

Daresbury Open Week 2023

Free KS5 Masterclass event 10th or 11th July 2023

As part of the Sci-Tech Daresbury Open Week, we are offering a choice of two dates for our one-day Key Stage 5 masterclass, which will run in addition to activities being delivered on campus to school children from upper primary through to upper secondary schools.

- Monday 10 July: Key Stage 2 & Key Stage 5 Option 1
- Tuesday 11 July: Key Stage 3, Key Stage 4 & Key Stage 5 Option 2

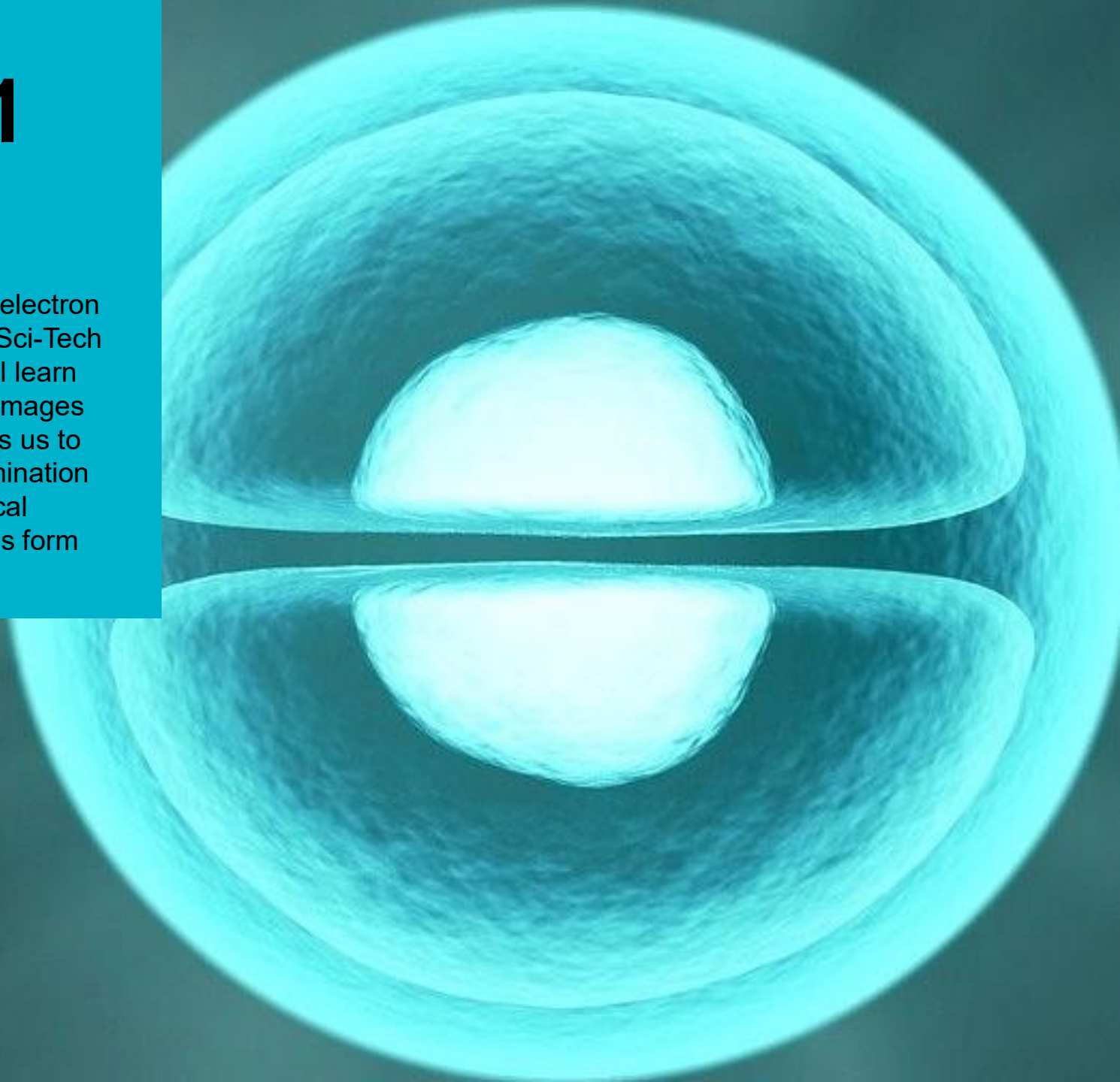


These exciting days of talks, tours and interactive workshops will fire your students' imagination and inspire them about cutting edge science and technology, as well as STEM career opportunities.

