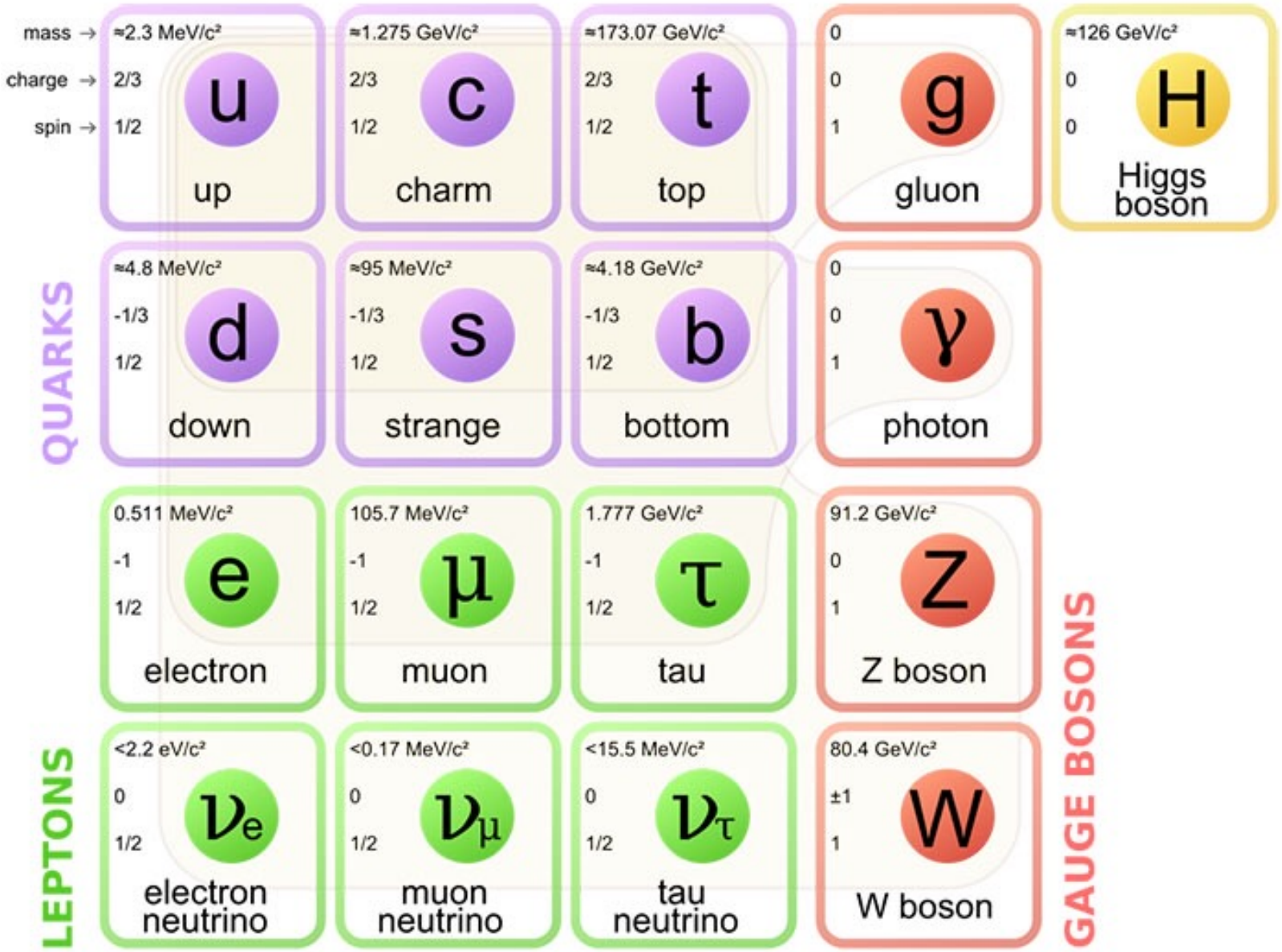
Allport, Brum and the BILPA

Paul Newman
(University of Birmingham)

With thanks to many colleagues,
Particularly Andy Chisholm,
Laura Gonella, Karol Krizka
Simon Pyatt & Alasdair Winter


SECURITY
MENDELEY

A man of many particles



A man of many particles

First attempt at a goodbye: 4 October 2022

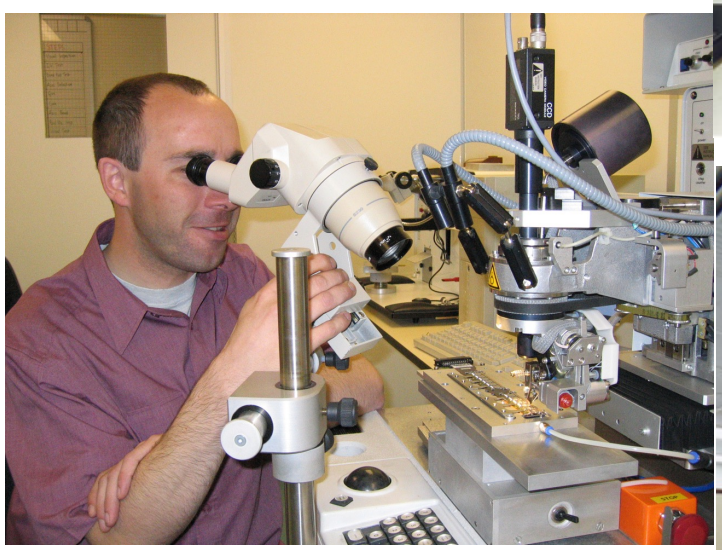
Once upon a time in Birmingham

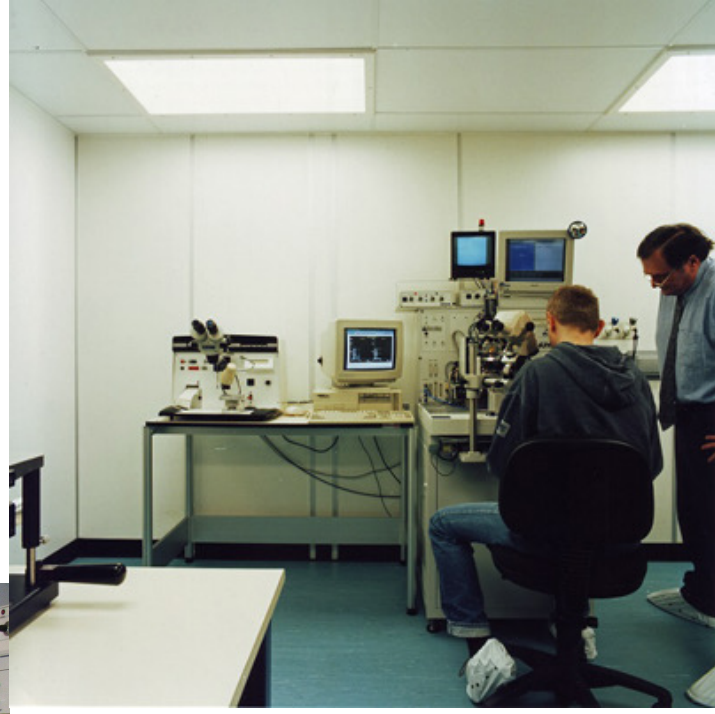
- Early silicon detector work, sharing clean rooms with astronomy group in Physics West

