

IOP PAB GROUP
NEWSLETTER

Issue 17

June 2018

Editorial

Welcome to the June 2018 edition of the IoP's Particle Accelerator and Beams Group Newsletter. As you can see from the contents opposite, our PABG members have been keeping busy in the six months since our last edition. Topics range from the computer design stage, through implementation and to the useful applications of our work.

As always, a range of this work was described by leaders in the field at our PAB Group Annual Meeting on 18 April, hosted by Lancaster University with help from Graeme Burt, who provided us with a great day. The meeting was a great success as can be seen from the meeting item in this Newsletter. We like to get reports from the Cockcroft and John Adams Institutes and they were provided by the Directors Peter Ratoff and Andrei Seryi, respectively. We were also informed that Andrei will be leaving the JAI to move to Jefferson Laboratory in the USA. So, thank you Andrei for your service to our community and our best wishes for the future!

The meeting kicked-off with a talk from Stewart Boogert of RHUL on the progress of the (recently published) [STFC Accelerator Strategic Review](#). Stewart was Chair of the Review Panel composed of a range of international experts across the accelerator and beams field. The Review looks at several accelerator 'themes' and provides recommendations to STFC management on where to target investment and resource for the accelerator programme, taking into account strategic direction from government, current funding landscape, areas of UK leadership and enabling technologies and synergies. The recommendations are also expected to inform the new research umbrella organisation UKRI's ongoing [UK Infrastructure Roadmap](#), which is due to report next Spring. So it is well worth the read!

I would like to thank Liverpool University's Andi Wolski who gave a great PABG [Prize talk](#) on the Irish physicist/astronomer William Rowan Hamilton. Many people remarked afterwards on how much they enjoyed it.

Other presentations and information are available from our [PABG website](#).

We also announced this year's PABG Prize winner Richard Walker of the Diamond Light Source 'For his exceptional contribution to the design and development of internationally pioneering modern light sources, for his outstanding leadership at the Diamond Light Source and its future development and his seminal contributions to the evolution of next-generation light sources'. On receiving the award Richard said 'I would like to say that being awarded the PAB Group Prize came as a complete surprise, and I feel greatly honoured to be recognised in this way by the Particle Accelerator and Beams community. I am lucky to have been working in the field of accelerator based light sources for more than 40 years and been involved in several new developments and projects, some more successful than others! But overall the progress over this period has been quite remarkable. Of course this is by no means the end and there are equal, if not greater, developments likely in the next few decades. This has been, and will continue to be, an exciting period for accelerator based light sources. I am very pleased to have played a small part in it and I am very honoured to be recognised with this Prize'.

The PABG Poster Prize for 2018 was awarded to Agnese Lagzda of the University of Manchester for her poster 'Very-High Energy Electron (VHEE) Studies at CERN's CLEAR User Facility'. Congratulations again Agnese!

Finally, there is a list of upcoming workshops and conferences, etc. at the end of the Newsletter. And remember to follow us on Twitter at [@PartAccelBeams](#) if you are so inclined. Any feedback, comments questions, please contact me.

[Brian McNeil](#).

Group Chair.

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News from the Laboratories — Daresbury

Testing Next Generation of Cancer Treatment

Technology at the heart of the Large Hadron Collider is being developed in the North West to treat cancer. A new proton therapy assembly and test facility will be built at the STFC Daresbury Laboratory in a collaboration with British firm [Advanced Oncotherapy](#).

The treatment produces fewer side effects than conventional radiotherapy. It uses beams of protons – part of the atom – to target cancerous tumours precisely while limiting damage to surrounding organs or tissue. Offering higher disease-free survival rates, proton therapy is most



Daresbury Laboratory
(Credit: STFC)

often used to treat brain tumours in young children whose organs and tissues are still developing, or cancers adjacent to critical part of the body (liver, lung, head and neck, prostate, breast).

Advanced Oncotherapy said the Laboratory, at the Sci-Tech Daresbury Campus in the Liverpool City Region, will become the mass-assembly and testing location for the next generation of proton particle accelerators. It said its 'LIGHT' system is expected to be the first commercially available linear proton accelerator and would be a milestone advancement in cancer therapy.

UK Science Minister Sam Gyimah said, 'Almost all of us have been affected by cancer in some way, whether that's receiving treatment ourselves or through people we know who have battled the disease. Today's investment will help develop the next generation of treatments and could take us one step closer to finding a cure, making a huge difference to millions of peoples' lives.