KS5 Masterclass 1

Workshop: Electron Microscopy

Be prepared to be taken to one of the world's most powerful electron microscopes, located in the SuperSTEM facility here on the Sci-Tech Daresbury Campus. In this interactive workshop students will learn how and why we need to use electrons to produce inspiring images at a huge range of magnifications which at it's extreme allows us to undertake direct imaging of atomic structures and the determination of elemental bonding. Students will learn that the technological developments incorporated into the SuperSTEM microscopes form some of the most precise optics ever used in science.



KS5 Masterclass 2

Workshop: Scientific Computing

Did you know that computational science and engineering is vital for research into complex fields such as the origins of life, how medicines work in cells within the body, and designing new materials that could help us live on Mars? Did you also know, that computational science and engineering has contributed to the development of many everyday items such as cosmetics, tablets and vacuum cleaners? Although covering many different topics, computational science and engineering always follows the same procedure, whether it is being used to explore the air flow over a vehicle or looking at how molecules attach themselves to proteins within cells.

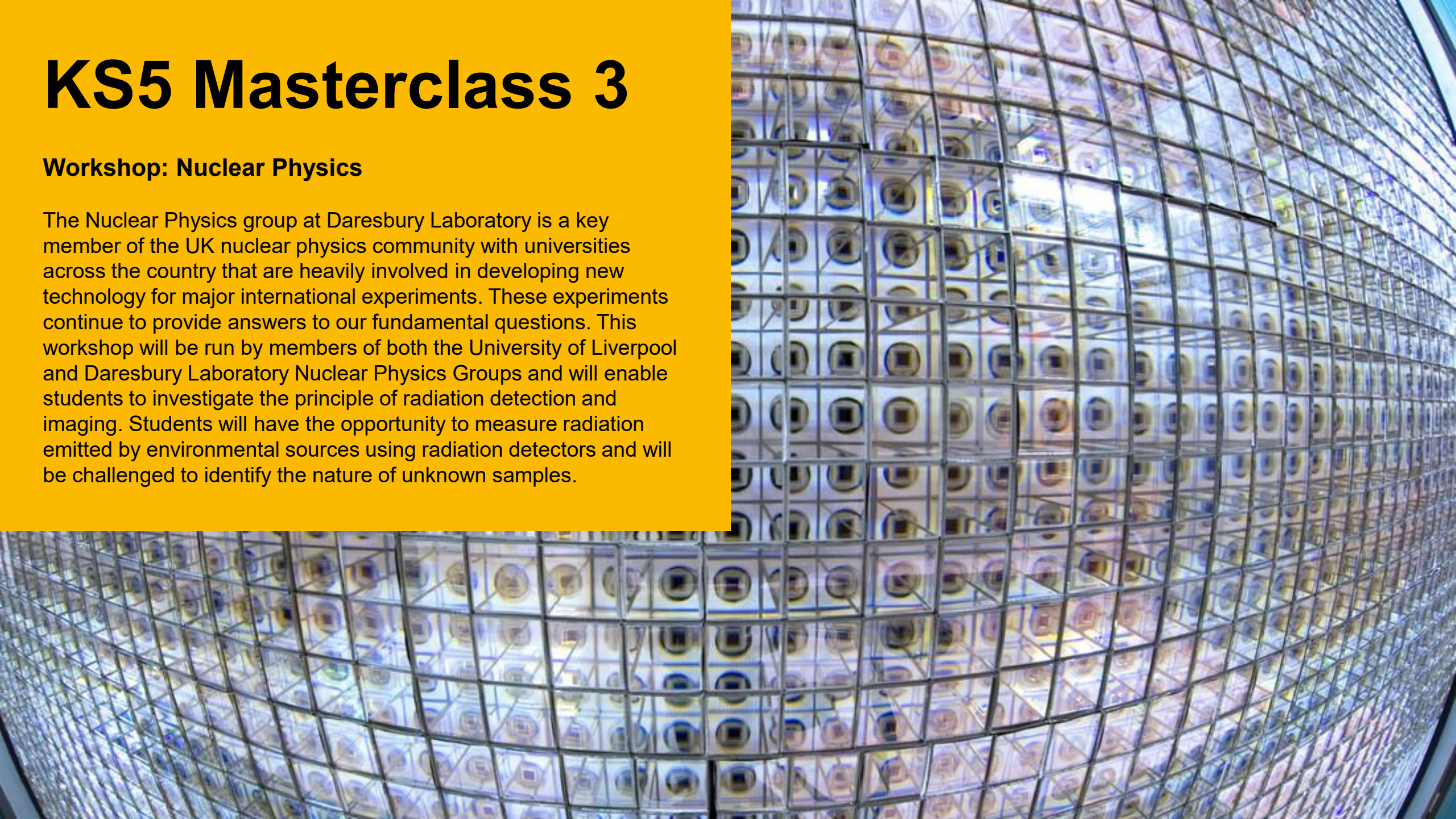
This workshop will introduce students to that procedure, also known as 'scientific modelling'. Students will become a computational scientist / engineer, whilst our real scientists and engineers guide them through the modelling methods required to explore the world of scientific simulations.