- Valuable, but relatively small, contribution to the ATLAS SCT

- Bright young technical staff

- Large involvement in ATLAS from the outset (L1Calo group, Charlton …)





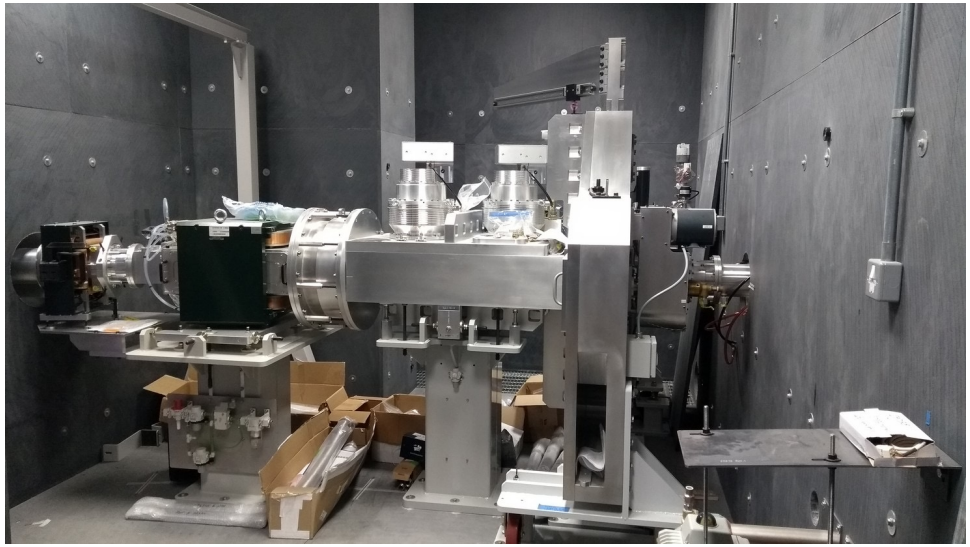
… potential to grow a bigger activity…

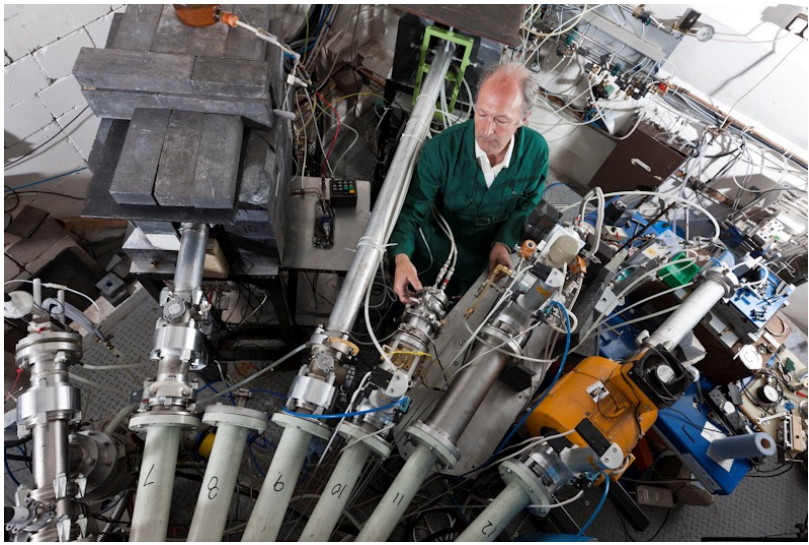
Accelerators and Medical Physics

- Proximity to local MC40 cyclotron offered possibility for on-site irradiation studies (John Wilson)

- Phil has a long-standing collaboration in instrumentation for proton therapy (PRaVDA) with Birmingham Physics and University Hospital (Stuart Green)

… Attractive place to join?





How did Phil come to Birmingham?

How did Phil come to Birmingham?

Fastest-written job description document in history?

School of Physics & Astronomy

Chair in Particle Physics

Closing date: add detail
Job reference: add detail

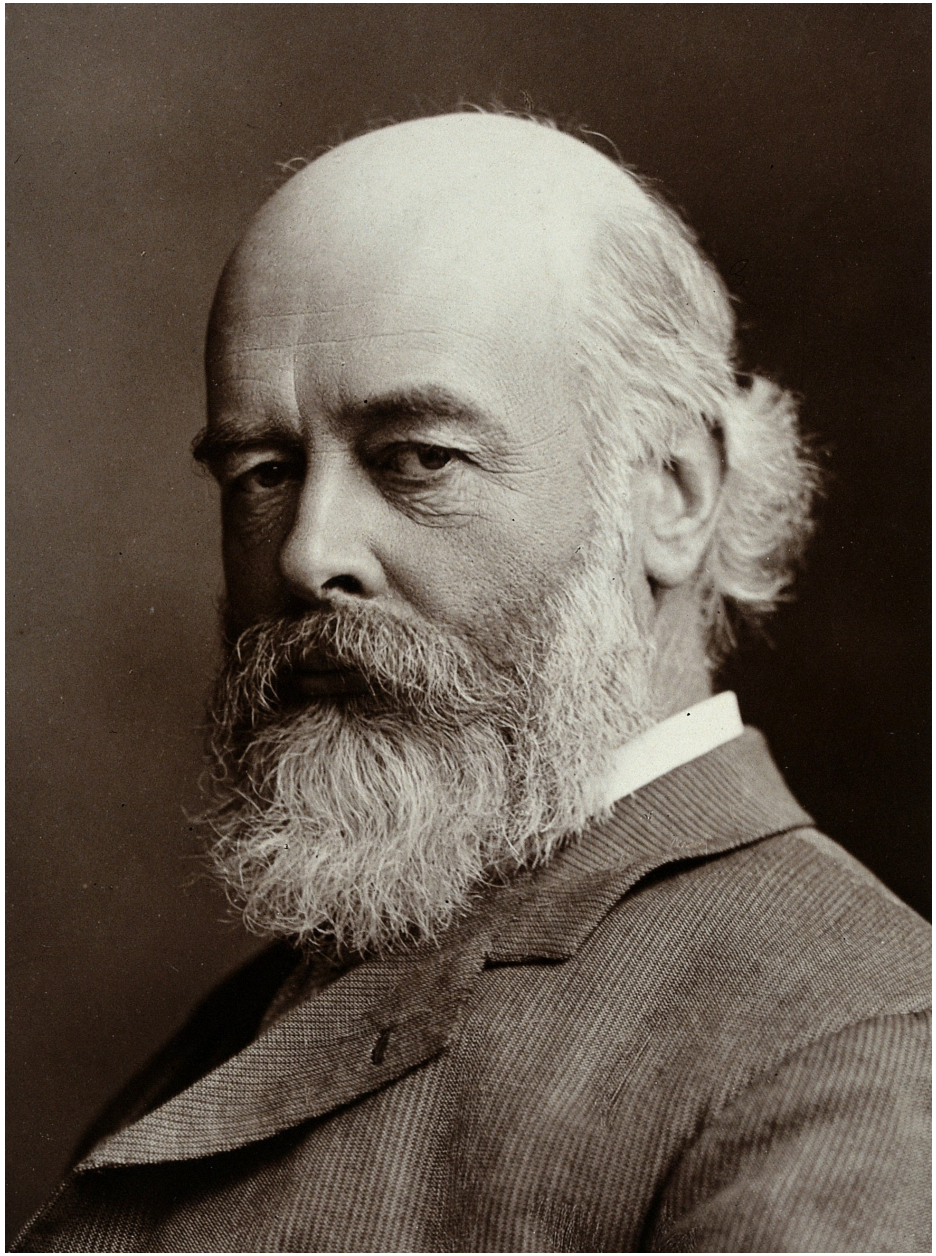
Person specification

The successful candidate will have a well-established international reputation as a leading particle physicist with a focus on the area of the design and construction of instrumentation. .(S)he will have several years experience of academic leadership in this context and a proven ability to work with a range of technologies aimed towards a range of applications. (S)he should also have an established record of excellence in teaching physics at undergraduate level.

