



Examples of Outreach at a UK University

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(based mainly on Outreach talks from Birmingham colleagues Lynne Long and David Evans)









Dedicated Outreach Officer

- We employ a dedicated **School's Liaison Officer** – **Mrs Lynne Long** (physics graduate and ex-school physics teacher).
- Works ~90% of her time on outreach activities.
- **Essential for effective outreach**

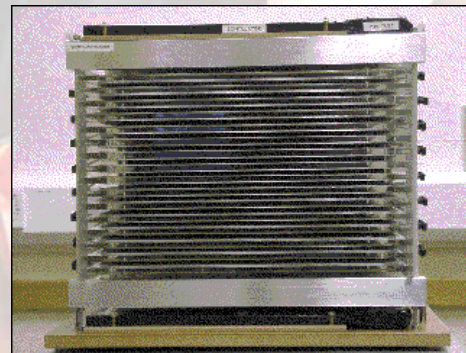


Lynne Long at CERN LHC



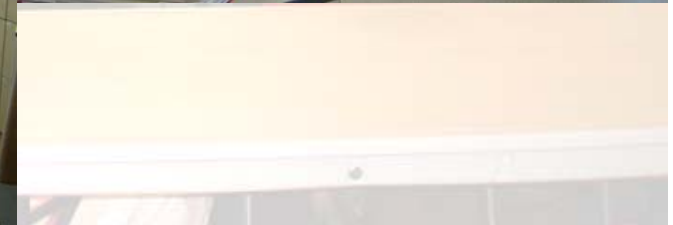
Going out to Schools

- 40-50 Demos/talks in schools (ages 11-18) – visits all over UK. Usually with liquid nitrogen (Lynne Long).
- 20-30 Spark Chamber demos to schools (mainly) in the West Midlands (Dr John Wilson).
- 20-30 specialist talks (particle, astro, nuclear, superconductivity, nanophysics, etc.).
- In total ~100 Talks and Demos in Schools around the UK each year.



Going out to Schools

- Plus Rocket Days – making and launching solid-fuel rockets ~ 60 pupils from ~ 15 schools.



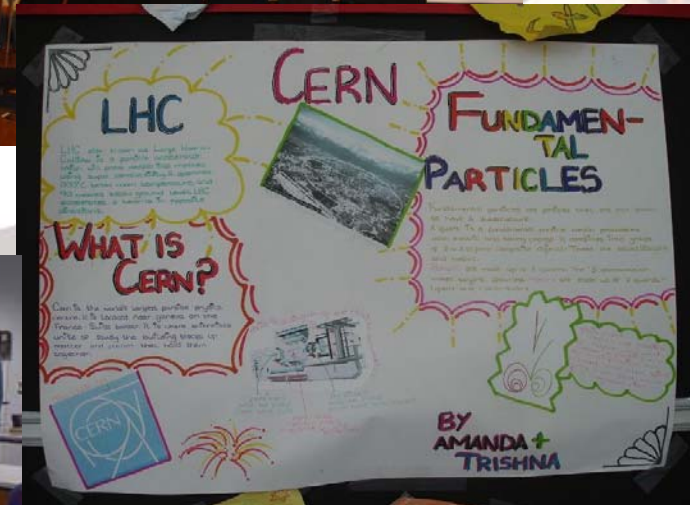
Conferences & Workshops

- Residential summer school for 17 year olds – every July (**40-50 students** UK wide) – 2 days.
- Teachers residential conference - 2 days ~ every 2 years (**30-40 participants** UK wide).
- 3 teacher network events/year (~ **20 participants**, local)
- 1 day teachers & technicians workshop every June ~ **30 participants**, local).



Quizzes, Activities, Competitions

- (13/14 year olds) 'Big Quiz'
 - Teams of 4 from local schools
 - ~180 children – medals/cups/prize
 - Hands-on workshop over lunch period
- 17 year olds Challenge/Activities day (June/July)
 - ~ 80 local participants (challenges with prizes + lectures/workshops)
- 14 year olds Poster Competition
 - ~ 80-100 local pupils
- Cascade of PP competition for 17 year old students
 - Finalist day – top prize is a trip to CERN.



