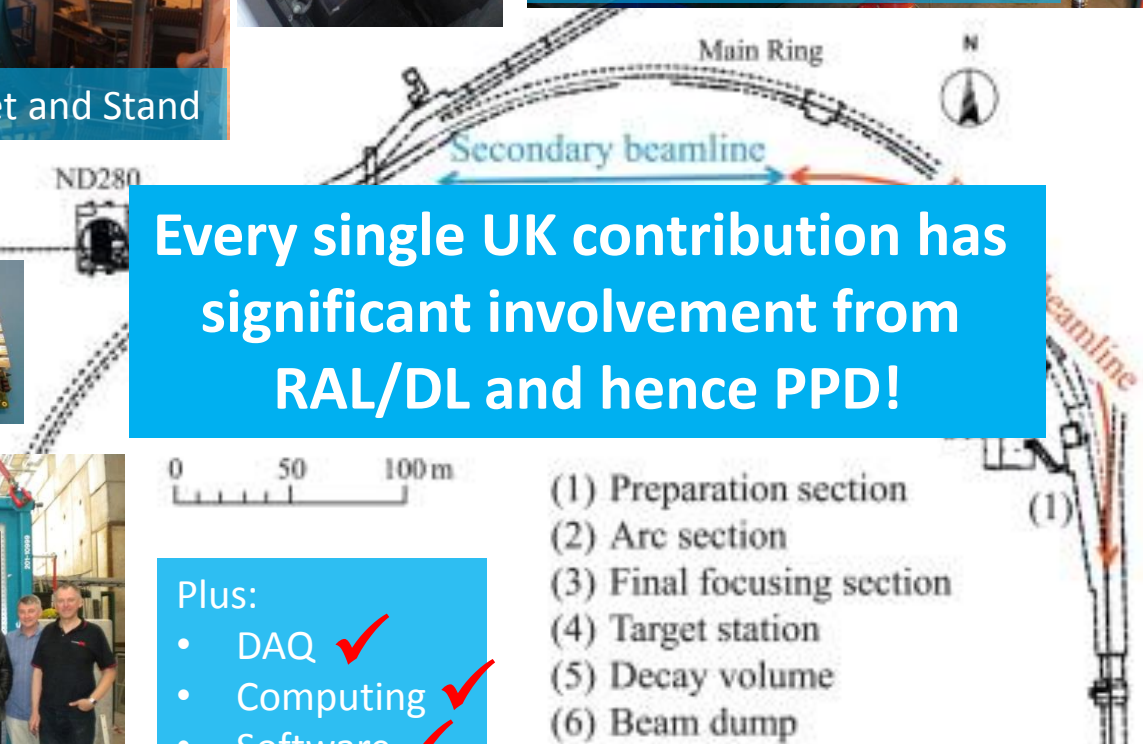


- Plus:
- DAQ ✓
 - Computing ✓
 - Software ✓
 - Analysis! ✓

- (1) Preparation section
- (2) Arc section
- (3) Final focusing section
- (4) Target station
- (5) Decay volume
- (6) Beam dump

T2K UK is 8 institutions (Imperial, Lancaster, Liverpool, Oxford, Queen Mary, Sheffield, Warwick, STFC Rutherford and Daresbury), ~100 physicists, £14.8M STFC construction grant plus ongoing operating.