Phil drove a suitably hard bargain, including 200m^2 of clean lab space and 3 associated academic positions

… began working in Birmingham February 2015

In the Footsteps of Giants?



Oliver Lodge

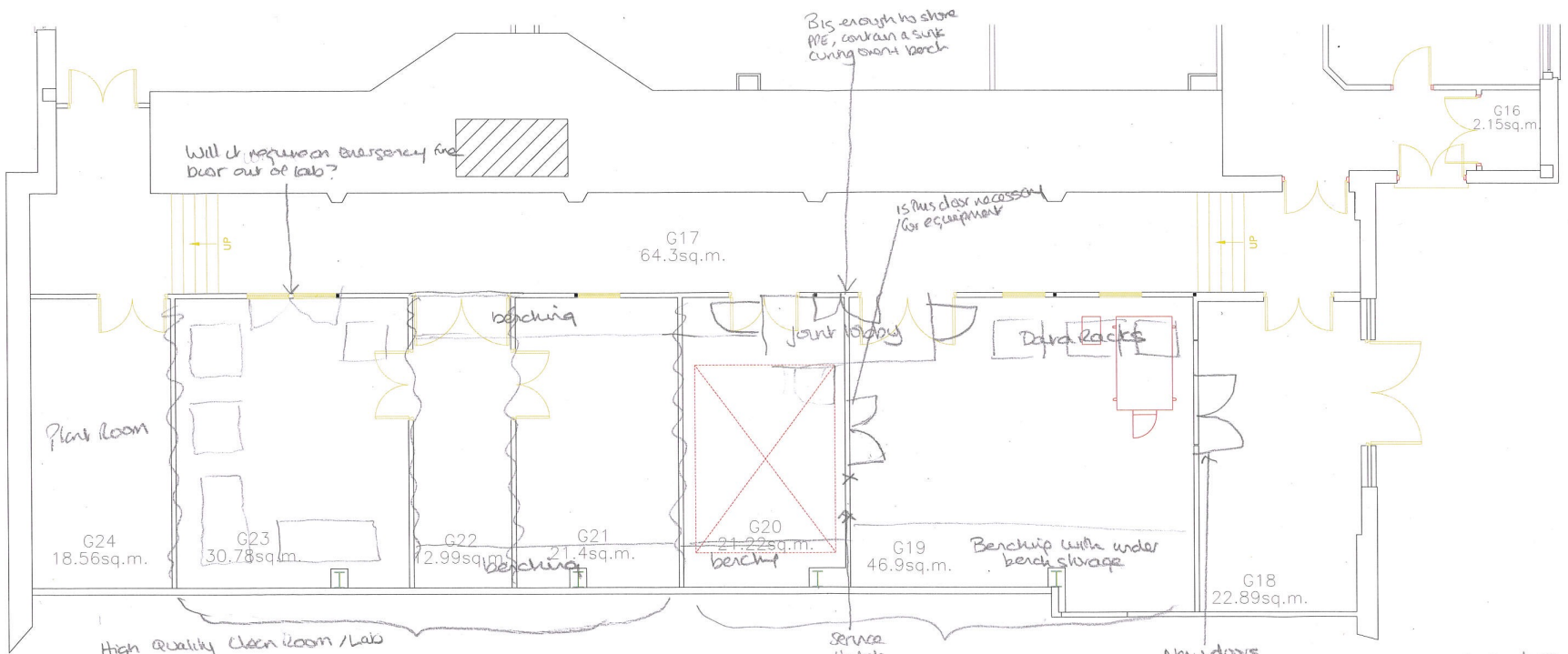
1881-1900: Professor of Physics and Mathematics at the newly founded University College, Liverpool (later the University of Liverpool).

1894: World's first public radio transmission (lecture demo!)

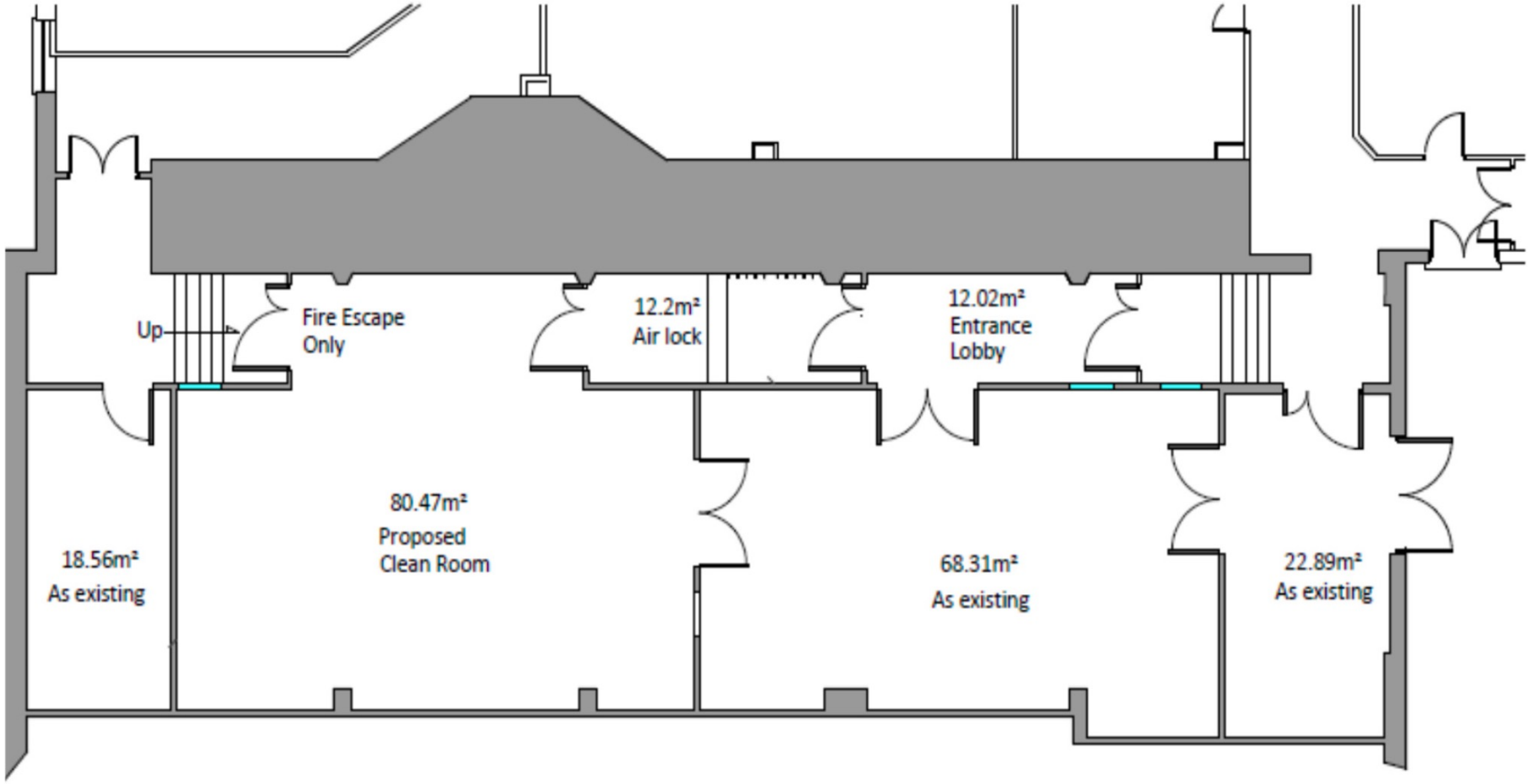
1900-1920: First principal of the new University of Birmingham, overseeing the move from the city centre to the current Edgbaston campus.