'The UK remains a leading destination for science, research and innovation and has been home to many of the world's greatest medical discoveries and development of treatments. Through the Government's modern Industrial Strategy and Life Sciences Sector Deal, we are encouraging collaboration between industry, academia and business to ensure the UK remains at the forefront of the latest technologies and developments – building a Britain fit for the future'.

Professor Susan Smith, Head of STFC's Daresbury Laboratory, said the decision was recognition of the Laboratory's world leading skills and experience in the field of particle accelerators. 'At STFC we are committed to developing accelerator technology and expertise to address the world's key challenges, as well as to help businesses innovate to the benefit of our society and our economy', Professor Smith said.

Particle accelerators are the heart of the Large Hadron Collider at CERN, where scientists confirmed the existence of the Higgs Boson in 2012. The work of STFC, as part of UK Research and Innovation, supports the UK's Industrial Strategy and contributes to the UK continuing to be a leading global destination for science and innovation.

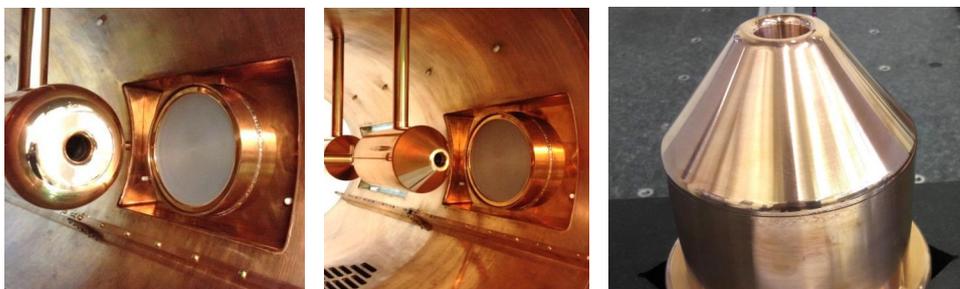
[Wendy Ellison](#)



News from the Laboratories — RAL

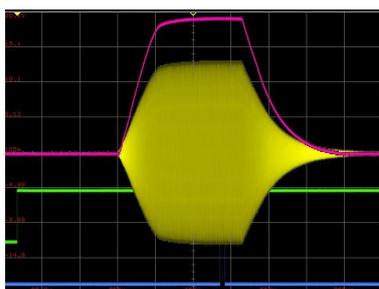
ISIS Linear Accelerator Tank IV Replacement

Since the last update presented in Newsletter Issue 12 (December 2015) there has been significant progress with the [ISIS](#) linac tank IV replacement project. Following a review it was decided that a modified design of drift tube with conical end pieces (rather than the traditional ISIS design with rounded end pieces) should be developed. Computer modelling and simulation predicted this design would provide a significant reduction in the peak RF power required to achieve the necessary accelerating potential, while remaining conservatively within operating limits. Several ‘dummy’ samples, without quadrupole magnets, were manufactured and fitted in the 2 m test tank and resonance and Q measurements were re-confirmed.



Test tank: view with traditional and conical drift tubes.
(Credit: ISIS)

A number of manufacturing attempts were undertaken in order to establish robust techniques to ensure reliable electrical and water connections to the drift tubes, while also retaining necessary brazing and electron beam welding steps. Production has since commenced for all 25 drift tubes (23 plus two halves) required for the full 12 m tank, with delivery due at the end of 2018.



Test tank drive signals and RF field during conditioning and at 200 kW peak power.
(Credit: ISIS)

Retaining the fitted and aligned conical dummy drift tubes, successful conditioning of the 2 m test tank to 200 kW peak power at 50 pulses per second was concluded recently. This was a relatively quick and smooth process. Vacuum pressure remained low ($\sim 2 \times 10^{-7}$ mBar) and minimal, if any, evidence of discharge or breakdown was observed throughout. Use of conical drift tubes requires only $\sim 75\%$ of the peak RF power compared with the traditional ISIS drift tubes, which is very encouraging and likely to offer significant savings both operationally and in specifying future high power RF sources.

A survey of X-ray measurements around the test facility during high power operation revealed pleasingly low dose rates. Final stages are in hand preparing a high power RF source such that ~ 2 MW of peak power will be available to condition and drive the full 12 m, 20 MeV tank.

