A large particle detector, likely the ATLAS experiment at CERN, is shown from a perspective looking down its length. The detector is composed of many layers of sensitive material, including a central calorimeter and outer tracking chambers. A person is standing on a walkway in the center, providing a sense of scale. The detector is surrounded by a complex network of cables and support structures. The overall scene is brightly lit, highlighting the intricate details of the machine.

# Particle Physics

investigating the nature of matter

# Who are we?

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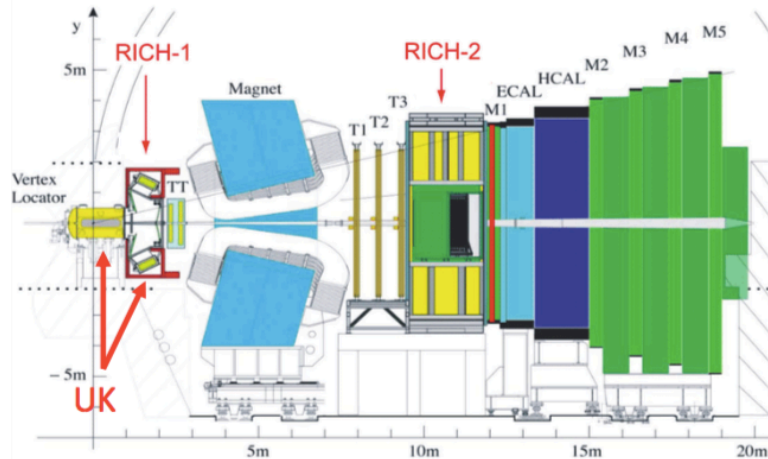
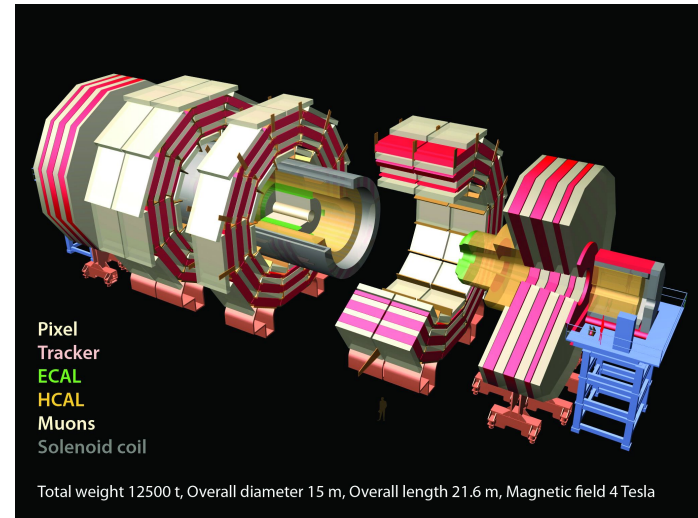
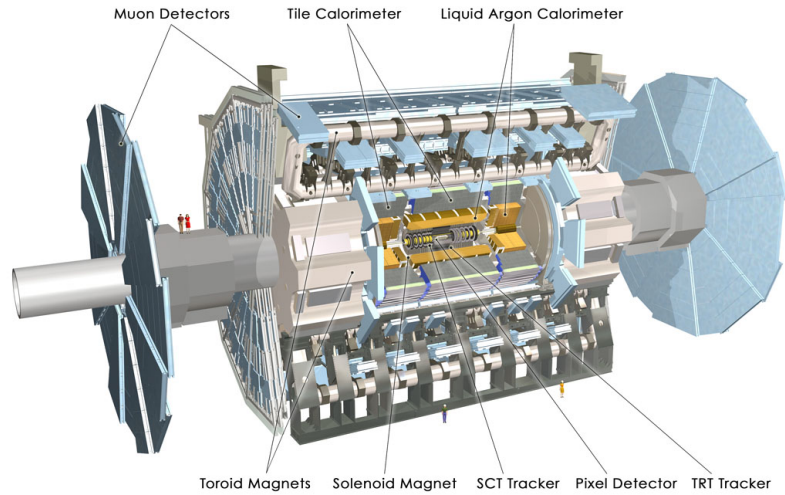
- Rutherford Appleton Laboratory is the UK's largest National Laboratory.
- Founded as a Particle Physics research laboratory it now houses the RAL Particle Physics Department for the whole of the UK.
- Department has approximately 70 staff.
- PPD is on all major particle physics experiments in the UK.
- Work with Technology Department. Access to engineering expertise. Scientific Computing dept. – hosts Tier 1.