KS5 Masterclass 3

Workshop: Nuclear Physics

The Nuclear Physics group at Daresbury Laboratory is a key member of the UK nuclear physics community with universities across the country that are heavily involved in developing new technology for major international experiments. These experiments continue to provide answers to our fundamental questions. This workshop will be run by members of both the University of Liverpool and Daresbury Laboratory Nuclear Physics Groups and will enable students to investigate the principle of radiation detection and imaging. Students will have the opportunity to measure radiation emitted by environmental sources using radiation detectors and will be challenged to identify the nature of unknown samples.



KS5 Masterclass 4

Workshop: Accelerator Technology Centre (ASTeC) Demonstrations

This workshop will be based in the Cockcroft Institute at Sci-Tech Daresbury, and we will show students how a particle accelerator works, using visual demonstrations. A Van de Graaff generator can not only make your hair stand on end, we show how we can use the same effect to accelerate a charged particle. Students will learn how superconductivity can make a train 'float' above a magnetic track, and will be shown why superconductivity is an important technology in particle accelerators. Our scientists and engineers will explain how magnets can be used to steer and focus particle beams, and show off some of the amazing properties of laser light, which plays a crucial role in particle accelerator technology. Students will leave with a greatly enhanced understanding of the underpinning physics behind particle accelerator technology, and the purpose of these great machines.



