

IOP PAB GROUP

NEWSLETTER

Issue 6

Dec 2012

Editorial

As required by our Constitution I have now stepped down as Group Chairman, but I am delighted to hand over to Phil Burrows from Oxford University. Phil was one of the small team that put the PAB Group together and has been very active ever since, including being our first Treasurer. I am sure you will give him and his Committee every support, just as you did for me.

When I and other colleagues set out some 5 years ago to establish an improved professional basis for the discipline of accelerator science and technology, under the auspices of the Institute of Physics, our objectives included an enhanced recognition within the wider physics community (and beyond) of both the nature of our activities and also the achievements of its participants. We wanted to emphasise the uniqueness of skills employed in particle beams projects and to improve opportunities for scientific discourse on them. You may be surprised to learn that initially IOP had to be convinced that we merited our own Group, but this was part of the very perception problem that we wished to address. However, after examining and accepting the strength of our case, IOP has given us enthusiastic encouragement and support since then. Our UK community has grown significantly in both size and strength over the last decade, driven particularly by the research funding that has regenerated our subject within the university sector. The Group now plays a significant role in offering an improved sense of professional identity across the wide base of our membership. Since its formation its size has continued to expand and we now have close to 200 members, but I am sure there is plenty of scope for more of your colleagues to join us – and I encourage you advertise us to them!

This year saw an important PAB event: the inaugural award of our new Prize for Distinguished Contribution to Neil Marks, whom so many of you will have encountered. The Prize is intended not only to recognise an outstanding individual but in publicising this also to raise wide awareness of achievements in our discipline. Neil is a great example of lifetime achievement with major impact on our discipline – and still going strong after 50 years of contributions to particle accelerator development!

Although we are currently experiencing severe funding pressures on accelerator R&D budgets there are still many exciting programmes and career opportunities for the latest generation of staff and students. Advanced particle accelerators continue to be in demand and to be at the core of some of the largest UK (and world) scientific projects. Close partnerships between university groups and government laboratory staff are now so common as to be considered the norm. There is also a welcome increase in collaboration between research centres and industrial developers. Overall our subject and its disciplines continue to thrive.

Finally please don't forget that this is your Group. We need you to be proactive in requesting and using Group facilities. This includes proposing (and attending) meetings, and also helping in organisational matters from time to time. My very best wishes to you all.

Mike Poole

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IOP PAB GROUP NEWSLETTER

PAB Events

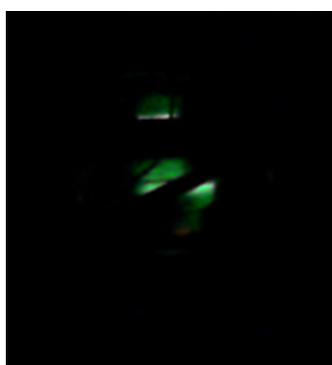
- mini-workshop: 'Simulation of Power Dissipation and Heating from Wake Losses in Accelerator Structures' Diamond, Jan 30, 2013
- PAB Group Annual Meeting Daresbury Laboratory 10 April 2013
- 3rd ILC beam dynamics workshop on low-emittance rings Oxford, July 10-12, 2013
- Impedance calculations for short bunches. 1/2 day meeting at Diamond Light Source
- New power technologies for accelerators
- Laser plasma wakefield accelerators for electrons and ions

Full details on Page 18

News from the Laboratories — RAL

Siemens Novel System Accelerates First Beam

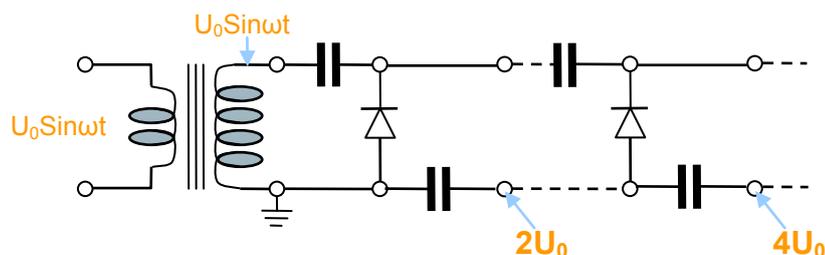
The Siemens novel compact DC electrostatic particle accelerator system accelerated its first beam on the 17th September 2012. Known as the "ONlIon ACcelerator), the Siemens tandem accelerator that has been built and developed at the Rutherford Appleton Laboratory in collaboration with ISIS engineers.