Designing the BILPA

Chose the ‘Deck area’ above former cyclotron

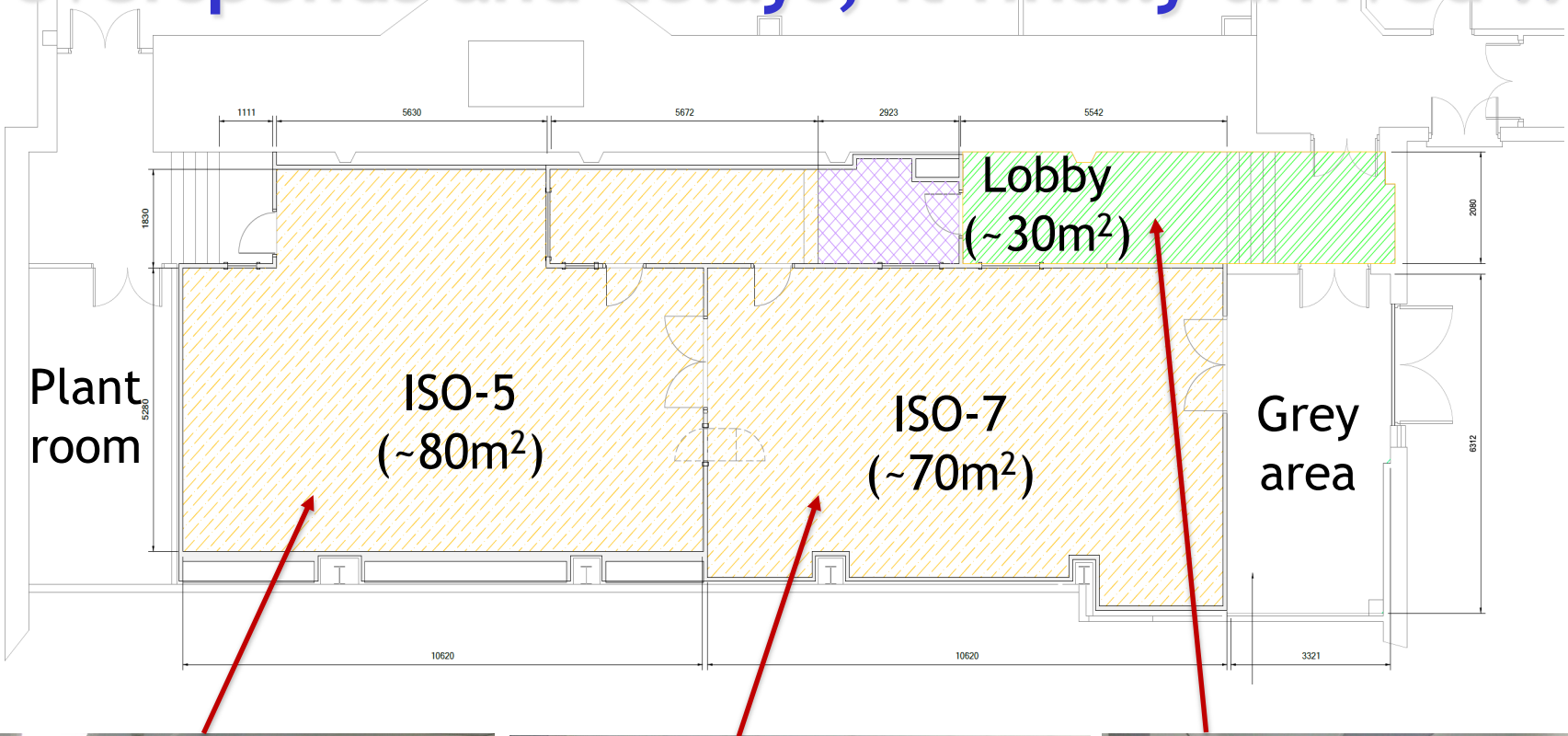


Designing the BILPA



Designing the BILPA

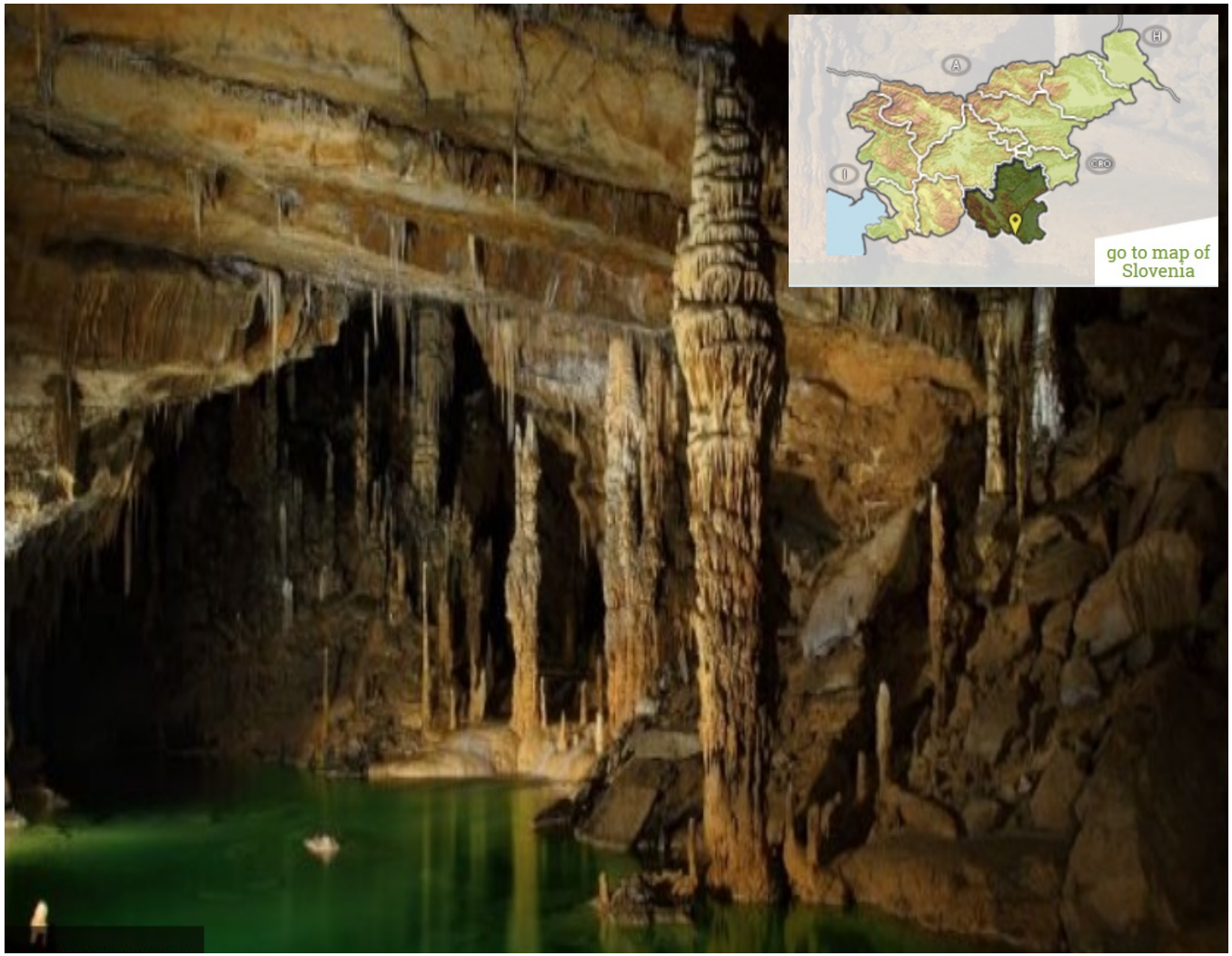
Despite some internal “difficulties”, some overspends and delays, it finally arrived ...