# Areas of Expertise – PPD & TD

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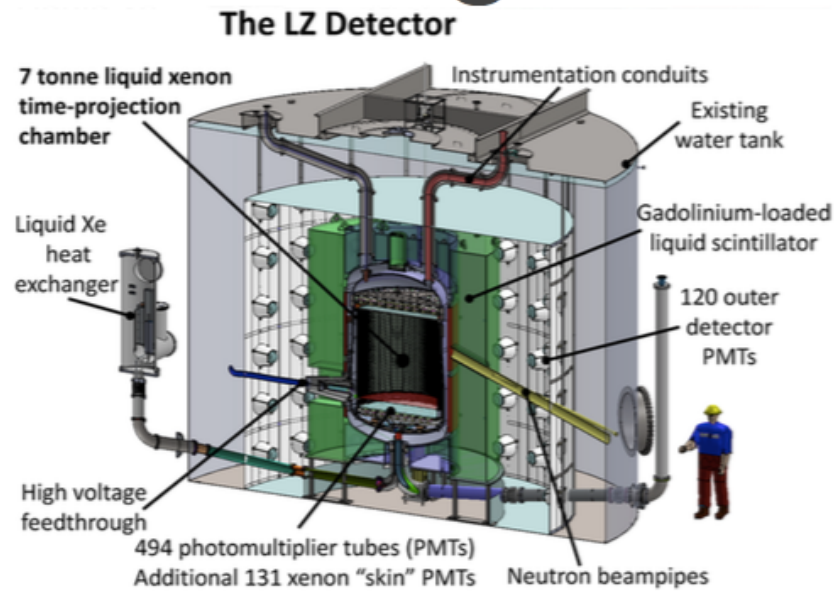
- High speed electronics and data acquisition architecture
- Silicon sensors
- Photon detection
- ASIC chip design
- Mechanical engineering for large scale complex stressed structures
- High power target design
- Cryogenics and noble liquids
- High throughput and high performance large scale computing systems
- Large scale calorimetry
- Complex software for data processing and pattern recognition.
- Data analysis

# LHC experiments

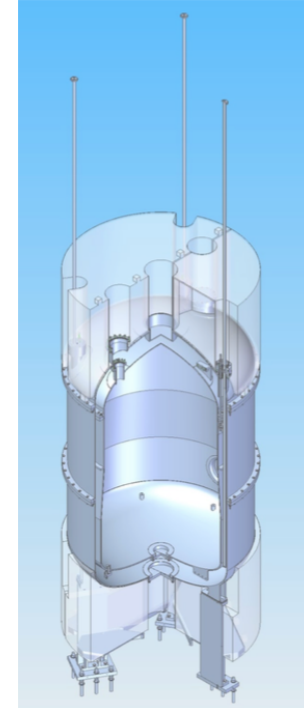


Only place in the UK with ATLAS, CMS and LHCb groups

# LZ experiment



Radiopure titanium



Delivered

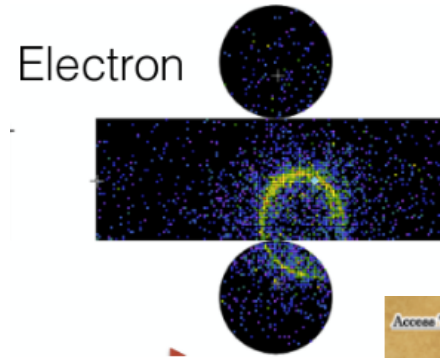
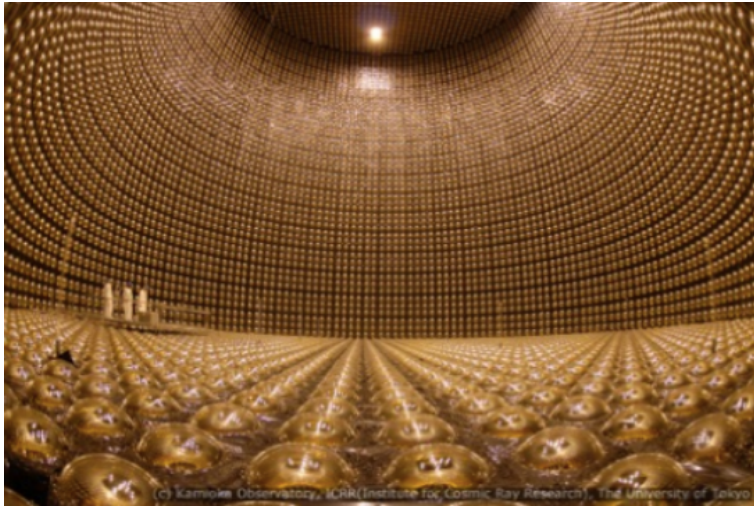