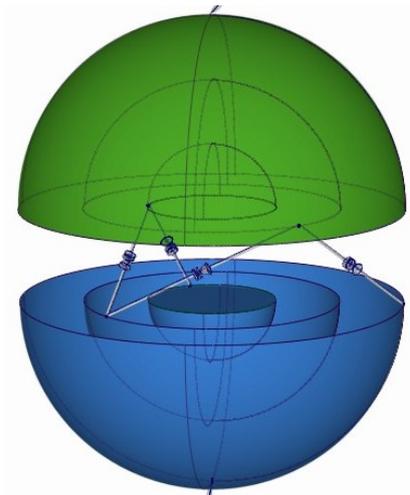
Scintillator screen showing first beam through the ONIAC (light is reflected on nearby surfaces)

The ONIAC system is being developed to investigate the opportunities to industrialise and commercialise particle accelerators for applications such as medical isotope production. Medical isotopes are used in Positron Emission Tomography (PET) scanners to test the functional behaviour of different organs. These special radioisotopes have short half-lives, so they must be produced a few hours before use and relatively close to the patient centres in order to distribute them quickly.

The ONIAC concept is based on the traditional Cockcroft-Walton system but with an innovative implementation of the key components.



Cockcroft-Walton voltage multiplier circuit diagram.



Schematic of the nested shells.



Shells being lowered into the vessel by Robert Selway - ONIAC design engineer

A new compact DC multicusp volume H^- ion source has been developed to produce a beam which is accelerated through a series of holes in the nested shells (resembling an onion, hence the name). Towards the centre, each shell is raised to higher and higher voltages. In the middle of the nested shells a stripping foil converts the H^- ions into protons. The protons are then reaccelerated down to ground potential as they pass through holes in the other side of the ONIAC.

The capacitances between the shells make up the Cockcroft-Walton voltage multiplier and are connected together with diodes to complete the circuit. A high voltage RF power supply, consisting of a resonant transformer and a solid state power amplifier, is connected to the outer shell. This drives the voltage multiplier circuit which produces the highest voltage on the centre shell.

Dr. Paul Beasley, Head of Strategic Development said, “The Siemens ONIAC project is a great example of how industry can collaborate with national labs to develop new technologies that will benefit society”. The next phase of the project is to increase the number of shells and increase the beam energy.



From L-R: Prof. Herman Requardt- CEO Siemens Global Healthcare, Dr. Paul Beasley- Head of Strategic Development, and Prof. Oliver Heid- Siemens Chief Innovator, on a recent visit to ISIS.

For more information contact paul.beasley@siemens.com or dan.faircloth@stfc.ac.uk

Workshop at Daresbury on High Performance Computing in Accelerators

A workshop is being planned at Daresbury, looking at ways to apply high performance computing in accelerators. A three- day event is planned, separate but linked, **January 15-17, 2013**.

Day 1: hands-on tutorial for people using parallelised accelerator codes on Hartree machines.

Day 2: talks by people who have used parallel computing successfully, in accelerator science and outside it. The hope is that it will give the audience ideas.

Day 3: will comprise discussions on where to go next

Thus Day 1 is aimed at users, Day 2 at programmers, and Day 3 at project managers (these categories are not mutually exclusive, of course.)

The details are coming together on <https://eventbooking.stfc.ac.uk/news-events/workshop-on-advanced-computing-for-accelerators> (The programme is still very fluid and if anyone has ideas we'd like to hear them.)

Roger Barlow

Anode Modulation Improves Reliability and Efficiency at ISIS

For many years the ISIS linac group has operated four, 2 megawatt triode RF amplifiers using cathode modulation (Fig 1). Cathode modulation was effective in simplifying the electronic hardware required but made it difficult to achieve reliable service from the triodes. Some of the triodes exhibited a mode of operation that demanded excessive current from the anode power supply.

The systems are pulsed at a repetition rate of 50 Hz, with an on-time of $\sim 500 \mu\text{s}$. However it was the 19.5 ms off-time that presented the problem because the tube could not be effectively biased off. This led to the valve conducting more than expected for 97.5% of the time.

Various additional biasing power supplies were tried along with tight filament power management. This afforded some limited benefit, but could not be relied upon to keep the current demand low enough. The major side effects apart from not having a power supply that could provide sufficient current was excess anode dissipation, which could lead to overheating, thermal instability and premature failure of valves costing tens of thousands of pounds.

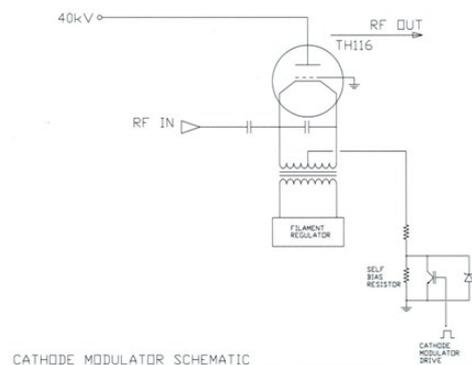


Fig 1. Cathode Modulation

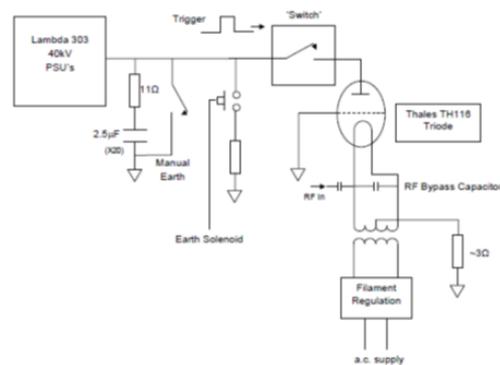


Fig 2. Anode Modulation

The chosen solution was to use anode modulation (Fig 2).