Naming the BILPA

An early major contribution from Allport”

‘Birmingham Instrumentation Laboratory for Particle physics and Applications’



BILPA Cave, Kolpa valley, Slovenia

Branding the BILPA

- Early versions discarded as being ‘too complicated’

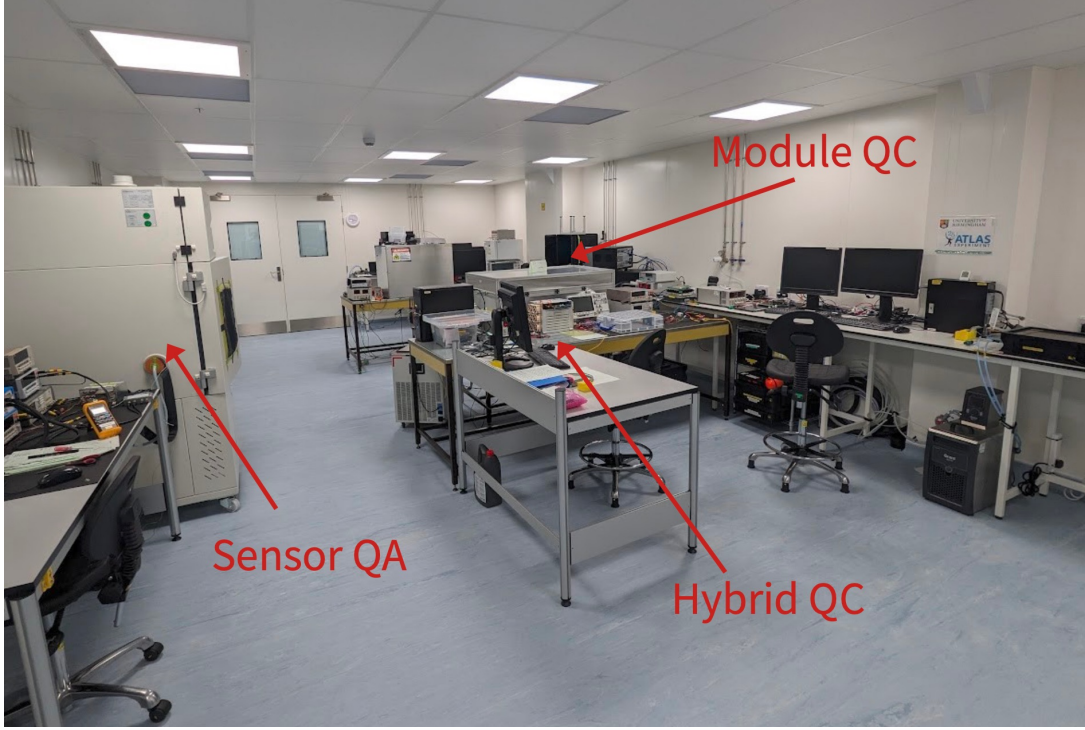
- Competition and vote among staff to design something more suitable

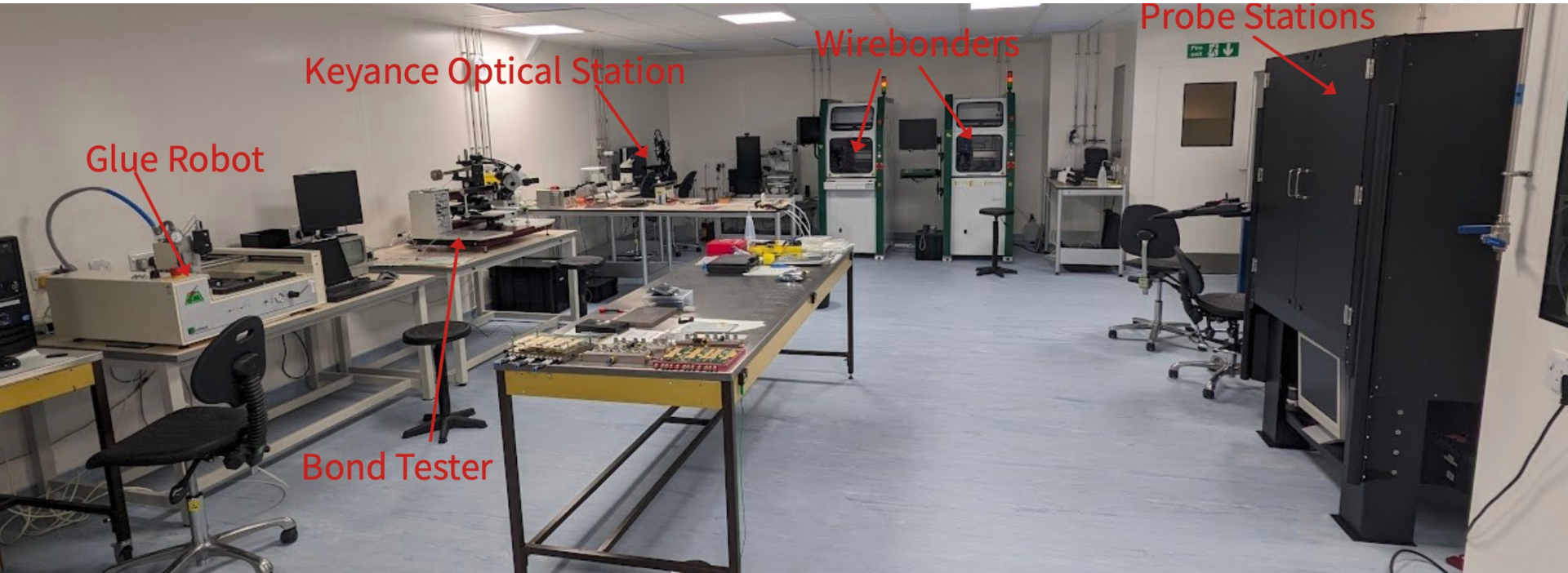
Opening the BILPA - Day of the Bunnies (14th July 2016)