KS5 Tours

CLARA

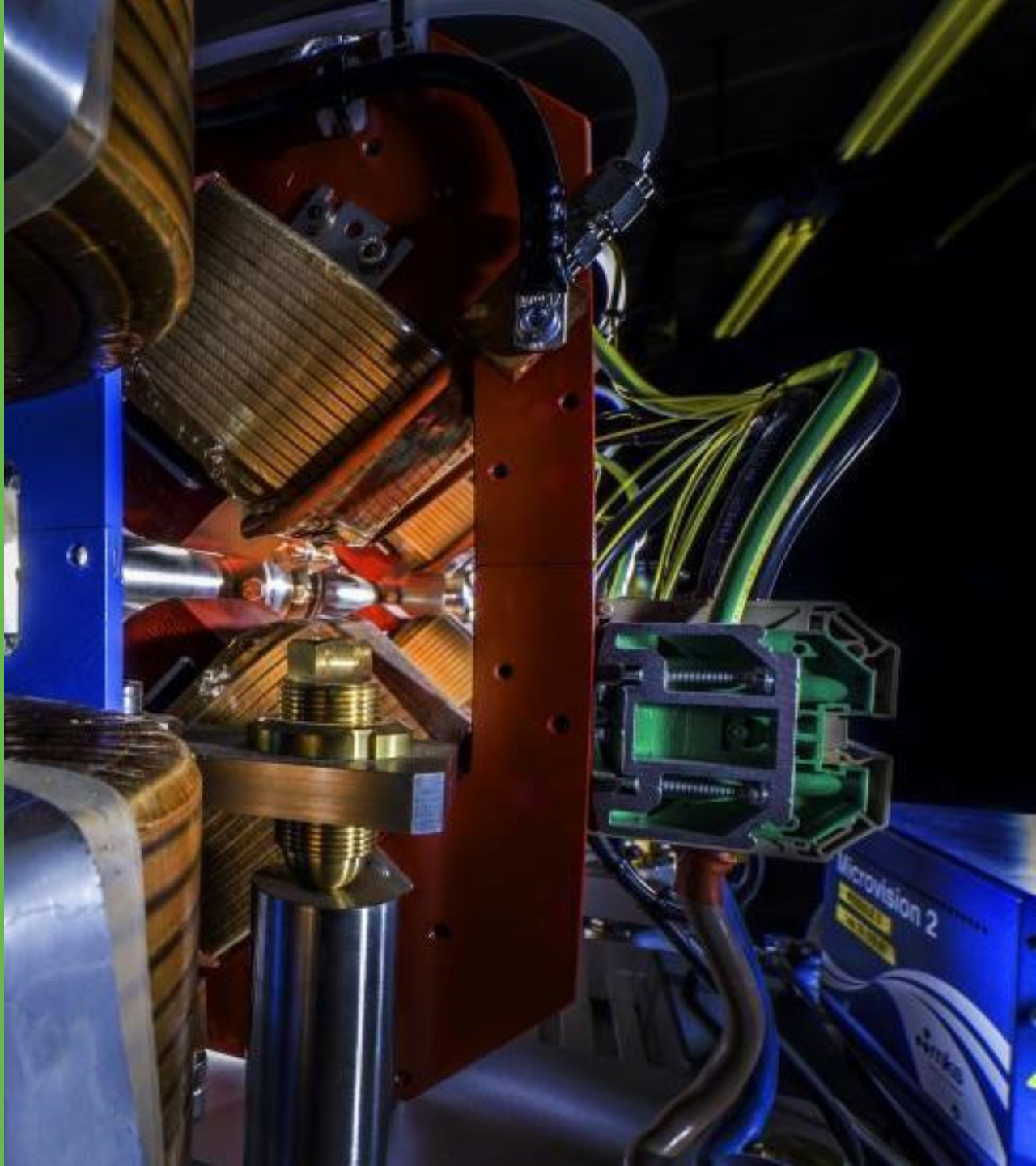
Experts at Daresbury Laboratory are constructing CLARA (Compact Linear Accelerator for Research and Applications) which is a world first facility designed to develop, test and advance new technologies and techniques for the next generation of Free Electron Lasers. These machines have the potential to tackle global challenges from drug development to the production of hydrogen fuels by looking at the atomic scale with unprecedented speed.

DUNE

DUNE (the Deep Underground Neutrino Experiment) is a flagship international experiment run by the United States Department of Energy's Fermilab. It involves over 1000 scientists from 31 countries. Various elements of the experiment are under construction across the world, with the UK and Daresbury Laboratory taking a major role in contributing essential expertise and components to the experiment and facility. DUNE aims to advance our understanding of the origin and structure of the universe. One area of study is the behaviour of neutrino particles and their antimatter counterparts, antineutrinos. This could provide insight as to why we live in a matter-dominated universe and why the universe survived the Big Bang.

VISTA

VISTA lab is a research and development facility for future accelerator technologies. We are looking to improve the sustainability, cost and performance across present and future accelerators. We investigate thin films for improving vacuum conditions, photocathodes for electron emittance and superconducting materials to accelerate particles. VISTA lab contributes to high impact worldwide science programs, these include CERN in Geneva, DESY in German, ISIS II and the Diamond Light Source here in the UK



Wonder Marquee

The Daresbury Open Week Science Wonder Marquee will be a celebration of the Science and Technology being delivered both locally in the North West of England, Nationwide and Internationally. Many exhibitors (including local Universities, Science Discovery Centres, National Sci-Tech companies and National Laboratories) will be on hand to engage pupils in a variety of hands on activities and demonstrations, to showcase the excitement that comes from working within Science, Technology, Engineering and Maths.