- ✓ All RAL/DL
- ✓ Part RAL/DL

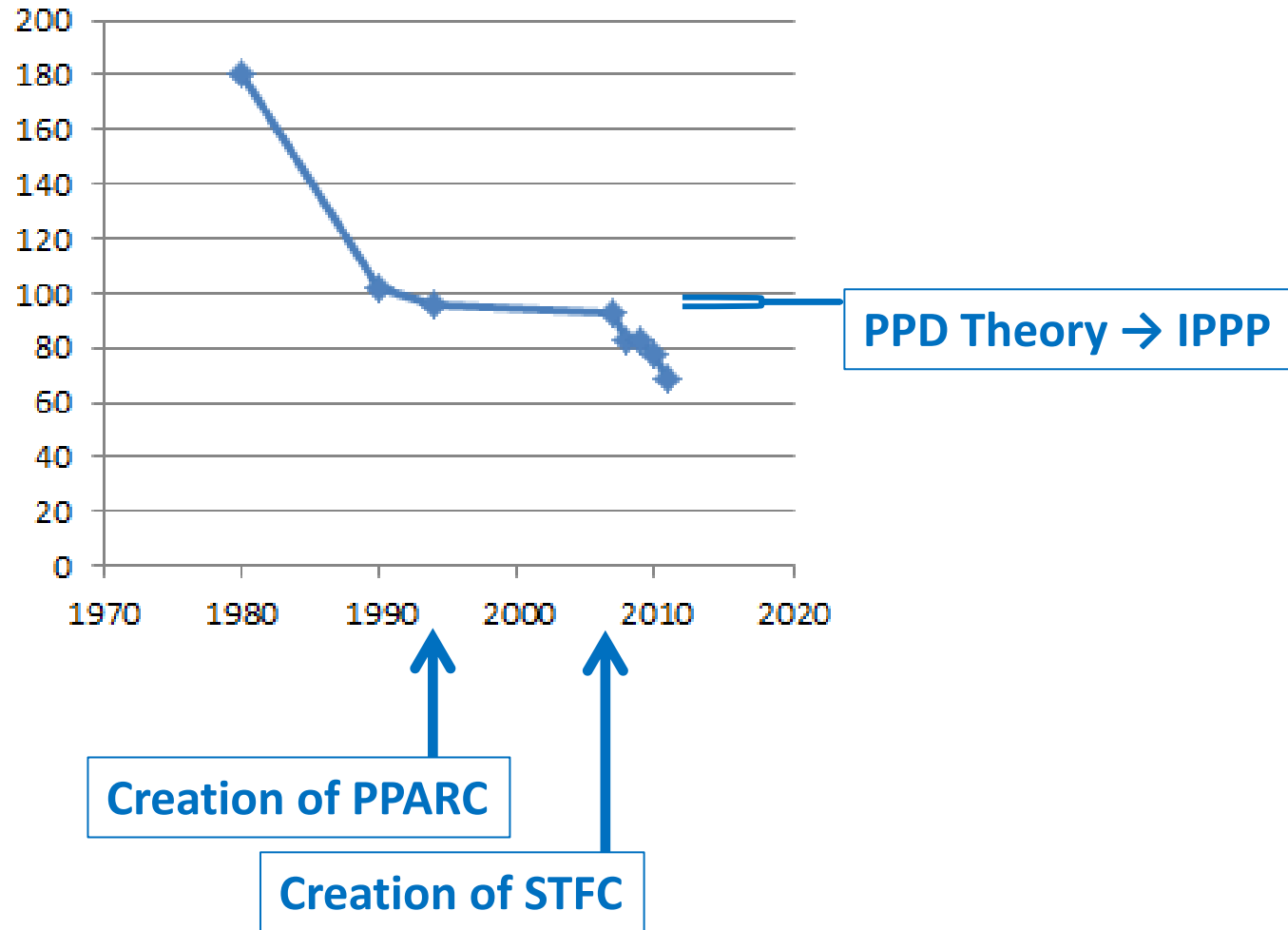


Current projects in PPD

Project	Funding	Located at	Programme 2010-2012
ATLAS	STFC	CERN	M&O, analysis, upgrade
CMS	STFC	CERN	M&O, analysis, upgrade
LHCb	STFC	CERN	M&O, analysis, upgrade
Computing	STFC, EU	RAL	Grid software, Tier (1,2,3) support
Neutron EDM	STFC	ILL	Deploy cryo-detector, M&O, analysis
Dark Matter	STFC	Boulby Laboratory	Zeplin III M&O, analysis; plus management of Boulby facility. DEAP calibrations, LAr R&D
Detector R&D	STFC	RAL, university collaborators	Developments for future PP experiments, and non-PP applications (<i>in vivo</i> dosimetry, PET scanning)
Neutrino experiments	STFC	Fermilab J-PARC	MINOS; T2K, LAGUNA/LBNO, T2HK, LAr R&D
Neutrino accelerator R&D	STFC(+ EU)	RAL	MICE; Neutrino Factory design studies; FFAG/EMMA
NExT	STFC/HEFCE	RAL + So'ron + RHUL+Sussex	(Virtual) Institute for Phenomenology.
Support	STFC	RAL, UKLO	Programme support for UK community

Number of Staff in PPD vs. Time

“Fiscal Cliff”
Triggered a
review of PPD.