The cathode hardware was replaced with anode hardware, retaining the 3 Ω resistor to establish the biasing of the triode.

Very simply, "no volts", "no current". Under this system a switch is introduced which must be capable of switching 40 kV at 300 A at 50 Hz. The switch is closed for the duration of an RF pulse and open at all other times. Therefore no excess current can be drawn during the 'off' period. Diversified Technologies Inc were awarded a contract to produce a switch to these specifications.

Calendar

PAB Group Annual Meeting
Daresbury Laboratory, UK,
10 April 2013

IPAC 13
Shanghai, PRC,
13—17 May 2013

European Linear Collider
Workshop (ECFA LC2013)
DESY, 27—31 May 2013

IEEE Plasma Science Conf
San Francisco, CA,
16—21 Jun 2013

Free-Electron Laser
Conference FEL 2013
NYC, 26—29 Aug 2013

Full details on Page 19



Fig 3. Anode Modulator

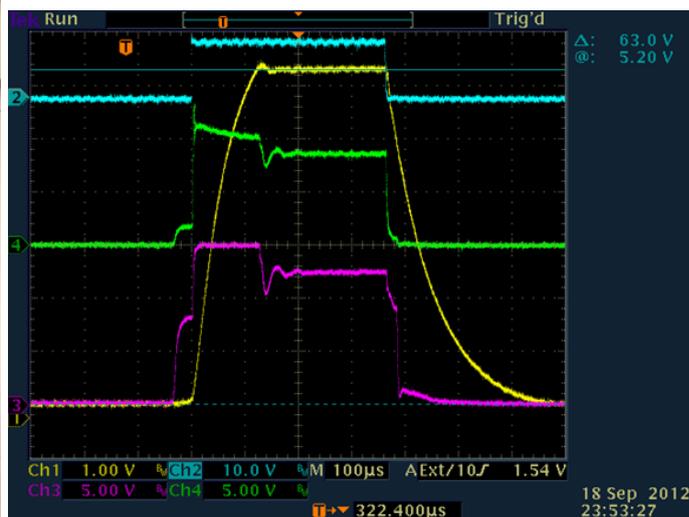


Fig 4. Typical waveforms

Fig 3. shows an image of the cabinet containing the "switch".

Fig 4. presents the expected typical waveforms of the current at the anode and cathode of the tube.

First operation was during September following a straightforward installation. Success! An immediate power saving of ~ 70 kW of electricity.

Further work will be carried out in due course to fully integrate the switch into the RF amplifier modulator chain. A big advantage of this "switch" design is that it can be commanded to open within a few μs . Therefore it is possible to utilise this feature in place of the present crowbar discharge system.

For more information contact:

mark.keelan@stfc.ac.uk - ISIS Injector Group Leader

Ada Lovelace Day- Celebrating Women in STEM

16th October 2012 was Ada Lovelace Day – an annual event celebrating women in science. ALD aims to create new role models for girls and women in STEM (science, technology engineering and mathematics) by sharing stories of inspirational women from around the world. This year one of the highlights was the 'Ada Lovelace Day Live!' event at the Institution of Engineering and Technology in London.

Dr. Suzie Sheehy, research fellow in the STFC ASTeC Intense Beams Group, was invited to speak at the event and in the run-up was interviewed by the BBC on-site at RAL to make a short news feature about women in science. ISIS TS2 and the FETS hall featured as a great backdrop for a discussion of what it's like to work in a male-dominated field and what might be done to bridge the gender imbalance in science.

Suzie says, 'I love working in physics but sometimes I do wonder why there aren't more women in the field. It's a fascinating, fulfilling and varied career and I'm passionate about engaging all types of people with physics – from primary school kids to retirees.'

Her talk at ALDLive used a series of physics demonstrations to pull together the work of Rosalind Franklin, Marie Curie and her own work in high power proton particle accelerators.



Suzie presenting a laser diffraction demonstration at Ada Lovelace Day Live! at the IET.

Links:

Ada Lovelace Day: <http://findingada.com/>

BBC feature: <http://www.bbc.co.uk/news/technology-19899478>

Suzie's blog post about the event: <http://www.highheelsinthelab.blogspot.co.uk/2012/10/ada-lovelace-day-live.html>

John Adams Institute Expanding

The John Adams Institute for Accelerator Science is expanding, with a new research base at Imperial College London joining two existing centres at Royal Holloway, University of London and the University of Oxford.