The full 12 m tank comprises six 2 m sections. These have been manufactured by Exotech in the Netherlands and copper plated at Nitech in the UK. These were delivered to RAL in early 2018 for temporary assembly and alignment in the ISIS accelerator workshop.

Excellent alignment was achieved, confirming that the specified high tolerances were maintained throughout machining, processing and transportation from the Netherlands.

Final machining and finishing will see the completed parts returned to RAL for late summer 2018, when they will be reassembled in the dedicated test area. The drift tubes will arrive shortly thereafter and be installed and aligned into the tank in readiness to close up the access ports, confirm a good vacuum level and then begin further RF work. Initial low level measurements will be made including a bead pull for which the mechanism and driving software developed on the test tank will be reused. It is planned to condition the 12 m tank up to full power and hold at an operational level for several weeks in order to build confidence that it will fulfil the demands of a typical ISIS machine cycle.



All six sections of the 12 m tank IV replacement temporarily assembled at RAL in April 2018.
(Credit: ISIS)

Significant planning work is underway as the proposed installation date approaches (this is expected to be during 2020 and will coincide with [another major ISIS project to replace the target station one target and target services](#)). This will ensure suitable overhead crane modifications are completed and that infrastructure can be removed and reinstated with minimal disruption.



Preparation for final machining at Exotech in May 2018.
(Credit: ISIS)

A very significant part of this project and of equipment life cycle is in waste management. The existing tank IV, which has become active after over 40 years of service in a radiation environment, will be removed from operation and its present location in one piece. This is not a trivial task and will require very careful manoeuvring around other parts of the ISIS injector, but will retain a contamination free area and minimise the time required before section-by-section installation of the new tank. ISIS will return to user operation following its planned 2020 shutdown.

[Mark Keelan](#)

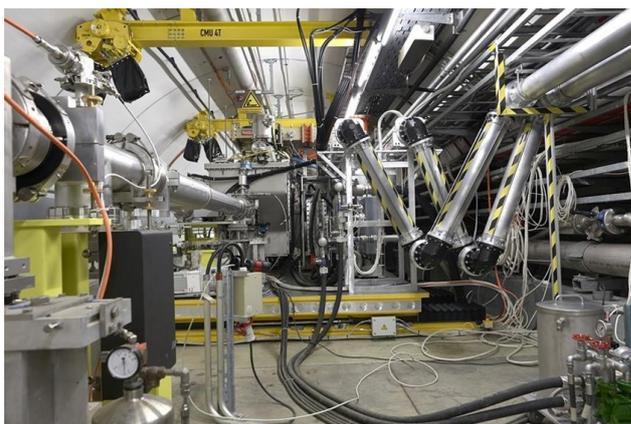


Science & Technology Facilities Council
ISIS Neutron and Muon Source

Proton Beam Crabbing Demonstrated for the First Time at SPS

A UK team from the Cockcroft Institute featuring Lancaster University, Manchester University, Liverpool University and STFC Daresbury Labs have worked alongside CERN and the USA to successfully rotate a beam of protons for the first time as part of the STFC funded HL-LHC-UK project. The test took place on 23 May using a beam from CERN's Super Proton Synchrotron (SPS) accelerator and showed that bunches of protons could be tilted using these superconducting transverse radio-frequency 'crab' cavities. These tilted bunches ensure that the beam has an effective 'head-on' crossing by cancelling the effect of the crossing angle where the two beamlines meet. These cavities are a key component of the High-Luminosity Large Hadron Collider (HL-LHC), the future upgrade of the LHC.

The crab cavity technology provides a very significant boost to the world of high energy particle physics as the implementation of crab cavities is critical to the delivery of the next level of energy and luminosity of the LHC. The UK has played a lead role in the development and construction of this technology and is working hard to make HL-LHC a reality.



Test bench of the first two prototype crab cavities in the Super Proton Synchrotron (SPS) accelerator. The cryomodule containing the cavities is installed on a mobile table that allows it to be moved into the beam line as needed.

(Credit: M. Brice/CERN)

STFC's Executive Director of Programmes Professor Grahame Blair said, 'This is a fantastic result for CERN and for all the collaborators involved. I am particularly happy that UK university teams, working with staff at STFC national laboratories and with the international community, have made such a key contribution. This demonstrates the value of our world class university-based programme in accelerator physics working alongside our detector and analysis teams in mapping out fully the structure of nature at the LHC energy scale – every bit of luminosity will count in this endeavour'.