STFC PPD Review

- **Membership:**
 - Prof. John Womersley, STFC (Chair)
 - Dr. Austin Ball, CERN
 - Prof. Steve Lloyd, Queen Mary University of London
 - Dr. Janet Seed, STFC
 - Prof. Steve Watts, University of Manchester
- **Terms of Reference for the Review Committee:**
 - **1. Consider**
 - a. the current capabilities and expertise in the Particle Physics Department at RAL;
 - b. the appropriate future role, looking to 5 years and beyond, for the Particle Physics activity at RAL given that we wish it to concentrate on a technical support mission for the UK national programme.
 - **2. Recommend the appropriate size, areas of expertise and structure for future Particle Physics activity at RAL.**
 - **3. Identify any areas of current activity which could more appropriately be delivered by other organisations, such as Universities.**
 - **4. Recommend oversight arrangements of future particle physics activity at RAL**

Summary of PPD Review

Mission and Purpose

39. The review recommended that PPD continue in its mission to support the national particle physics programme in the areas (in alphabetical order) of:

- Administrative support tasks (at some appropriate level) for the national particle physics programme, including LTA attachments at CERN;
- Computing - especially the liaison between the experiments and Tier-1 Centre;
- DAQ / online / controls;
- Detector / instrumentation capability, especially design, construction, engineering, integration and simulation of major detector systems;
- Maintenance & Operations (M&O) support for ongoing experiments;
- Trigger systems;

And that this mission be undertaken in the context of the national programme priorities as given by the STFC science roadmap and prioritised programme.

Full report available at: http://www.stfc.ac.uk/resources/PDF/PPD_review.pdf

Summary of PPD Review

Size and Structure of Particle Physics Activity at RAL

43. The appropriate base size of PPD to carry out this mission for the next 5 years should be derived from the level recommended by PPGP in 2009 and recent PPRP project reviews. In order to allow some additional flexibility, the review recommended that any savings made from reductions in administrative and IT posts should be transferred to research posts. As such it is proposed that the total number of positions in PPD funded by STFC should be 50 (excluding GridPP and Boulby posts), comprising:

- 1 Director Post
- 8 Research Leader Posts (see below for definition)
- 22.5 Base Posts (research) (see below for definition)
- Up to 3.5 Base Posts (programme support)
- Up to 5 Base Posts (admin and IT support)
- 10 Non-permanent Research Posts

To be supplied/enhanced by joint appointments with the universities – making progress, but arrangements tricky.

Some are joint/part time, to which are added GridPP posts, MICE, EU, etc., to get to a total staff complement of ~63.

All this to be reviewed in 4 years!

How do we allocate staff to projects?

- In the first instance that is already done, because the review basically recommended we should keep the funded staff, who already had jobs.
- As the programme evolves we have to move our staff into new projects so as to track changes in the programme.
- We are already doing that, and plan to do it by keeping close links with the community – the danger is missing new projects, so you must talk to us (and me).
- If you aren't sure what capabilities are available at RAL and DL, please ask!



Other ways to connect...

- We are finally sorting out the Joint Appointment arrangements, and want to have a broader geographical representation.
- At the moment we are particularly open to swaps!
- We expanded our summer student programme and it turned out to be wildly popular (sorry about that....)
- I would like to explore having M.Sc. projects supervised at the lab, and would like to talk to interested universities.
- Want to hear from new projects and new groups (we are talking to μ g-2, COMET, CTA, any others?), and of course old projects with new ideas! Particularly interested when it fits with the existing strengths of PPD and TD (electronics, DAQ, FPGAs, major construction, etc.), but will explore any idea.
- Are discussing offering FPGA programming course – interested?

- **Membership:**
 - Prof. Mark Lancaster, UCL (Chair)
 - Dr. Christophe de La Taille, CNRS/IN2P3
 - Mr. Gary Rae, UKATC
 - Dr. Nigel Watson, Birmingham
 - Prof. Steve Watts, University of Manchester
 - Mr. Tony Medland, STFC Programmes
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As the last speaker at this meeting it falls on me to thank once again all the organizers and especially our hosts for a magnificent three days....



Questions?....