<http://www.adams-institute.ac.uk/news/?scheme=0&id=77>

The John Adams Institute for Accelerator Science is a centre of excellence in the UK for advanced and novel accelerator technology, providing expertise, research, development and training in accelerator techniques, and promoting advanced accelerator applications in science and society. The JAI was created in October 2004 initially as a joint venture between the Departments of Physics in the University of Oxford and Royal Holloway, University of London, and is operating with enabling support by the Science and Technology Facility Council (STFC).

Prof Andrei Seryi, the JAI Director, said: "The JAI teams and the Imperial teams started developing these joint plans in the beginning of 2011, which culminated in submission of a four-year JAI scientific plan to STFC in early Summer of 2011, its positive review by an independent panel of experts and consequent award of the STFC grant for JAI at three universities. I am very pleased that these efforts were successful."

Prof Zulfikar Najmudin, the JAI Deputy Director and Professor of Physics at Imperial College London, said: "The JAI now connects the world-leading efforts on laser plasma acceleration which were developed in Imperial's Plasma Physics group and Oxford's Atomic and Laser group, and enhanced by the traditional strength of JAI in laser-beam expertise, and creates new opportunities for developments of laser plasma acceleration applications and new instruments, in particular compact X-ray light sources."

Prof Maggie Dallman, Principal of the Faculty of Natural Sciences at Imperial College London, and member of the JAI Governing Board, said: "With JAI established in Imperial we are looking forward, in collaboration with our two excellent university partners, to enhancing our activities toward development of application based on our innovative research in accelerator, plasma and laser physics as well as boost our industrial connections."

Prof John Womersley, the STFC Chief Executive said: "STFC supports the JAI because of the importance that we place on accelerator R&D and the Institute's world-class capabilities. The expansion of the Institute to include Imperial College London will not only strengthen the collaboration between leading UK universities, with a focus in developing new laser-based accelerators, but will also lead to novel applications areas and help to attract and train the next generation of accelerator scientists and engineers."

On the photo (see web site): "A research team from the newly formed Imperial College division of the John Adams Institute for Accelerator Science working on an experiment on the Gemini High Power Laser Facility at the Rutherford-Appleton Laboratory."

Synchronized announcements at Imperial College, Royal Holloway and University of Oxford.

http://www3.imperial.ac.uk/newsandeventspggrp/imperialcollege/newssummary/news_31-8-2012-17-52-44

<http://www.rhul.ac.uk/aboutus/newsandevents/news/newsarticles/johnadamsinstituteisexpanding.aspx>

<http://www2.physics.ox.ac.uk/news/2012/08/31/john-adams-institute-is-expanding>

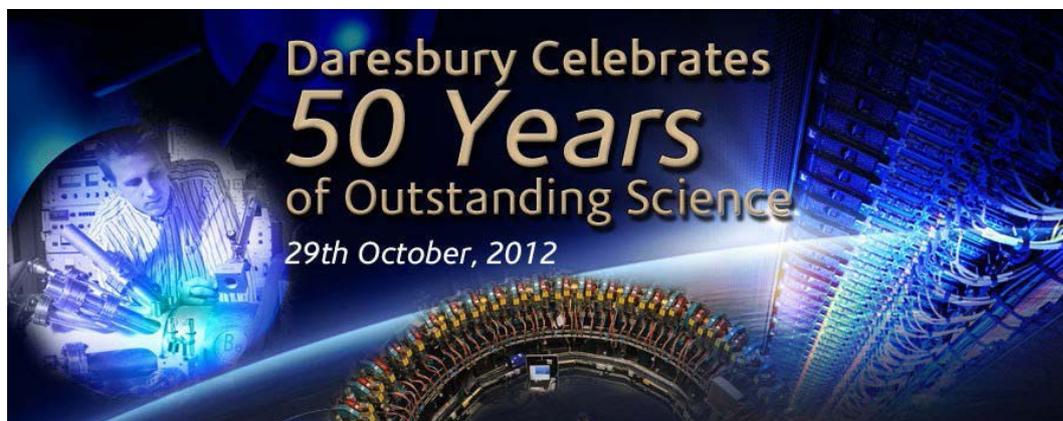
NVEC Meeting, Oxford, 25 June 2012



On the 25th of June 2012, the National Vacuum Electronics Conference (NVEC) was hosted at the John Adams Institute for Accelerator Science in Oxford.

46 participants were welcomed from UK universities, research centres and industry, representing a vibrant and growing research and industrial community. The one-day conference was dedicated to vacuum electronics and RF science and engineering. The conference strongly supports and encourages early-career researchers to present their work. This year, more than half of the participants were graduate students and postdocs, who gave 70% of the talks.

