

## And then there was AVA!

**In the cover article of issue 12 of the oPAC newsletter from October 2015 I highlighted an urgent need in additional training programs that would follow onto the success of oPAC.** I am absolutely thrilled that the European Commission has now announced that a new network on “Accelerators Validating Antimatter physics” ([AVA](#)) will be funded! This is fantastic news and comes at exactly the right time: The ELENA decelerator at CERN is being commissioned and will open up many new research opportunities. To fully exploit the potential of this new machine an intense R&D program into beam transport and handling, advanced diagnostics, as well as studies into novel experiments will be required. All of this will be done in the frame of AVA which I will have the pleasure of coordinating. The EU provides the collaboration with almost 4 M€ of funding to train 15 Fellows over the 4 year project duration. Similar to what we have done within oPAC, the new network will also organize a number of international events, including Schools, Workshops and Conferences that shall benefit the wider research community. This is yet another amazing outcome of the oPAC project and I would like to thank everyone who has supported this idea.

**More than 5000 higher education professionals from all corners of the world have participated in the Europe’s largest Higher Education’s Conference ([EAIE](#)).** We had the pleasure to lead a session about ‘Accelerating Researcher Careers’.

The session presented the successful training model that has been established by the oPAC collaboration. In an interactive setting a member of the Liverpool project TEAM and an expert from Inventya Limited who specializes in academia-industry collaboration discussed the specific needs from industry and how modern training schemes can provide what industry needs. A PhD student chaired the session and also presented their own experiences. There were many questions from the audience after the presentations – a clear indicator that postgraduate training schemes are still in need of improvement.

**Almost 1 year after the end of the oPAC project we had an excellent workshop on beam loss monitors in Barcelona.** This followed right after the [IBIC](#) conference which was perfectly organized by our colleagues from ALBA. The workshop joined around 30 experts from all over the world and allowed us to have what large conference can not normally provide: intense and detailed discussions around a highly specialized area where knowledge exchange is key to advancing technologies and systems. oPAC has organized a large number of these events over the years and there is a very impressive number of presentations now available via [indico](#). We will continue this tradition with a workshop on gas jet-based profile monitors that will be held in Liverpool, UK in March 2017. If you would like us to consider additional events – please get in touch !



Carsten P. Welsch, Coordinator

### Special Interest Articles

- oPAC in IBIC 2016
- Multimillion Euros Project on Antimatter Research announced
- CNA joins RD50 collaboration at CERN

### Individual Highlights

- Research News
- oPAC Events
- Interview with Daria Astapovych
- Vacancies

## Research News

### Novel analysis technique for measurements with single-crystal chemical vapor deposition (sCVD) diamond detectors – Pavel Kavrigin

OPAC fellow Pavel Kavrigin and his supervisor at Cividec Instrumentation, Erich Griesmayer, have recently published two papers in European Physics Journal A, detailing a new technique to analyse cross section measurements with single-crystal chemical vapor deposition (sCVD) diamond detectors.

This method exploits the unique electronic property of sCVD diamond sensors that the signal shape of the detector current is directly proportional to the initial ionization profile.

In fast-neutron fields the diamond sensor acts simultaneously as target and sensor. The interaction of neutrons with the stable isotopes  $^{12}\text{C}$  and  $^{13}\text{C}$  is of interest for fast-neutron diagnostics. The measured signal shapes of detector current pulses are used to identify individual types of interactions in the diamond with the goal to select neutron-induced reactions in the diamond and to suppress neutron-induced background reactions as well as g-background.

The method was verified with experimental data from  $^{13}\text{C}(n,\alpha)^{10}\text{Be}$  cross section measurements performed at the Van de Graaff facility of the Joint Research Centre Geel. The  $^{13}\text{C}(n,\alpha)^{10}\text{Be}$  cross section was

measured relative to the  $^{12}\text{C}(n,\alpha)^9\text{Be}$  cross section at 14.3 MeV and 17.0 MeV neutron energies.



