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The right tool for the job

A new Initial Training Network is looking for early stage researchers to investigate electroweak symmetry breaking. HiggsTools comprises 10 teams from 37 European universities and research institutes including Durham University, UCL, CERN and four industry partners.

The main goal of the project is to provide excellent training to young researchers in the field of high energy physics, giving them the skills and expertise to make new discoveries about the fundamental nature of the Universe.

Electroweak symmetry breaking is one of the goals for the LHC and the 21 early stage researchers will spend three years gaining a PhD by looking at ways to extend theoretical and experimental studies. Some will become members of the ATLAS and CMS collaborations while others will benefit from a theoretical training.

The theory behind electroweak symmetry breaking dates back to 1964 and there is an expectation that, during the three-year lifetime of the HiggsTools network, analysis of data from the LHC experiments will either confirm that the new particle announced in July 2012 is the Standard Model Higgs boson, or that it is one of the bosons predicted by theories that go beyond the Standard Model. If it is the latter, this opens up a revolution in theoretical physics.

More information including eligibility to apply to join the network is available on the HiggsTools website and the closing date for applications is 31 May.

HiggsTools is supported by the 7th Framework Programme of the European Commission.

Real results

School visits to CERN really do influence the future career choices of the young people involved; Neston High School recently visited CERN for the 10th consecutive year and the students were shown around by a former pupil who is now a University of Liverpool researcher working on the ATLAS experiment.

Dean Forshaw was a Neston High School student on the first CERN trip organised by the University in 2004. He is currently developing detectors for ATLAS which will need to cope with up to 10 billion collisions per second and much higher radiation doses once the LHC is upgraded early next decade to become the High Luminosity LHC (HL-LHC).
“I never would have considered a career in particle physics without the opportunities and support given to me by Neston High School,” says Dean. “Ten years on from my first trip to CERN; I’m about to complete my PhD at Liverpool.”

This is the 10th year that the Institute of Physics and the University of Liverpool have sponsored the school to run these trips for their physics students. In that time there has been an increase in students picking physics for A Level and many, like Dean, have gone on to study the subject at university.

During the visit, the students saw the ATLAS experiment, LHC control centre, the magnet test facility and the control room for AMS, the anti-matter experiment on the International Space Station.

“Seeing CERN was an amazing experience,” says Neston student Cameron McAllister. “Talking to the scientists working there, some of whom had been to my school, just showed how far you can go by studying physics.”

Phil Allport (Liverpool) is leading the upgrade to the ATLAS detector, “I don’t think either Dean or I expected when we first met while he was a student at Neston High School that 10 years later he would be exploring technologies that will make operation of the HL-LHC possible. I very much hope that I’ll be working alongside some of this year’s students in the future as well.”

I’m a (winning) scientist

CERN and the people who work on its experiments are proving a winning combination in ‘I’m a Scientist, get me out of here!’, the online X factor style competition where school students meet and interact with scientists. In the latest event, the final of the nuclear zone was dominated by CERN researchers, with Clara Nellist (LAL, Orsay and ATLAS) just edging out Thomas Cocolios (Manchester and ISOLDE) to take the winner’s crown.

The two week competition allows school students to quiz researchers about any and every aspect of science during intense, fast-paced, online live chats. For teachers, the event supports the ‘How science works’ curriculum. For students, it is often their first opportunity to engage directly with people working at the forefront of science and gives them the chance to find out what life as a full-time researcher is like – the highs, and the lows.

A combination of peer pressure and personal recommendation encouraged Clara and Thomas to take part. “The fact that it was specifically about Nuclear Physics, I felt that someone from ISOLDE should most definitely take part,” says Thomas. “As it was also funded by STFC (so is my Ernest Rutherford Fellowship), I thought it was a nice way to endorse the event and give some of my time back to my supporting body.”

“I recently moved to France to start a post-doc,” says Clara, “and my French still needs some work before I am able to do outreach here, so ‘I’m a Scientist’ allowed me to share my research with students in the UK without leaving my desk (or getting on a plane).”

“The event was split into live chats with the students (30 minutes per class), and posted...
questions to be answered later. I really enjoyed the live chats because it allowed the students to probe deeper into our answers. From the posted questions my favourite was ‘How will the research of the scientists at CERN with the Large Hadron Collider expand our understanding of the Universe?’ but a close second was ‘My friend wants to be an astronaut so what do you think she should do about like tests an’ all that?? ;)' [sic].”