Day of the Bunnies

Equipping the BILPA

Equipment in the BILPA now

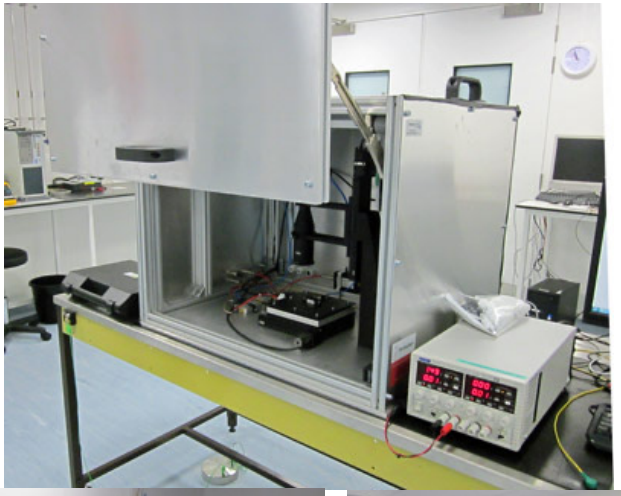




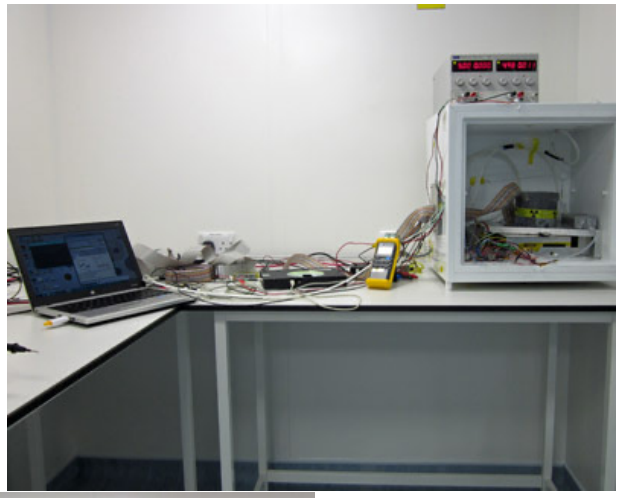
Equipment in the BILPA now

Smartscope

Scanning TCT



ALiBaVa



Manual Die-bonder

Climate Test Chamber

Every opportunity taken to bid for STFC and internal capital funding (and to tap up the poor group leader) → >~£2M worth of equipment … and growing

→ 'Well-found lab

… `Uncanny' ability to find new ways to spend money

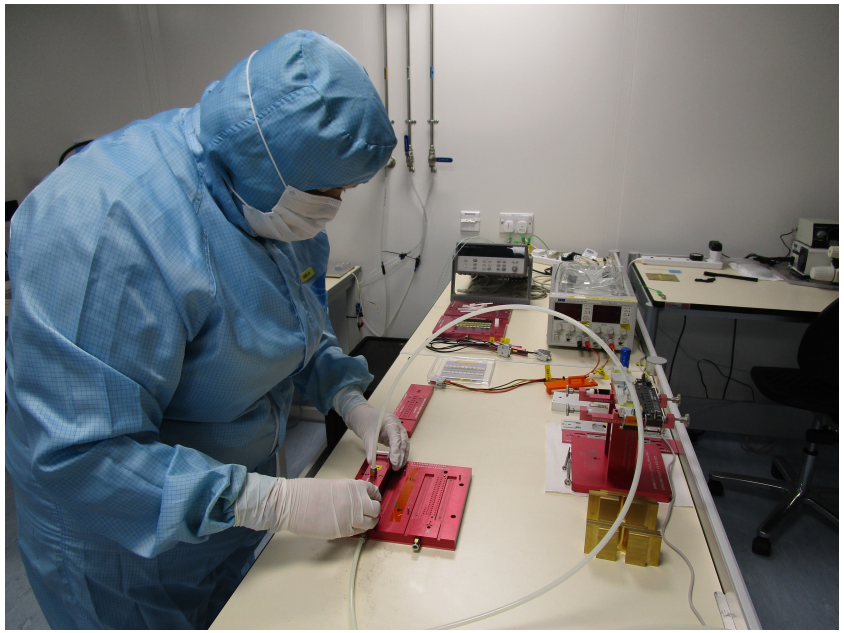
Staffing the BILPA

"As part of the briefing process, we also went to visit the lower ground area of Physics West. As there was no activity at the time, I did … ask why Prof Allport could not move into or share this ideal clean room space"
Anne Homer (Estates) to Head of School and Head of College, Feb 2015

It can be important to have warm bodies in your lab at all times.

Innovative solutions exist.

Growing People in the BILPA



Growing People in the BILPA

+ a new PPGP-supported Responsive RA post to come soon

+ numerous PhD students (apologies for omitting!)

Academics in the BILPA

- Future secured through Laura, Tony, Karol and Andy

- Mixture of real instrumentation and applications specialists

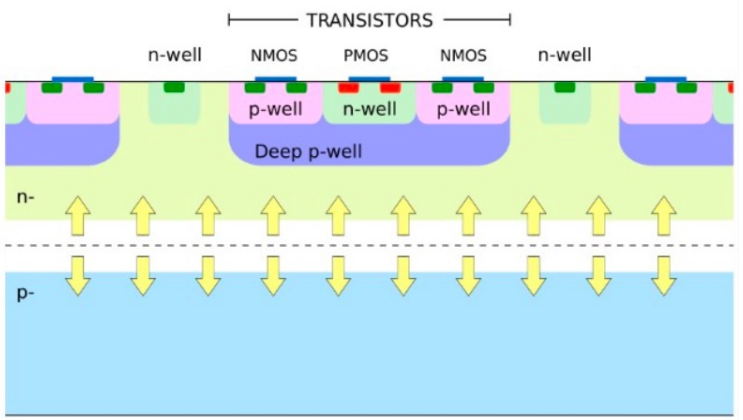
- Phil wasn't leaving until he saw the university promises kept!

Science in the BILPA

Beyond ATLAS ITk (Dave's talk) and PRaVDA / OPTIma (Nigel's talk), Phil has taken every opportunity to bring other projects into the lab, promoting younger colleagues along the way.

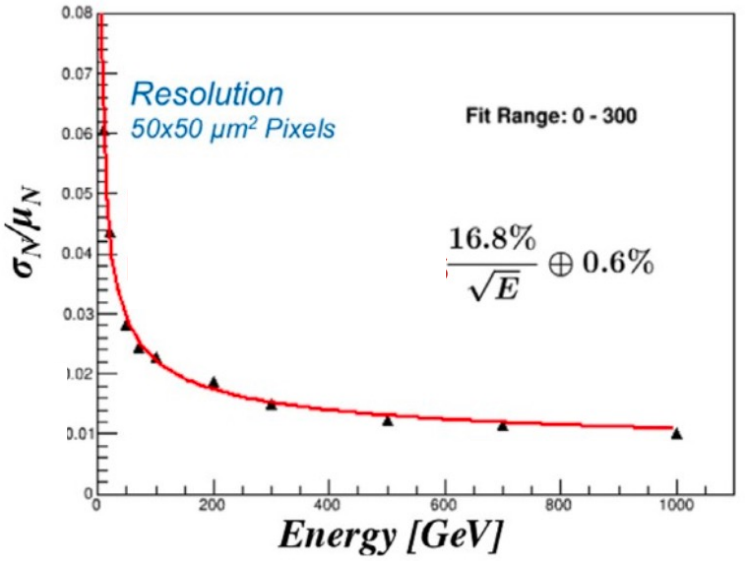
Malta: Radiation hard MAPS R&D

- Birmingham involvement from the earliest stages.
- Currently commissioning MALTA2 set-up in Birmingham