Not just DM

$2\beta 0\nu$

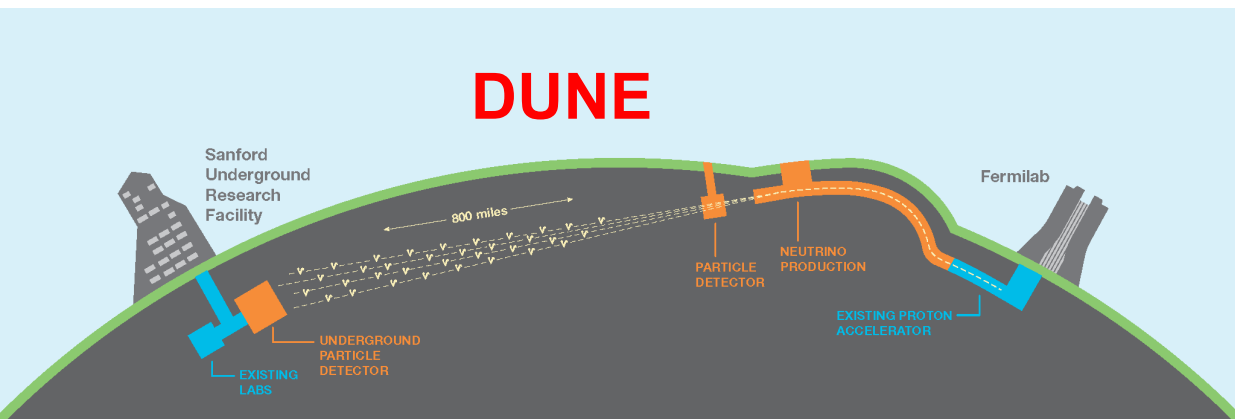
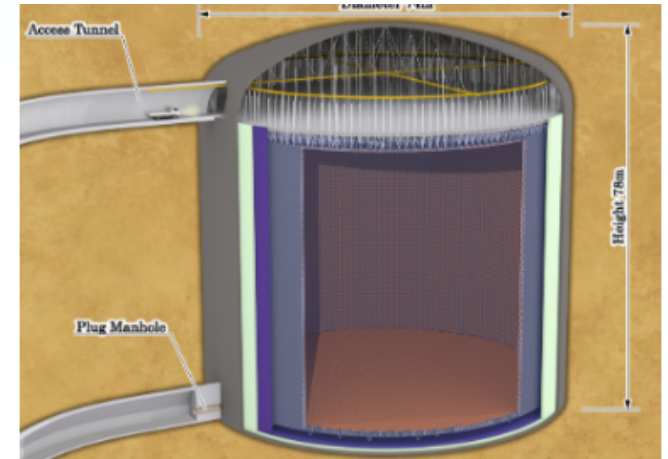
Solar  $\nu$