In the coming months, the cavities will be commissioned to their nominal voltage of 3.4 MV and will undergo a series of tests to validate their operation fully for the HL-LHC era. A total of sixteen such cavities will be installed in the HL-LHC – eight near ATLAS and eight near CMS (the LHC's detectors).

[Graeme Burt](#)



UK Plasma Accelerator Roadmap Discussed at Community Meeting

The IoP Plasma Physics and Particle Accelerators and Beams groups co-supported a Community Meeting held at IoP on 26 January 2018. The purpose of this meeting was to discuss, and provide feedback on, the first draft of a UK Plasma Accelerator Roadmap.

The meeting was well attended, with good representation from university groups, the two UK Accelerator Institutes, and national laboratories. For each of the main sections of the draft roadmap, short presentations were given, followed by a generous period of discussion. The day concluded with a one-hour review of the main points raised in the meeting and a discussion of potential roadmap recommendations.

Production of the UK roadmap is being co-ordinated by the Plasma Wakefield Accelerator Steering Committee (PWASC), which represents and coordinates UK groups working on plasma accelerators. Updates on the development of the roadmap, and information on how to comment on it, can be found [here](#).

[Simon Hooker](#)



Frontiers of Ultrafast Science Seminar

The latest seminar in the [Frontiers of Ultrafast Science](#) series was held at STFC's Daresbury Laboratory on 15 November 2017. Ultrafast science primarily concerns the use of ultra-short pulses of light (presently down to tens of attoseconds) to study ultrafast dynamics in matter. This seminar series aims to strengthen the ties between UK scientists working in the field of ultrafast science, as well as to identify and explore cutting-edge problems in this field.

There were approximately 30 participants in attendance, including both theorists and experimentalists from a range of different universities and national laboratories across the UK. After an introduction by the event's organiser Agapi Emmanouilidou, the first speaker was Jon Marangos from Imperial College London who gave a fascinating talk titled 'X-ray Photon Sources for Attosecond Measurements', in which he presented his team's latest studies in the field of attosecond science using both their own laboratory-based sources and international free electron laser facilities.

Dave Dunning from Daresbury Laboratory gave a talk on free electron lasers as a source of attosecond pulses for the UK and Adam Wyatt from STFC's Central Laser Facility (CLF) gave an excellent talk on the CLF's latest work in the area of ultrafast science. There followed a discussion session on the talks plus plans for future seminars, aiming to continue with approximately three events each year across different UK universities and institutions. The event was sponsored by the IoP Particle Accelerators and Beams Group and STFC.

The next related event is the international conference on Attosecond and Strong Field Science, [Atto-FEL 2018](#), taking place on July 2 - 4, 2018 at University College London.

[Dave Dunning](#)

Intelligent Control Systems for Particle Accelerators

Particle Accelerators continue to push the envelope of current technologies. For example, a major goal of the Free Electron Laser community is to capture real time footage of atomic dynamics. This will require incredible effort and attention paid to the design, manufacture, and implementation of accelerator structures and control systems. It is now very clear that the introduction of more advanced control methods that incorporate machine learning/AI components will be necessary to operate the next generation of particle accelerators.



[The first Intelligent Controls for Particle Accelerators workshop](#) was held at STFC Daresbury Laboratory 30 - 31 January 2018. The goal of the workshop was to foment cooperation and discuss future developments among world leaders in particle accelerator and machine learning research. A welcome address was given by Lab Director Professor Susan Smith, who made a convincing case for more advanced control methods as particle accelerators continue to develop.



Participants at the Intelligent Controls for Particle Accelerators workshop.
(Credit: STFC)

The workshop first learned about the various hardware issues involved in operating an accelerator facility and how one could adapt legacy control systems to suit modern control methods. One key point that came across is that in order to get the best performance from AI control methods high quality data is essential. Such data must be accurate and precise, time-stamped and cross calibrated. Many of the talks were focused on the application of AI techniques to a variety of different particle accelerator sub-systems, such as electron gun water cooling, high power RF and particle orbit control systems. Modern beam-based feedback systems in use at various international facilities were then presented while outlining a path forward to address limitations of the present control systems using advanced AI-type control policies.