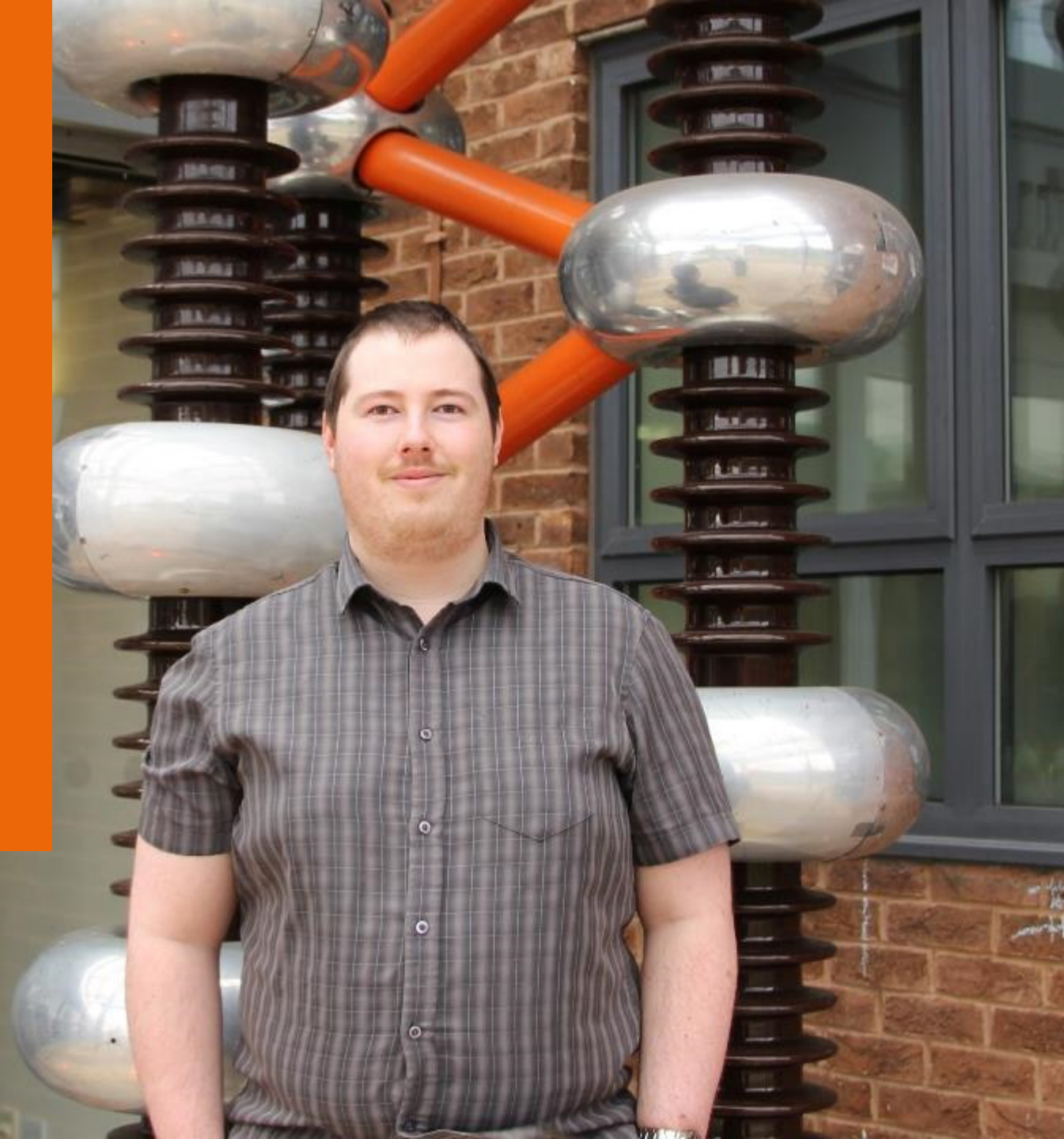


KS5 Inspiring Talk

Dr Alex Bainbridge, Magnet Physicist & Outreach Lead

Title: “Particle accelerators: Shining light on the unseen world at Daresbury”

Particle Accelerators are some of the most powerful, versatile and impressive instruments of modern science. Daresbury Laboratory has been at the forefront of the development of these machines for over half a century, designing and building accelerators for purposes ranging from high energy particle physics to x-ray production for cancer treatment. This lecture delivered by Dr Alex Bainbridge of the Daresbury Laboratory Accelerator Science and Technology Centre (ASTeC) will explain the history behind the development of this technology at Daresbury Laboratory, with a particular bias towards using accelerators as light sources to produce synchrotron radiation. We will discuss the past, present and future of these incredible machines, how we build them, and most importantly, *why* we build them.