# Neutrinos



SuperK  
T2K

HK next generation





# Boulby Underground Laboratory

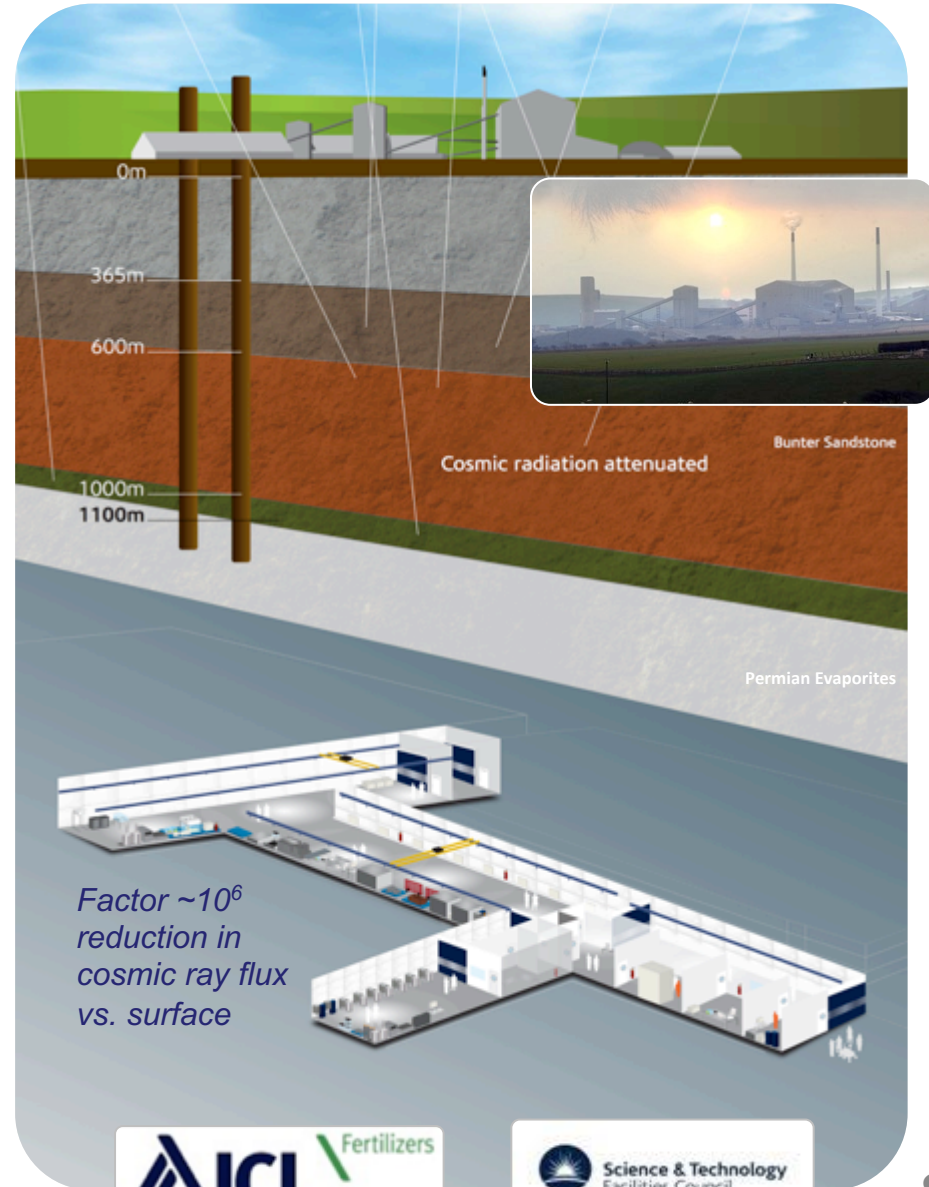
The UK's deep underground science facility operating in a working polyhalite and salt mine.

1.1km depth (2805 mwe). With low background surrounding rock-salt

Operated by the UK's Science & Technology Facilities Council (STFC) in partnership with the mine operators ICL



*New Lab open since 2017*



# Other things...

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- Detector R&D – Silicon sensors etc.
- Computing facilities – T1 and T2 plus accelerated computing.
- New experiments possibilities.
  - This year AION a new activity has a studentship.



# Studentships – Practical Info

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- PPD has 6 studentships available: ATLAS, LHCb, DM, Neutrinos and Medical Physics .
- RAL does not award degrees therefore all studentships are in association with a university. Usually 2 supervisors
- Studentships funded for 3.5 years. (All STFC for 3.5 years)
- All UK and EU nationals eligible. However only home fes available.
- Travel is funded and expected to CERN and other experiment sites.
- Discussion with supervisors for all posts.

# Studentships – Practical info

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- The standard university eligibility and qualification criteria must be met.
- Initial course work will usually be at the relevant university. Students will normally be resident at the univ. for the first two terms.
- The rest of the studentship will either be at RAL or the experiment site (e.g. LTA for CERN experiments).

# Today

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- Talks on experiments and PhD projects to follow.
- Lunch....
- Virtual visits this year.
- Informal chats with current students
- Slots for talking to supervisors follow tomorrow

# Important information

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If you expressed an interest initially in a particular studentship but would like to consider others please sign up in the available slots.

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Enjoy your day with PPD at RAL