Ivan Konoplev, Phil Burrows.



On 29 October, Daresbury Laboratory celebrated 50 years since its opening in 1962, with a symposium for its current and former staff members. Many special guests were also at the occasion including former heads of the Laboratory, local Councillors, and representatives from our partner universities.

Before the symposium, Ian Munro, former director of the Synchrotron Radiation Source, performed the inauguration of “Dipole Henge”, a sculpture built from the 16 SRS dipole vacuum chambers.

Former Director of Daresbury, Alan Leadbetter, then chaired the event in front of an audience of 400 guests, introducing many key figures of the Laboratory’s past to share their memories from the initial construction of the site up until the current day.

The audience listened intently as the speakers praised the original founders of the Laboratory, particularly the founding director, Sir Alec Merrison, examined the challenges it had encountered and highlighted the path for the future. Topics included synchrotron radiation, computational science and nuclear physics at Daresbury.

Following the Symposium, everybody congregated in the Workshop where John Womersley led a “Raise A Glass to Daresbury” celebratory toast acknowledging the past and present work that has been carried out at the Laboratory and in anticipation of the future ground-breaking science and technology at Daresbury.

Several guests including Simon Pendlebury from IBM were then invited on to the podium to share their own memories of the past 50 years of the Laboratory. Finally, to round the occasion off, former SRS scientist Dr Kenneth Lea performed his Daresbury classic, “The Synchrotron Song”, which was a fitting end to a wonderful celebration.



Programme

- 14.15 Opening of Dipole Henge – Commemorative Sculpture crafted from the SRS
 15.00 Welcome by Alan Leadbetter
 15.10 Professor Robin Marshall – Particle Physics: the Launch of Daresbury Lab
 15.30 Professor Ian Munro – Synchrotron radiation at Daresbury Lab
 15.40 Professor John Inglesfield – A brief history of TCS: from the Theory Group to the Theory and Computational Science Division
 15.50 Professor Richard Catlow – Theory and computation at Daresbury and the support provided to the academic communities
 16.10 Professor John Simpson – Nuclear Physics at Daresbury
 16.30 Professor Gwyn Williams – The next generation of light sources: Opening up new frontiers in science
 16.50 Professor Paul Durham – Scientific Computing and the development of the Hartree Centre
 17.00 Professor Susan Smith – Daresbury Laboratory; looking forward to another 50 years of outstanding science