Digital ECALs

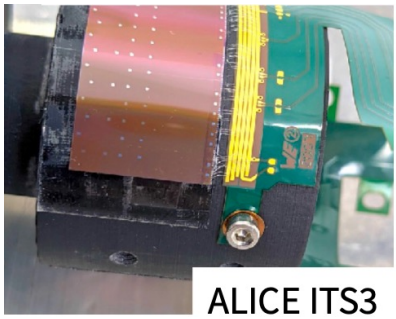
- SiW calorimetry based on MAPS Sensors (energy α #pixels)
- Latest version is a CMOS radiation-hard process

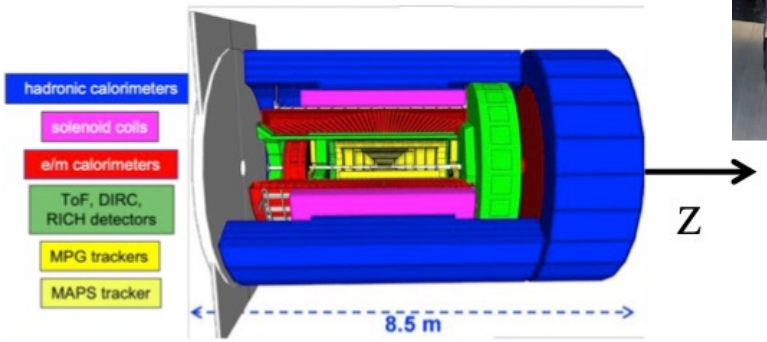


Science in the BILPA

Electron Ion Collider Tracking (ePIC)

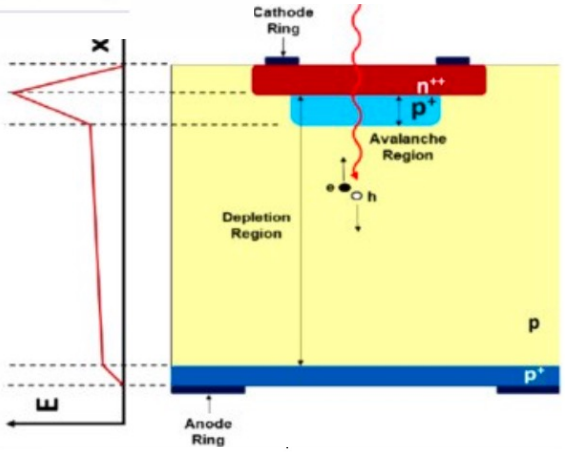
- 65nm MAPS technology, co-development of ALICE ITS3
- Test set-up commissioned in Birmingham
- Potential large-scale construction project





LGADs with Teledyne-e2v

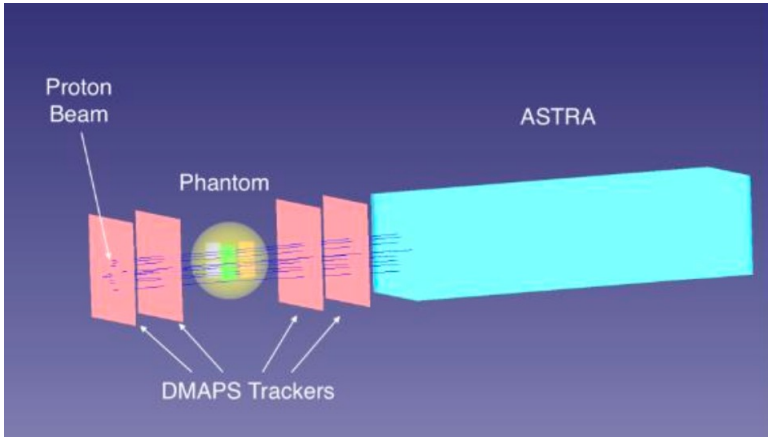
- Industrial partnership to develop manufacturing in the UK
- Towards radiation-hard '4D' silicon detectors with precision timing
- BILPA studying time response and gain



Alternative Sensor Possibilities

- Set-ups for characterising Schottky diodes and GaN substrate

Science in the BILPA

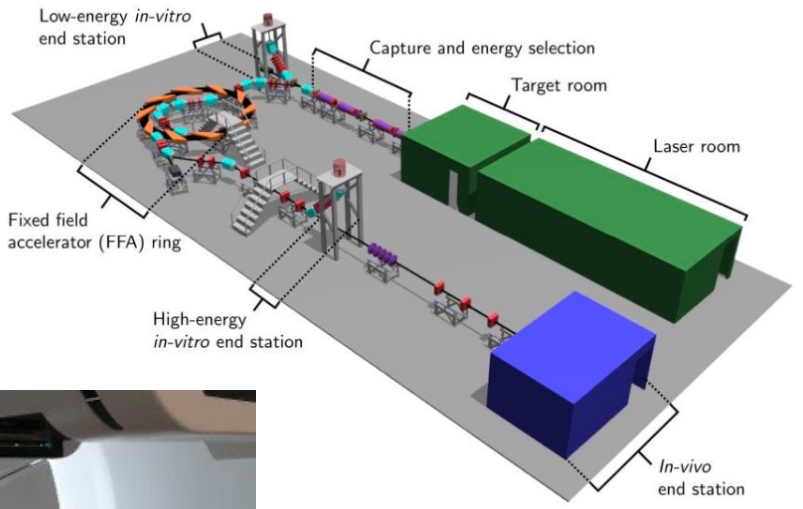


MAPS for proton Computed Tomography

- Grenado et al, investigating prototype using DMAPS instead of strips for tracking, with machine learning for track recognition

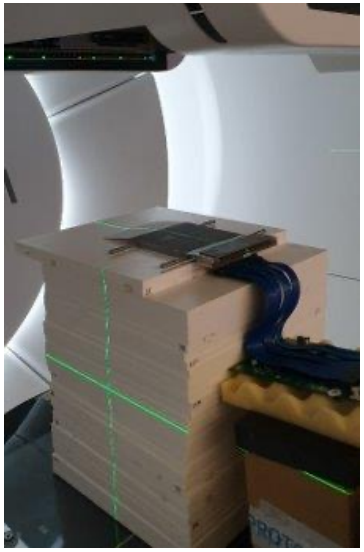
LhARA

- Laser source, plasma lens instead of large synchrotrons → more compact and cost-effective ion therapy machine?
- Birmingham leading work package on end-stations and detectors



Dosimetry

- Investigating use of CMOS detectors along with graphite calorimeter to enhance spatial resolution

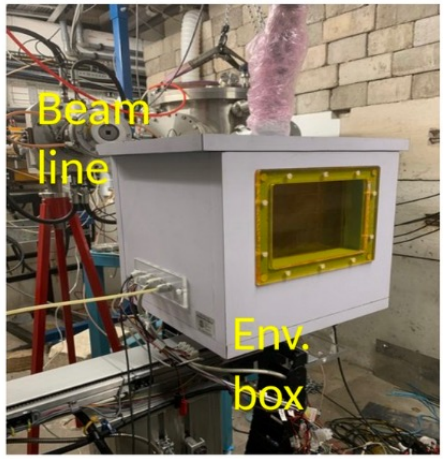


Birmingham Irradiation Facilities

MC40 Cyclotron

- HL-LHC fluence (10^{15} 1MeV n_{eq} / cm^2) in one day with 27 MeV protons.