Marco Lonza from Elettra Sincrotrone Trieste spoke on the control automation and feedback system in place for the FERMI FEL.
(Credit: STFC)



Sergey Tomin from the European XFEL told the workshop about automatic optimization research taking place at European XFEL.
(Credit: STFC)

The workshop ended with a lively discussion on the future of AI-type accelerator control systems, what diagnostic data from current machines is needed and how the community may better collaborate in this area. Talks can be found [here](#) with video of Day 2 talks [here](#). The workshop was made possible with sponsorship from the IET, IoP, ASTeC and the Cockcroft Institute.

[James Henderson](#)

The Institute of Physics National Particle Accelerator Open Day

Wednesday 14 February saw this year's National Particle Accelerator Open Day, a suitable day for those already in love with particle accelerators and those who – after seeing one – might fall in love too! The 2018 Open Day was jointly sponsored by the Cockcroft Institute, ASTeC and of course the IoP Particle Accelerators and Beams Group, and was hosted at the Daresbury Science and Innovation Campus in sunny Cheshire.

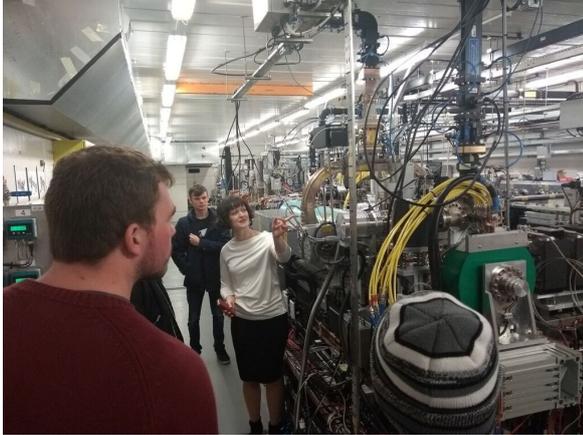


Alexandra Alexandrova talks about transferring research to industry.
(Credit: STFC)

Around 70 undergraduate students - mostly physicists and engineers in their 2nd or 3rd year of study – were hosted for a full day of talks and tours as in previous years' events. Phil Burrows from the John Adams Institute gave a hugely informative overview of opportunities working in our field and we were very fortunate this year to have not one but two talks on taking accelerator technology into industry, from Alexandra Alexandrova – who leads the D-Beam spinout from the Cockcroft Institute – and John Allen, chief engineer at Elekta – one of the largest manufacturers of particle accelerators in the world.

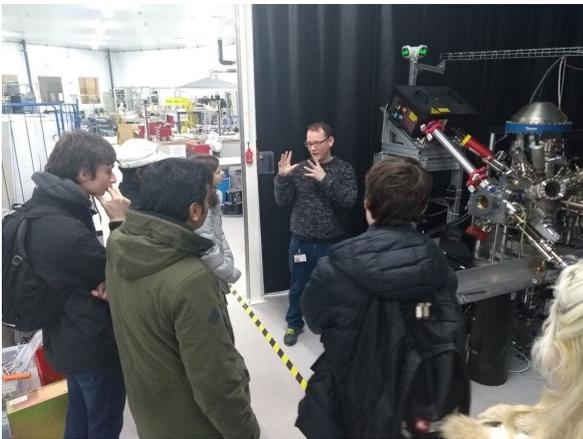


John Allen from Elekta talks about working in industry.
(Credit: STFC)



Louise Cowie shows the state-of-the-art design of the CLARA injector.
(Credit: STFC)

Tours of the Daresbury campus were hosted by STFC's scientists and engineers and included visits to the impressive new CLARA test facility, the surface science laboratories developing (amongst other things) new photocathodes and surface treatments, and the Engineering Technology Centre which is building components for the European Spallation Source.



Undergraduates visit the Daresbury vacuum science laboratory
(Credit: STFC)

A new element in this year's Open Day was a Recruitment Fair where a number of labs and companies showcased their work and opportunities for graduates. Most of the principle university and laboratory groups working in accelerator science and technology were represented, giving up their valuable time to attend on the day – these included the John Adams Institute, Imperial College, Rutherford Appleton Laboratory (ISIS and CLF), Queen's University Belfast, and AWE.

Our visiting guests gave very positive feedback about the day, and we would like to pass on their thanks to all those who participated – as a community we hope to have shown just how exciting our work is, so that today's visitors will turn into tomorrow's professionals. Next year we intend to attract even more visitors and raise the profile of our field even further.