Smashing particles: let's celebrate the LHC

Project sponsored by the Royal Society

It involves 2 schools (Yardleys from Birmingham and Netherhall from Cambridge) plus 2 scientists who acts as scientists 'in residence'

25 pupils in total, 16 years old

(Cristina Lazzeroni)

Organised as an after-school club: once a week over 4 months, plus a visit to Cavendish Lab and to Birmingham University

Masterclasses

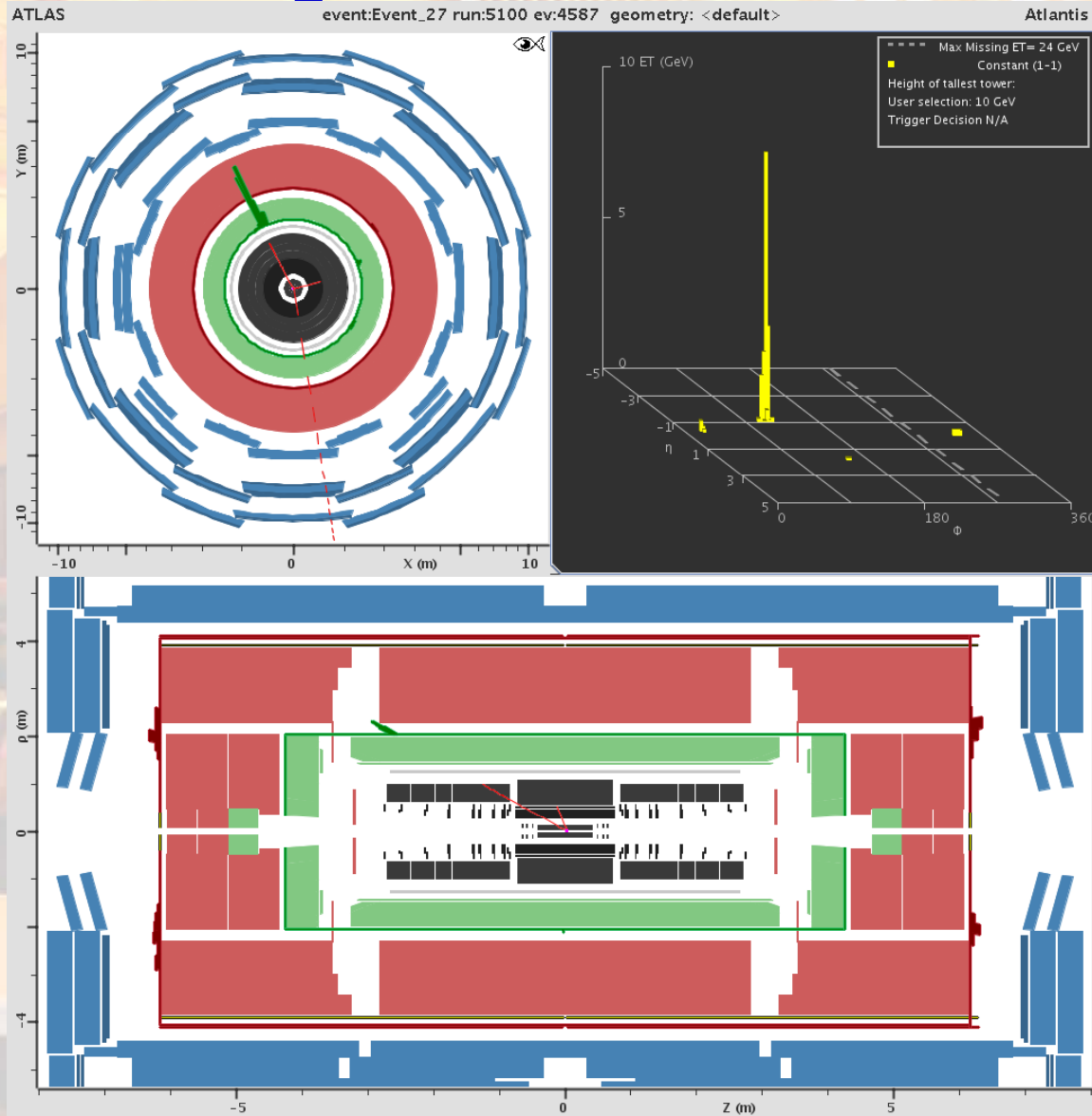
- PP masterclasses for 17 year old students
 - ~150 local students – 1 day event in April
 - ~30 local younger students for – ½ day.
- Astrophysics masterclasses for 17 year old students
 - 1 or 2 half days per year
 - 30-40 students each event
- Other masterclasses
 - 15 year old 'Hot + Cold' ~ 30 students
 - 12/13 year olds 'Rockets' ~ 30 students



RAL Masterclass (Monika Wielers)

- This year Masterclass hands-on exercise based on LHC using Atlas event display (Atlantis)
 - Scan a mix of various physics events and classify them in the categories $W \rightarrow e\nu$, $W \rightarrow \mu\nu$, $Z \rightarrow ee$, $Z \rightarrow \mu\mu$, QCD di-jet events
 - Calculate the ratio of W/Z production
 - Note each student will get different events
 - There are 2 $H \rightarrow 4l$ events in the whole batch and there will be a prize (ATLAS 3D viewer) for the groups who find them
 - Exercise can be done (hopefully) on real data next year
- RAL/Bham contributors: M. Stockton, P. Watkins, B. Scott, MW