Susan Smith cuts the cake



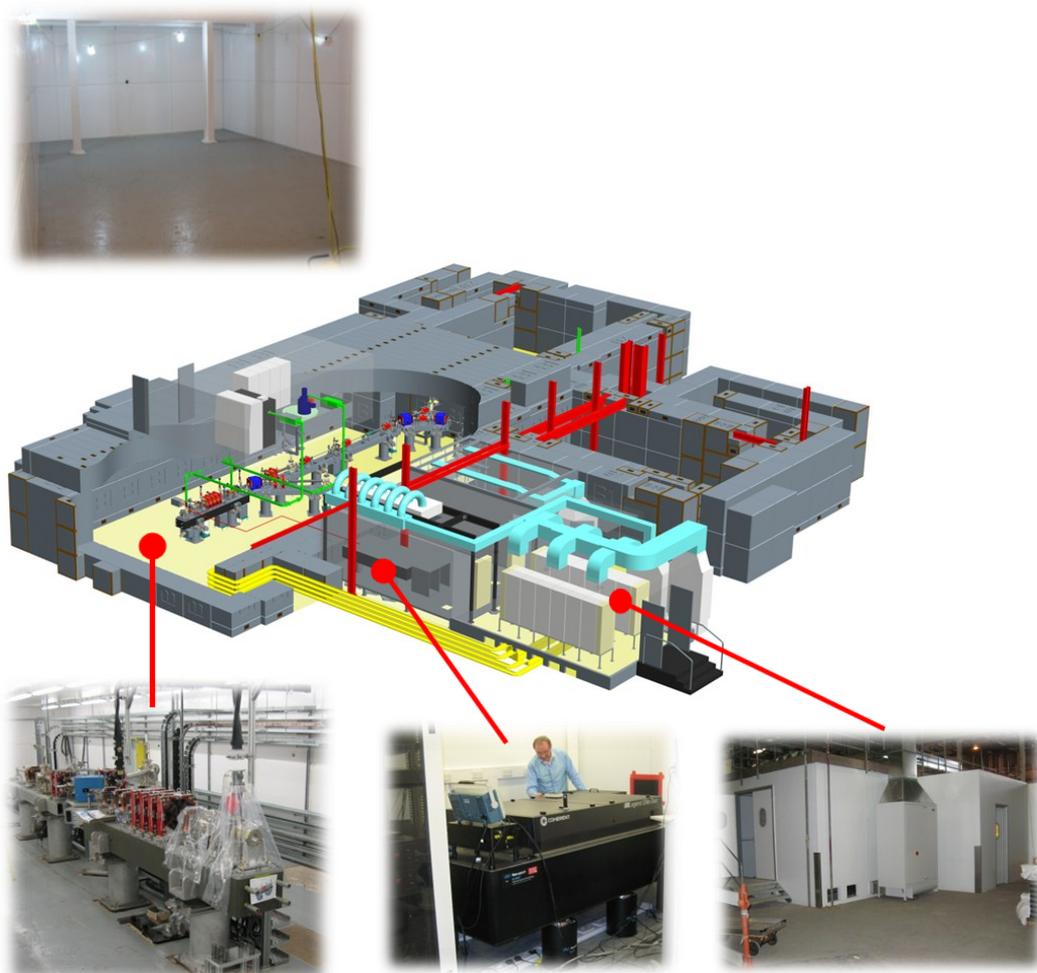
Ian Munro opening the Dipole Henge

Daresbury Electron Beam Test Facility - Ready for Commissioning

In August 2011, David Cameron visited Daresbury to launch the Daresbury Enterprise Zone and formally announce a £10M scientific investment, £2.5M of which was to design and build the Electron Beam Test Facility (EBTF).

EBTF is a modular injector facility capable of delivering a highly stable, highly customisable, short pulse electron beam. The 6 MeV beam will be used by collaborations between industry, STFC and HEIs for the development of accelerator technologies for commercial applications. These include cargo scanning, medical imaging, radiotherapy, sterilization, polymer crosslinking and rheological modification, water treatment and environmental clean-up.

EBTF consists of an RF photoinjector, beam diagnostics and transport to two industrial user areas. In November, staff at Daresbury celebrated the successful completion of the shielded enclosures, commissioning of the klystron and waveguide distribution system and commissioning of the photoinjector laser system. ASTeC staff are on track to achieve first electrons by Christmas.



Commissioning of Laser – ASTeC Head of Lasers and Diagnostics, Steve Jamison (left) with engineers from Coherent

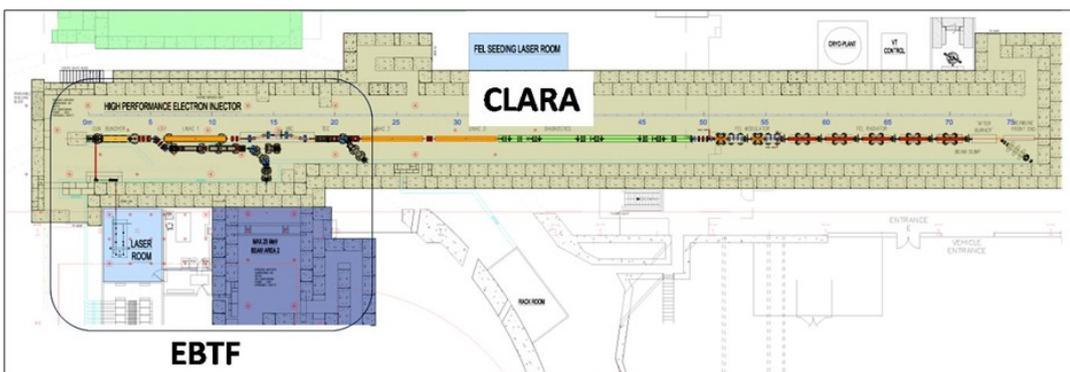


Laser Room

Module 1 under bake



Ultimately, EBTF will be the first stage of the Compact Linear Accelerator for Research and Applications (CLARA). This will be a UV free-electron laser (FEL) test stand, enabling the establishment of novel methods of coherent short pulse generation. CLARA will prepare the UK to make significant advances in testing several seeding concepts as well as to meet technological challenges to pave the way for a full scale UK FEL user facility.