[Hywel Owen](#)

PAB Group Annual Meeting

The IoP Particle Accelerators and Beams Group's Annual Meeting was held at Lancaster University on the 18 April this year, where ~80 delegates gathered for a range of talks, posters and discussion on accelerator activities in and beyond the UK.



Brian McNeil presents this year's poster prize to Agnese Lagzda, (Credit: John Thomason)

The meeting began with an introduction talk from Stewart Boogert from RHUL on the STFC Accelerator Strategic Review followed by updates from the Directors of the Cockcroft Institute and John Adams Institute. After the coffee break sponsored by Tech-X there was a session focused on novel accelerators. Steve Jamison from STFC/Lancaster University gave an interesting talk on THz and laser accelerators, followed by a talk from Chris Murphy from the University of York on industrial applications of plasma accelerators.

The lunch break sponsored by CST and featured a student poster competition and the Group AGM. The poster prize was won this year by Agnese Lagzda from the University of Manchester on her work on Very High Energy Electron therapy. The AGM included a report from the group chair Brian McNeil and a report on finance by the group treasurer Jonny Smith.

After lunch we had an extended talk by last year's PAB group prize winner, Andy Wolski from Liverpool University, following a session on industrial accelerators. The session also featured very interesting talks from Ian Shinton from Elekta on MR Linacs, Mike Jenkins from Alliance Healthcare on radioisotope production in the UK, and Karen Kirkby from Manchester University/Christie Hospital on proton therapy.



Melissa Uchida

Following on from the AWE sponsored coffee break we had a final session on major accelerator projects featuring John Thomason from ISIS on the China Spallation Neutron Source, Jim Clarke from STFC on CLARA, Ian Martin from Diamond on the Diamond Light Source upgrade and the final talk of the day was from Melissa Uchida from Imperial College on MICE.

The meeting closed with a reception sponsored by the Cockcroft Institute.



Andy Wolski

[Graeme Burt](#)

Accelerators for Security, Healthcare and the Environment Summer School

The Cockcroft Institute hosted the first of what is hoped will be many summer schools as part of the Accelerators for Security, Healthcare and the Environment (ASHE) doctoral training centre starting on Tuesday 22 May and running for two weeks. The school focused on smaller industrial accelerators used in radiotherapy, medical imaging, cargo scanning, irradiation of waste water, mass spectrometry and radioisotope production as well as many other applications.

The school was split in three sections covering technical accelerator design, applications of accelerators and transferable skills. Speakers were drawn from industry, giving students a chance to interact with experts from outside of academia, including representatives of the ASHE partners in Antaya, Elekta, Rapiscan, Adaptix, NHS Christie and Waters, as well as from E-beam, Tech-X, Alliance Healthcare, Anacail, NPL, and the Surrey Ion beam centre. STFC Innovations, ASTeC and Manchester University also provided lectures on project management, market surveys, business plans, IP management and industrial project costing.

The school also featured a visit to the Christie Proton Therapy Centre. The school featured two practical assessments, one in the Manchester University Nuclear teaching laboratory and the other allowing the students to create a business plan for some technical innovation.



The discussion panel – left to right James Ollier (Rapiscan), John Allen (Elekta), Graeme Burt (Cockcroft), Declan Diver (Glasgow University/ Anacail), Jonny Smith (Tech-X), and Hari Menon (STFC Innovations).
(Credit: Cockcroft Institute)