KS5 Timetable

Time	Group 1 (25 max)	Group 2 (25 max)	Group 3 (25 max)	Group 4 (25 max)	Group 5 (25 max)
08:45 - 09:30	Arrival				
09:30 - 09:45	General Introduction				
09:45 - 10:30	Electron Microscopy	Scientific Computing	Nuclear Physics	Tours	ASTeC Demonstrations
10:30 - 11:15	Scientific Computing	Nuclear Physics	Tours	ASTeC Demonstrations	Electron Microscopy
11:15 - 12:00	Nuclear Physics	Tours	ASTeC Demonstrations	Electron Microscopy	Scientific Computing
12:00 - 12:45	Tours	ASTeC Demonstrations	Electron Microscopy	Scientific Computing	Nuclear Physics
12:45 - 13:30	Lunch				
13:30 - 14:15	ASTeC Demonstrations	Electron Microscopy	Scientific Computing	Nuclear Physics	Tours
14:15 - 15:00	Science Fair				
15:00 - 16:00	Inspiring Science Talk				
16:00 - 16:45	Evaluation and Departure				

Registering your Interest

Registration for expressing an interest in attending is now open with registrations closing at **11pm on Wednesday 22 March 2023**.

All schools/colleges/colleges will be contacted via email by **Wednesday 29 March 2023** to confirm whether or not they have been successful in gaining a place.

We will put all schools/colleges who have not gained a place on a waiting list to be contacted should places become available.

If you want your pupils to find out how science and technology is changing the world, then please register your school's interest via the link below.

Register now: <https://www.smartsurvey.co.uk/s/UXEJQ1/>



Important information

1. Due to the vast amount of effort required for delivery, this is a special event delivered just once every four years
2. This event will involve over 100 staff including scientists, engineers and support staff based at Sci-Tech Daresbury and our partner organisations
3. This event will use public funds to enable schools/colleges to attend this event free of charge
4. Key Stage 5 groups will need to organise their own transport to and from the event
5. Head Teachers from successful schools/colleges will be required to give a written guarantee of attendance on behalf of their schools/colleges
6. All students in attendance on the day will be split into groups of up to 25, therefore we may need to split larger schools/colleges college bookings up to ensure that we accommodate the maximum number of participants possible. We will contact you in advance if we are splitting your students up.
7. Pupils, teachers and other accompanying adults will need to bring a packed lunch
8. Due to the volume of schools/colleges on site, we request that all pupils wear schools/colleges uniform to be easily identifiable during activities that involve multiple schools/colleges participating together
9. A full information pack will be sent out to schools/colleges who successfully gain a place prior to the event

How places will be allocated

- There will be 125 pupil places available on each day (250 places in total) for KS5 students to participate.
- Allocated student places will reflect the different localities of schools/colleges who register for the event.
- Student places will be allocated by a series of blind ballots with the following weightings across the two days:
 - ~75 places will be reserved for students from hyper-local schools/colleges within Halton and Warrington;
 - ~90 places will be reserved for students from local schools/colleges from Cheshire West and Chester, Halton, Knowsley, Liverpool, Salford, St Helens, Trafford, Warrington, Wigan, or Wirral;
 - ~85 places will be reserved for students from schools/colleges from any location

Ask Wendy

UKRI believes that everyone has a right to be treated with dignity and respect, and to be provided with equal opportunities to flourish and succeed in an environment which enables them to do so. We also recognise and seek to maximise the benefits achieved by diversity of thought and experience within inclusive groups, organisations and the wider community.

We work hard to provide young people with opportunities that will open their eyes and minds to science and technology. We love what we do here and want to share that passion with as many young people, from as many different backgrounds, as possible. If you are thinking about registering your school, but have questions, just ask. It could be about physical accessibility, suitability for young people with SEND requirements, links to the curriculum, getting to Daresbury...whatever your question, big or small, get in touch.

If you have any questions that we have not answered, please contact Wendy Cotterill [by email](#) or call 01925 603408.



Register now at:

<https://www.smartsurvey.co.uk/s/UXEJQ1/>