- BILPA projects irradiate 1 day per week with dedicated beamline



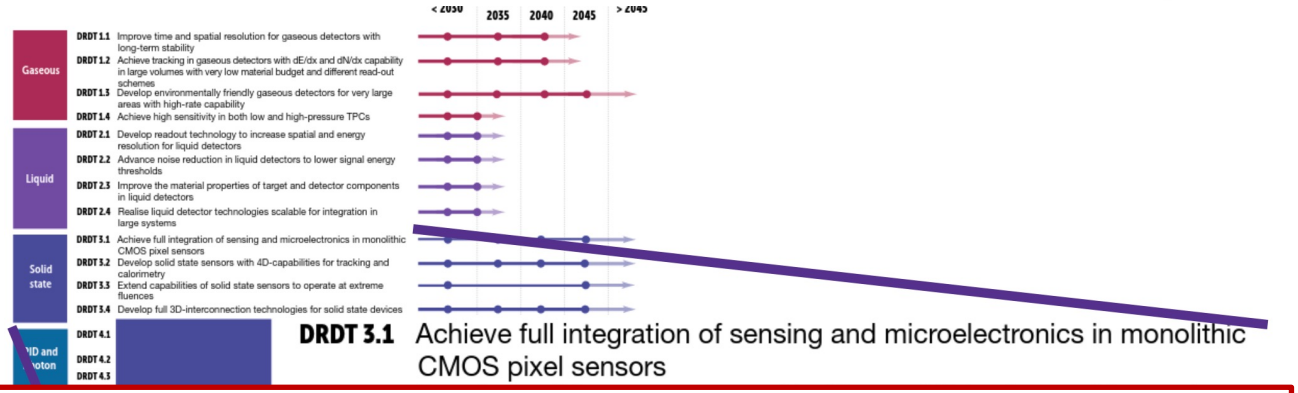
- EURO-LABS trans-national access funding to support HEP radiation hardness R&D and improve scanning infrastructure → 10^{17} 1MeV n_{eq} / cm^2

Neutrons?

- Potential to exploit new High Flux Accelerator-Driven Neutron facility (ADNIF) … separate effects from ionising v non-ionising radiation

… towards a unique centre for silicon detector R&D, construction, testing and radiation hardness characterisation at a single site

Relation to the ECFA Detector Roadmap



Solid state

DRDT 3.1 Achieve full integration of sensing and microelectronics in monolithic CMOS pixel sensors MALTA, DECAL, 65nm MAPS

DRDT 3.2 Develop solid state sensors with 4D-capabilities for tracking and calorimetry LGAD

DRDT 3.3 Extend capabilities of solid state sensors to operate at extreme fluences EUROLABS, RD50

DRDT 3.4 Develop full 3D-interconnection technologies for solid state devices in particle physics

Did Phil build the BILPA to meet the needs of the ECFA R&D roadmap, or vice versa?

Some wider contributions in Birmingham

UG Teaching … 1st year Tutor
2nd year Laboratory
2nd year Quantum Mechanics lectures
2nd year Electronics lectures
4th year Masters projects

PG Teaching … Lectures on particle detectors etc for PTNR Masters

PhD training … main or co-supervisor of 5 PhD students, past and present

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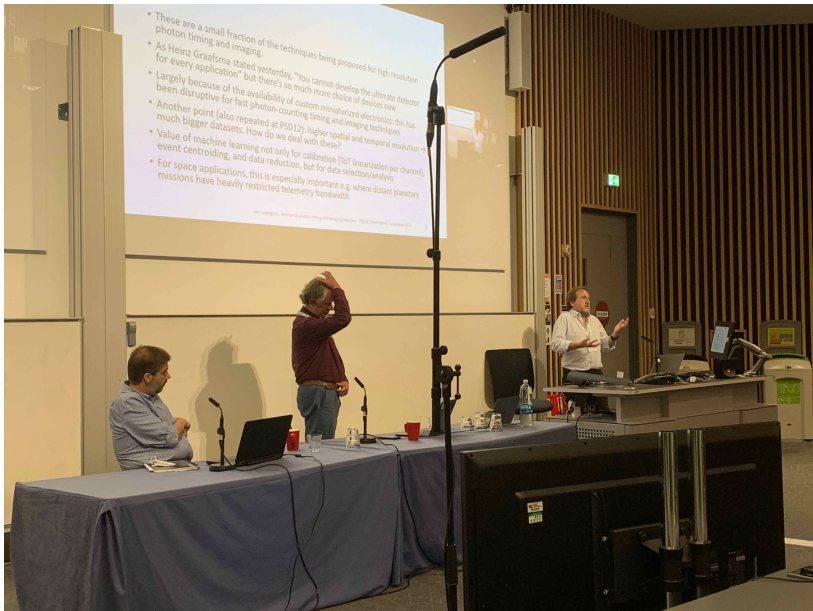
Lead-organiser of one of the first conferences to re-introduce an 'in-person' mode, post-COVID

12th International Conference on
POSITION SENSITIVE
DETECTORS



Selected Citizenship Roles

- Chair of STFC PPAP, fellowships panel, non-core science board member
- Chair of PPARC technology panel, PPESP and PPC member
- Chair of IoP HEPP group

… and chair of the 'Particle Physics Action Group' at a time of existential crisis for the field (with Brian Cox, Brian Foster, Mark Lancaster, Ken Peach, James Stirling).

See Joost's talk for full details

Quoting Phil:

"We were known within STFC as the `paramilitary wing of the IoP' and the entire PP community was dubbed The Borg, a reference to Star Trek and the failure at the time of the research council to try and split the community to help drive through their programme."

Connections to Parliament

… giving evidence to Science and Technology Select Committee

… taking MPs to CERN (Esther McVey), leading to mention at PMQs …

Hansard, 4 July 2012

Esther McVey >
(Wirral West) (Con)

Share

Today is a hugely significant day for British scientists with the announcement of the Higgs boson discovery. Some 6,000 scientists worked on it worldwide—700 from the UK—and there was a major contribution from the north-west. A constituent of mine, Professor Phil Allport, head of particle physics at Liverpool university, led the ATLAS experiment. Will the Prime Minister confirm this Government's commitment to science and to institutes in the north-west?

The Prime Minister >

Share

My hon. Friend is absolutely right to raise this issue, the immense British contribution there has been to this extraordinary breakthrough—not least that of Higgs himself—and the extraordinary work that, as she says, is done in the north-west of England. It is a very big step forward and we should congratulate everyone involved. This Government's commitment to the science budget is without any doubt, not least because although we have had to make difficult cuts, we have preserved the science budget.

Were these pictures taken in R1?

(currently on the back-benches)

Recent Recognition

2022 IoP Chadwick medal and prize

… awarded to Professor Phil Allport

"for broad contributions to particle physics instrumentation, most notably in the establishment of radiation-hard silicon sensor technologies and their deployment in large experiments".

Final Words

- Some of Phil's qualities …
  - Tenacity
  - Conviviality
  - Generosity
  - Modesty
  - Straight-talking
  - Hands-on

- Hard to believe he has only been a Brummie for 8 years!

- This is not the end - just the end of the less-enjoyed bits

Thanks from all of us in Birmingham!