Daresbury Laboratory

Cockcroft Researcher Awarded RSE/STFC Enterprise Fellowship

<http://www.cockcroft.ac.uk/news/rse.htm>

Cockcroft Institute Postgraduate Conference

http://www.cockcroft.ac.uk/news/CI_pg_conference.html

ASTeC builds novel prototype magnet for CLIC

<http://www.stfc.ac.uk/ASTeC/News+and+events/39101.aspx>

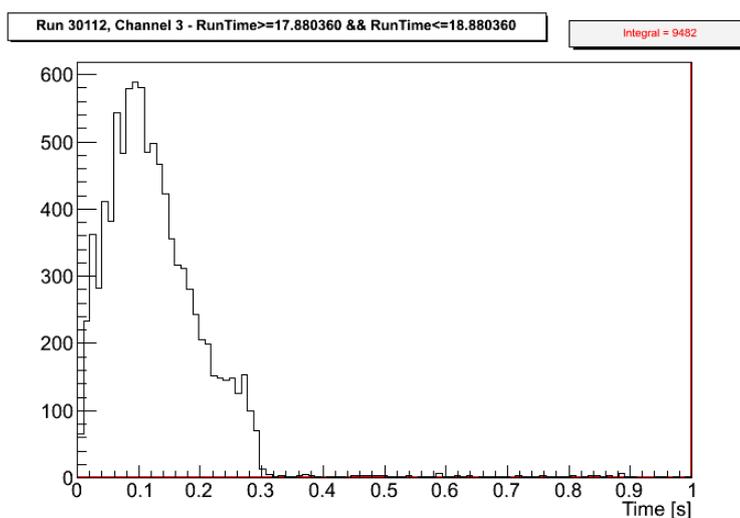
STFC World Expert Recognised with IOP Award

<http://www.stfc.ac.uk/ASTeC/News+and+events/39122.aspx>

ScandiNova Modulator Site Acceptance Test

<http://www.stfc.ac.uk/ASTeC/News+and+events/39393.aspx>

Antiprotons Caught !



The ALPHA Catching Trap successfully trapped antiprotons for the first time. This device, designed in collaboration between members of the Cockcroft Institute, Daresbury Laboratory Technology department, University of Manchester, and the ALPHA collaboration, is the first stage of the ALPHA-2 experiment and is responsible for capturing, cooling and accumulating the 5 MeV antiprotons delivered by CERN's Antiproton Decelerator and providing them on-demand to the ALPHA-2 atom trap.

The ALPHA Catching Trap has been designed and manufactured over the past year with construction at CERN beginning just over a month ago. Trapping antiprotons from the AD is a critical milestone in commissioning this device. Over the next few months, the team at CERN will continue to work towards creating the low-energy antiproton plasmas necessary for producing trapped antihydrogen in the ALPHA-2 experiment. The goal of the ALPHA-2 experiment is to conduct precision spectroscopy and measurements on trapped antihydrogen atoms.

LA³NET first international school on laser applications at accelerators GANIL, Caen, France October 15-19 2012

LA³NET is a recently established EU Marie Curie Network, led by Liverpool University, bringing together laser and accelerator specialists to solve problems associated with the use of laser systems at particle accelerator laboratories.

The network's series of events started off with a highlight: almost 80 researchers working with lasers at accelerators came together for an international school on laser applications at accelerators at GANIL in Caen, France to learn about the state of the art in laser-based particle sources, laser acceleration and particle beam diagnostics. This was an exciting week during which we learned a lot about this important field, and many new contacts between researchers from across the world were made possible. It was also the first time that all our newly recruited fellows got to meet each other and presented their background and projects in the form of short presentations. Fifteen new Fellows have already been recruited to the network, with two positions still to be filled.

The School also included an industry session comprising presentations from four of the industry partners in LA³NET: Danfysik from Denmark, Cosylab from Slovenia, Thorlabs from Germany and Cobolt from Sweden. These complementary presentations gave both young researchers and experienced academics an insight into what it is like working in industry and where working practices and priorities differed from academia.

A key lasers & accelerators research area is that of laser-based particle sources. Lasers have been successfully used to provide high brightness electron and exotic ion beams that cannot be realized by any other technique. They have unmatched selectivity in multi-step resonant ionization by wavelength-tuneable lasers at ISOL facilities and are able to provide very high currents for energy applications in heavy ion fusion. Within LA³NET, laser-based sources are being developed at CERN/Switzerland, Helmholtz Centre Dresden-Rossendorf/Germany and GANIL/France. All three projects will challenge existing techniques and technologies and require to go significantly beyond the present state-of-the-art.



International Symposium: Quantum Systems and Research(ers) at Accelerators

To celebrate the achievements of the [DITANET](#) project, a symposium was held at the Cockcroft Institute on May 16th. More than 70 students, researchers and policy makers from universities, research centres and industry from all across Europe took part in this event. They were given an insight into present and future challenges in antimatter research, beam diagnostics R&D, as well as researcher training - areas on which the projects had focused during the past four years - through a number of keynote talks and poster presentations.

The event started at 12:30 with a poster reception, before Prof. Carsten P. Welsch, Associate Director at the Cockcroft Institute and scientific coordinator of DITANET, gave an overview of the main project outcomes and showed how the future FLAIR facility will be able to provide unprecedented beam qualities. His talk was followed by Prof. Swapan Chattopadhyay, Director of the Cockcroft Institute, who presented accelerators as a key driver for cutting edge research in his presentation "Particle Accelerators - Beaming into Matter and Life".