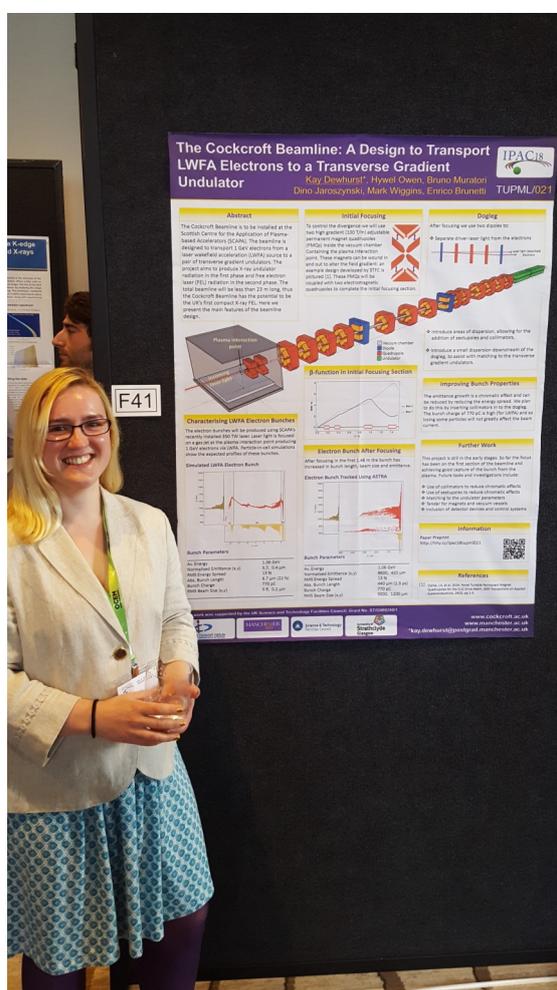
The school finished with a panel discussion session where students were able to ask questions to be discussed by the panel, with topics including employment, working with industry, and commercialising research.

Dr Graeme Burt, head of the ASHE program said, 'Particle accelerators are a vital part of UK industry and we hope this school provides the training to future PhD graduates in how to innovate these vital machines to keep UK at the forefront of high tech industry. STFC's strong commitment to funding this programme will have a massive impact for years to come'.

[Graeme Burt](#)

IPAC 18 – A PhD Student’s Experience

Between the 29 April and 4 May, physicists and engineers from around the world gathered in Vancouver, Canada for the [9th International Particle Accelerator Conference \(IPAC 18\)](#). I was fortunate enough to be able to join them, thanks to student grants from the Institute of Physics and the organisers of IPAC 18. As a second year PhD student, this was the biggest conference I have attended and it provided a great opportunity for me to discover more about the international community surrounding accelerator research.



Presenting my poster.

My conference experience began earlier than most with two days of tutorials especially designed for student attendees at the impressive University of British Columbia. These tutorials were delivered by leading scientists including Stephen Brooks from BNL, F  licie Albert from LLNL and Oliver Br  uning from CERN, just to name a few. The talks provided introductions to topics that would later make up the session themes at the main conference. All the speakers were very approachable, sharing lunch with the students and answering lots of questions. This is the first year IPAC has held student tutorials, and they really served as a positive and welcoming start to the week. I hope they will continue to be included at the conference in the future.

IPAC 18 officially began with a student poster session, where I displayed my poster amongst other students working on Laser Wakefield Acceleration (LWFA). Although manning a poster for 4 hours is hard on the feet, I was able to have insightful conversations with the students around me, finding out about their areas of research as well as the best things to see and do in Vancouver. At this session, poster judges asked each student to present their work, which served as a useful practice for the main poster session later in the week where we could expect many more visitors.

The conference was a great success and really useful for me as a PhD student to learn about all the activity in the world of accelerator physics and make some meaningful connections. The talks were very wide ranging, from interesting project updates such as the CBETA talk by Georg Hoffstaetter (Cornell), to emerging topics such as Applying Artificial Intelligence to Accelerators by Alexander Scheinker (LANL). I found the poster sessions particularly useful for finding out about other groups who are also researching beamlines for LWFA, including those from ELI (Europe), COXINEL (France) and KIT (Germany).

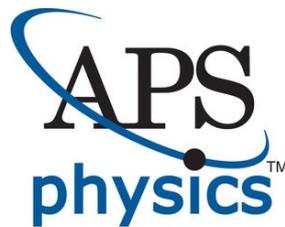
The conference was very vibrant and exciting with lots of satellite events surrounding the main talks, poster sessions and industrial partner stalls. I particularly enjoyed the student 'Breakfast and Learn' event on the publishing process hosted by APS Physics, and the Women In Science and Engineering dinner with guest speaker Grace Wong-Sneddon. I finished my visit to IPAC with a guided tour of the TRIUMF accelerator facility. It was great to see the large range of experiments at TRIUMF and hear from the enthusiastic guides about their work. Not forgetting how cool it was to stand on top of the world's largest cyclotron!



Visiting TRIUMF.

Throughout IPAC 18 I learned a lot about my field and also met a lot of researchers that I hope to collaborate with in the future – a really enjoyable and useful experience.