Example: $W \rightarrow e\nu$ event



RAL Masterclass (2)

- RAL ATLAS exercise was used very successfully by ~500 students
- Exercise very easy to install and set-up
- Exercise a bit difficult for the students to start with but after the first events they get into it
- Hunting for the Higgs added quite a bit to the fun
- Exercise and instructions are in
 - http://hepwww.rl.ac.uk/pust/masterclass/atlasexercise08/masterclass_instructions.html
 - contains
 - zipped Atlantis version incl. data samples (500 events)
 - Introductory slides and slides of LHC-ATLAS lecture
 - Accompanying sheets (summary, Atlantis instructions, how to identify particles, example event for each category)
 - Overall results sheets with the various ratios
 - Html page still needs some improvements, but everything is there
 - Accompanying sheets will be improved using feedback
- Univ. of Birmingham will use this exercise later in April

Talks + Other

- IOP evening lectures – mainly 6th formers and teachers but GCSE & public also attend.
 - 6 per year (including one from me this year) ~ **250 participants** for my talk.
- Y11 (GCSE) ‘**Light + Sound**’ – talks with demos ~ **20** students.
- **Work experience** placements for Y 10/11/12 students – **30-40** students per year (1 week placements).
- Plus other activities but no time to talk about them.



UNIVERSITY OF
BIRMINGHAM

New National competition for 2007-8

a **Cascade** of Particle Physics in schools & colleges

STFC

An exciting Opportunity to....

Enhance your A Level studies

Develop Key Communication Skills

- *Make personal links with Research staff at a leading University*
- *Win money to help finance a trip to CERN*



CERN accelerator control room

What is involved?

- **Groups of A Level students are invited, with support from their teachers and particle physicists at Birmingham, to prepare a short presentation relating to particle physics, and then deliver it to another group of students, either at their own school or college, or to an invited audience from other institutions.**
- **The presentations will then be judged by a team from the University – Particle Physics experts and teachers – and the best six schools will be invited to a GRAND FINAL at the University – *provisionally scheduled for April 24th 2008* - where they will repeat their presentations in front of an invited audience, the team of judges and other competitors.**
- **TWO major cash prizes of £1000 and FOUR minor cash prizes of £500 will be awarded on the day, *to be used to help finance visits to CERN in 2008-9.***
- **Please see enclosed information sheet for details of competition rules and procedures.**

IF YOUR SCHOOL IS INTERESTED IN TAKING PART, PLEASE RETURN THE ENCLOSED FORM ASAP!!

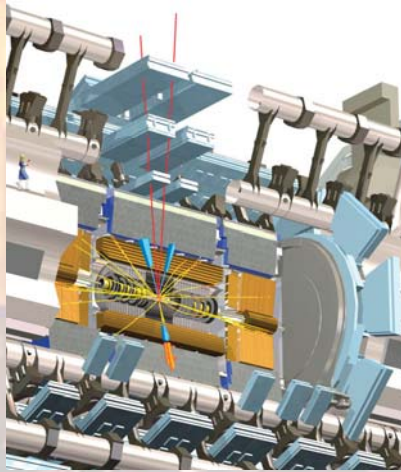


In 2008, it is expected that the Large Hadron Collider (LHC), the World's most powerful particle accelerator, will be running experiments at CERN in Geneva.

The experiments bring together thousands of scientists from dozens of countries - including the Particle Physics group at the University of Birmingham.

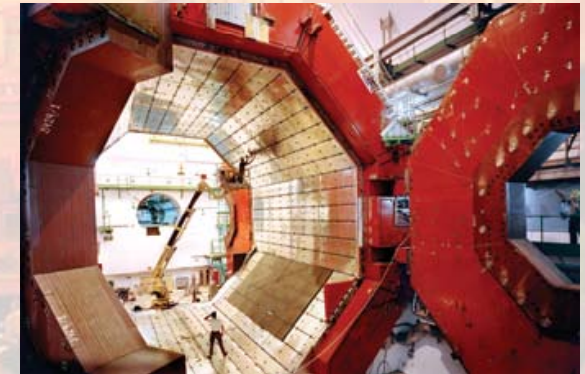


LHC Tunnel



Possible ATLAS event

The biggest detectors ever built will be investigating the origin of mass and studying the fundamental particles that were present at the beginning of the Universe.....



ALICE Detector

Particle Physics -

What do we already know?

What will be discovered next??