Thomas’ favourite question was ‘How does your faith/beliefs affect your research?’ “I think that it is quite a deep question that goes beyond the atomic nucleus and goes to the root of being a scientist. Everyone should consider this carefully at one point or another. I was quite impressed by the wide range of questions, going from faith to aliens, from cancer research to black holes, from my favourite football team to funding and prospects in research.”

Of course, the aim of the event is to inspire students to pursue STEM subjects at university and beyond, but what did Clara and Thomas gain from the experience?

“Apart from it being a really enjoyable two weeks of sharing my research and love of science with enthusiastic young people, it also forced me to re-think how I answer questions to non-specialists,” says Clara. “And it gave me a reason to spend my evenings reading about nuclear submarines and exoplanets; the students didn’t just want to ask nuclear questions, but also how the brain works, if there are aliens and could we live on other planets? Not to mention what is antimatter and can we cure cancer? I also enjoyed how friendly the chats were. I know it was a competition, but all of the scientists got along really well and I enjoyed learning about their research.”

Thomas agrees, “I met some really nice STFC-funded scientists in my zone and got quite challenged by some of the questions. I also had to research some to answer them accurately and learned a bit of Latin in the process! I hope that I have inspired some students to go into science, be it nuclear or anything else. Asked what they would say to a fellow scientist thinking about taking part in a future 'I'm a Scientist', both researchers were extremely enthusiastic:

“You should!” says Clara. “It's a brilliant experience. It's also a great way to start getting into outreach if you've not talked to the public about science before. But clear your schedule, it's worth putting the time into it.”

“It is a wonderful experience, though demanding for two weeks,” agrees Thomas. “You will not regret any minute of it and you should most definitely join in the fun!”

Interested? The next 'I'm a Scientist' event will be held in June. The zones will include extreme energy, lasers and astronomy. If you think your research would fit within one of these zones, why not apply. The parallel 'I'm an Engineer’ event is also looking for participants for the Apprentice zone.

More information for scientists, engineers, apprentices and teachers is available on the ‘I'm a Scientist’ website.

A world a particle

120 years of particle physics research and development at the University of Liverpool is being celebrated at the city’s Victoria Gallery and Museum.

The ‘A world a particle’ exhibition is demystifying the past, present and future of particle physics and showcasing the university’s contribution to this area of science.

With three Nobel laureates among the Physics Department’s alumni, involvement in three of the four LHC experiments and world-leading
expertise in developing detectors that can withstand radiation-rich environments, the university has a rich source of material from which to draw.

Alongside pieces of equipment and components from experiments that have furthered our understanding of fundamental physics, there is the opportunity to conduct your own hunt for the Higgs boson, watch a 3d film and have a go at other interactive activities.

‘A world a particle’ runs until 8 January 2016 and entry is free.

New fund to inspire new audiences

The UK government’s Department of Business, Innovation and Skills has just launched the BIS Science and Society Community Challenge Grant Scheme. With £500,000 allocated to the scheme, it is intended to support individuals and organisations to create and run pilot projects which take science to diverse audiences, and engage them with science in their own communities.

The scheme is targeted at audiences that are under-served by existing activities, and aims to inform, inspire and involve them in science. The scheme provides the opportunity to investigate and test new methods of engagement and participation.

Three levels of project funding are available: up to £10,000, up to £20,000 and up to £40,000, depending on the size and difficulty of the project.

The scheme is open to a wide range of people, including scientists and researchers, teachers and science communicators, museums, community groups, churches, games developers and film makers.

More information (including terms and conditions) is available on the BIS website and the closing date for applications is 16 May.

And finally…

Social media is alive with apps that will tell you, based on a series of improbably vague questions, which character you are from your favourite film, or where in the world you should live.

But now, the app that you have all been waiting for is finally available – which large LHC experiment are you?

ALICE, ATLAS, CMS and LHCb – which one are you? © CERN

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Diary dates

Collider exhibition in London until 6 May
Collider in Manchester 23 May–28 September
CERN Council – 16 – 20 June
A world a particle - until 8 January 2016