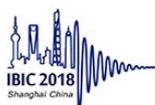
[Kay Dewhurst](#)



International Calendar



23rd International Conference on ECR Ion Sources (ECRIS 2018)
Catania, Italy, 10 - 14 September 2018
<https://agenda.infn.it/conferenceDisplay.py?ovw=True&confId=13199>



7th International Beam Instrumentation Conference (IBIC 2018)
Shanghai, China, 9 - 13 September 2018
<https://indico.sinap.ac.cn/event/3/>



22nd International Conference on High-Power Particle Beams
Changsha, China, 16 - 20 September 2018
<http://www.eappc-beams2018.org/>



29th Linear Accelerator Conference (LINAC2018)
Beijing, China, 16 - 21 September 2018
<https://indico.ihep.ac.cn/event/7319/>



12th International Workshop on Emerging Technologies and Science Facilities Controls (PCaPAC 2018)
Hsinchu, Taiwan, 16 - 19 October 2018
<https://indico.nsrcc.org.tw/event/1/>



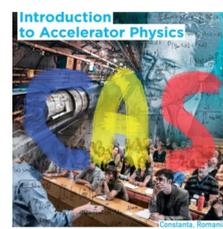
13th International Computational Accelerator Physics Conference (ICAP'18)
Key West, Florida, USA, 20 - 24 October 2018
<http://www.icap18.org/>



14th International Conference on Heavy Ion Accelerator Technology
Lanzhou, China, 22 - 26 October 2018
<http://hiat2018.csp.escience.cn/dct/page/1>

Upcoming schools

CERN Accelerator School — Introduction to Accelerator Physics
Constanza, Romania, 16 - 29 September 2018
<https://cas.web.cern.ch/schools/constanta-2018>



CERN Accelerator School — Numerical Methods for Analysis, Design and Modelling of Particle Accelerators
Thessaloniki, Greece, 11 - 23 November 2018
<https://cas.web.cern.ch/schools/thessaloniki-2018>



ΑΡΙΣΤΟΤΕΛΕΙΟ
ΠΑΝΕΠΙΣΤΗΜΙΟ
ΘΕΣΣΑΛΟΝΙΚΗΣ

PAB Group & UK Events

Attosecond and Free Electron Laser Science International Conference 2018

University College London, July 2 - 4 2018

<https://eventbooking.stfc.ac.uk/news-events/afels-2018>

The Future and Next Generation Capabilities of Accelerator-driven Neutron and Muon Sources

STFC Rutherford Appleton Laboratory, 14 August 2018

<https://www.isis.stfc.ac.uk/Pages/IoP-Network-Event.aspx>

The Future and Next Generation Capabilities of Accelerator-driven Neutron and Muon Sources

Event information

The future and next generation capabilities of accelerator driven neutron and muon sources is a one day event aimed at bringing two important aspects of neutron and muon facilities together – Accelerators and Users. This will highlight future possibilities for upgrades at the STFC Rutherford Appleton Laboratory and Showcase current and future opportunities in neutron and muon science. The aim is to generate user support to build the science case for the next iteration of neutron and muon facilities.

Speakers:

Jeff Penfold, David Barlow, Rob Dalgleish, Sarah Youngs, Lucy Clark, Steve Hull, Zoe Bowden, Ciprian Plostinar, Mike Plum, Philip King, John Thomason

14th August 2018

STFC Rutherford Appleton Laboratory, Chilton, Didcot OX11 0QZ

IOP Institute of Physics | **RSC** Advancing the Chemical Sciences

Neutron Scattering Group & Particle Accelerators and Beams Group

 ISIS Neutron and Muon Source



www.iop.org/conferences

Organised by the IOP Neutron Scattering Group and Particle Accelerators & Beams Group
Co-sponsored by STFC ISIS Pulsed Neutron and Muon Facility

Useful Links

<http://www.scitech.ac.uk/>

http://www.desy.de/index_eng.html

<http://www.cockcroft.ac.uk/>

<http://www.linearcollider.org/newsline/>

<http://www.adams-institute.ac.uk/>

<http://home.web.cern.ch/>

www.diamond.ac.uk

<http://www.jacow.org/>

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IOP Institute of Physics
**Particle Accelerators
and Beams Group**

IoP Particle Accelerators and Beams Group

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**Deadline for submissions to the
next newsletter is
30 November 2018**

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