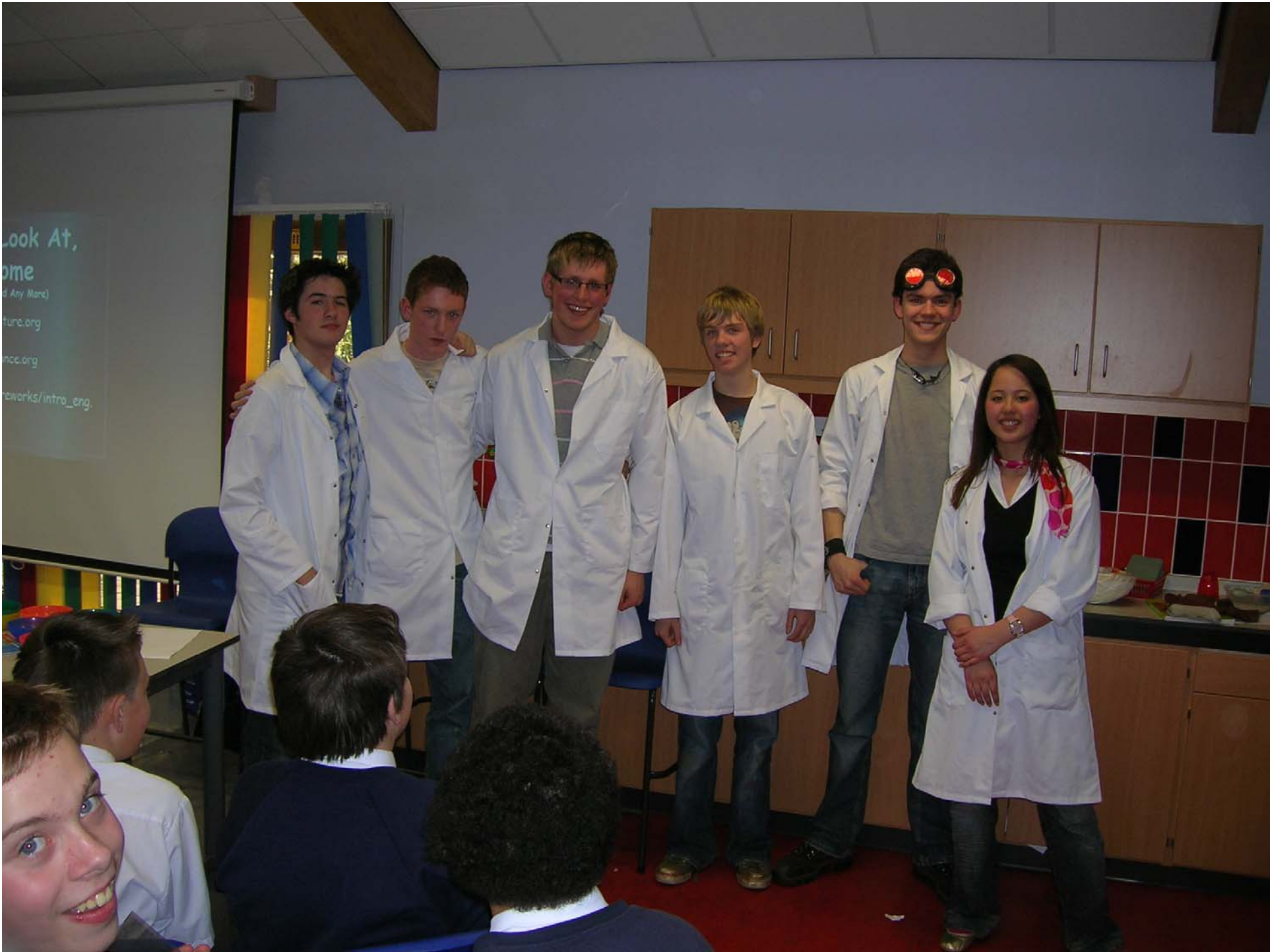


A world-wide computing Grid will be used to sort and analyse the vast amount of data collected in the experiments - selecting interesting events will be like looking for 1 person in a thousand World populations – one year's data from the LHC would fill a stack of CDs 20km high!



Schools - 'Cascade Competition'

- Third year of the competition
- Steadily increased the number of schools
- In 2008 - 41 schools registered, 150 students giving talks to over 1500 students(all over UK)
- Separate competition for talks to 13-14 year olds and those to older children
- Very impressed by the originality, quality and scope of the talks and demonstrations
- Select finalists to give talks at University (next week!)
- Many students can get interested and learn about Particle Physics and tell other students about it without taking too much teacher or researcher time



Look At,
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(d Any More)
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Particle physics and its
applications in medical science

By
Merchant Taylors' Girls' School,
Crosby