The development of beyond state-of-the-art beam instrumentation was one of the main aims of DITANET and Dr. Rhodri Jones, leader of the beam instrumentation group at CERN, gave an outlook on the needs of future accelerator projects. His talk underlined that international collaboration and continuous training of researchers was of crucial importance for tackling the many existing challenges. The importance of technology transfer was then addressed by Rok Ursic, founder and CEO of Instrumentation Technology, Slovenia. He gave all attendees an idea of what made his company an international success story and strongly encouraged a close dialogue between the industry and academic sectors.

Prof. Walter Öfert from FZ Jülich is one of the key scientists in low energy antimatter research. Amongst others, he was in charge of the PS210 experiment that produced 11 antihydrogen atoms back in 1996. It was not least this experiment that led to the foundation of a whole research area. In his talk, he gave an overview of almost 20 years of fascinating research at CERN and also an outlook on what exciting opportunities will come up with the new ELENA storage ring. Another future experiment at CERN was then presented by PD Dr. Alban Kellerbauer from the MPI for Nuclear Physics, Heidelberg. The ERC grantee explained the aims of the AEGIS project and the challenges in determining the effects of gravity on matter and antimatter systems.

The last part of the symposium was dedicated to researcher training. Dr. Janet De Wilde, head of STEM at the Higher Education Academy, gave an overview of postgraduate training in the UK and Europe, before Victoria Llobet from KoWi, Germany talked about present EU funding opportunities for researchers at all career stages. These presentations triggered many interesting discussions amongst the participants about researcher careers.

PAB GROUP & UK EVENTS

Workshop on High Performance Computing in Accelerators

Daresbury Laboratory, 15-17 January 2013 (see page 4 for details)

Mini-workshop: Simulation of Power Dissipation and Heating from Wake Losses in Accelerator Structures

Diamond Light Source, 30 January 2013

Accelerators for Security Applications

Reading, February 2013 (AWE organised)

Accelerator Training Workshop

March 2013 (tentative)

PAB Group Annual Meeting

Cockcroft Institute, Daresbury Laboratory, 10 April 2013

3rd ILC Beam Dynamics Workshop on Low-Emittance Rings

Oxford, 10-12 July, 2013

Impedance Calculations for Short Bunches

1/2 day meeting

Diamond Light Source

New Power Technologies for Accelerators

RAL, 2013

X-Band Workshop

Laser Plasma Wakefield Accelerators for Electrons and Ions

Useful Links

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

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

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

www.diamond.ac.uk

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

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

INTERNATIONAL CALENDAR

Seeding and Self-Seeding at New FEL Sources

ICTP, Trieste, Italy 10-12 Dec 2012

<http://www.elettra.trieste.it/SSSFEL12/index.php?n=Main.HomePage>

CLIC Collaboration Meeting

CERN, Geneva, 28 Jan -1 Feb 2013

<https://indico.cern.ch/conferenceTimeTable.py?confId=204269#all.detailed>

LA3NET 1st Topical Workshop on Laser Based Particle Sources

CERN, Geneva, 20 -22 Feb 2013

<https://indico.cern.ch/conferenceDisplay.py?confId=212365>

IPAC 13

Shanghai, PRC, 13—17 May 2013

<http://www.aps.org/meetings/meeting.cfm?name=IPAC13>

European Linear Collider Workshop (ECFA LC2013)

DESY, Hamburg, 27—31 May 2013

<http://lc2013.desy.de/>

International Workshop on Beam Cooling and Related Topics, COOL'13

Murren, Switzerland, 10 -14 June 2013

<https://cool-13.web.cern.ch/COOL-13>

IEEE Plasma Science Conference

San Francisco, CA, 16—21 Jun 2013

Lepton—Photon 2013

SLAC, CA, 24—29 Jun 2013

Free-Electron Laser Conference FEL 2013

New York City, 26—29 Aug 2013

<http://www.c-ad.bnl.gov/fel2013/>

International Beam Instrumentation Conference (IBIC 2013)

Oxford, UK, 16—19 Sep 2013

16th International Conference on RF Superconductivity, SRF 2013

Paris, France, 23 - 27 Sep 2013

<http://www.srf2013.fr/>

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IoP Particle Accelerators and Beams Group

IoP PAB Committee

Chair: Prof. Phil Burrows (Oxford)

Secretary: Dr. Peter Williams (Daresbury)

Treasurer: Dr. Brian McNeil (Strathclyde)

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Dr. Dan Faircloth (RAL); Web Manager

Prof. Mike Poole (Daresbury)

Prof. Susan Smith (Daresbury)

Mr. Aled Jones (AWE)

Dr. Riccardo Bartolini (Diamond Light Source & JAI)

Dr. Adina Toader (Manchester)

Dr. Paul Beasley (Siemens); Industrial representative

Dr. Jonathan Smith (Tech-X UK); Industrial representative

James Henderson (Strathclyde); co-opted student

**Deadline for submissions to the
next newsletter is
01 April 2013**

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