The  $^{13}\text{C}(n,\alpha)^{10}\text{Be}$  reaction was successfully extracted from the dominating background of recoil protons and g-rays and the energy resolution of the  $^{12}\text{C}(n,\alpha)^9\text{Be}$  reaction was substantially improved. The presented analysis technique is especially relevant for diagnostics in harsh radiation environments, like fission and fusion reactors. It allows extracting the neutron spectrum from the background, and is particularly applicable to neutron flux monitoring and neutron spectroscopy.

More information:

[\$^{13}\text{C}\(n,\alpha\)^{10}\text{Be}\$  cross section measurement with sCVD diamond detector](#)

P. Kavrigin, E. Griesmayer, F. Belloni, A.J.M. Plompen, P. Schillebeeckx, C. Weiss  
Eur. Phys. J. A 52, 179 (2016)

[Ionization signals of diamond detectors in fast neutron fields](#)

C. Weiss, H. Frais-Kölbl, E. Griesmayer, P. Kavrigin  
Eur. Phys. J. A 52, 269 (2016)

## Improving Ion Beam-based Cancer Therapy – Cristina Battaglia

**One of the major advantages of proton or ion beams for cancer treatment is their excellent depth-dose profile exhibiting a low dose in the entrance channel and a distinct dose maximum (Bragg peak) near the end of range in tissue.** In the region of the Bragg peak, where the protons or ions are almost stopped, experimental studies with low-energy particle beams and thin biological samples may contribute valuable information on the biological effectiveness in the stopping region.

In a paper that has just been published in the expert journal *Physical Review Accelerators and Beams* OPAC Fellow [Cristina Battaglia](#) and co-researchers present how a beam line has been prepared to get uniform spatial profile irradiation fields of low energy protons. The resulting setup was used to study the dose calibration of radiochromic films for proton energies at which maximum deposition occurs in the active layer. These studies are important to supply an accessible way of measuring dose distributions in proton therapy cancer centers, since color changes in films can be associated to dose measurements.

Such experiments require beam optimization and special dosimetry techniques for determining the absolute dose and dose homogeneity for very thin biological samples. At the [National Centre of Accelerators in Seville](#), one of the beam lines at the 3 MV Tandem Accelerator was equipped with

Further information:

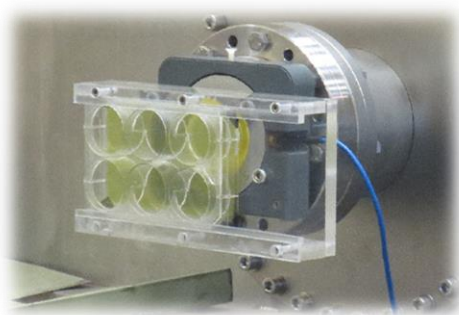
[Dosimetric response of radiochromic films to protons of low energies in the Bragg peak region](#)

M. C. Battaglia, D. Schardt, J. M. Espino, M. I. Gallardo, M. A. Cortés-Giraldo, J. M. Quesada, A. M. Lallena, H. Miras, and D. Guirado  
Phys. Rev. Accel. Beams 19, 064701 (2016)

[Dosimetry for low energy protons with ionization chambers and EBT3 films in the BRAGG peak region](#)

M. C. Battaglia, D. Schardt, J. M. Espino, M. I. Gallardo, M. A. Cortés-Giraldo, J. M. Quesada, A. M. Lallena, H. Miras, and D. Guirado  
Physica Medica 32, Supplement 3, 204 (2016)

several elements in order to be able to irradiate cell cultures. In the journal article, which also forms part of a [special oPAC edition](#) of the journal, the quantification of the energy deposited by protons is studied with radiochromic films, which have the property of turning blue proportionally to the dose absorbed (fig. 1). The study group successfully obtained results in terms of homogeneity of the beam profile. A protocol of dose calibration for radiochromic films was also established at energies far from the Bragg peak, while effects of saturations were noticed in this region, and further studies will soon be carried out to establish the exact nature of these effects.



Irradiation setup for radiochromic films.

Cristina presented this work in the 1<sup>st</sup> European Congress of Medical Physics in Athens (1 – 4 September) and the proceedings were published in a special issue of [Physica Medica](#).

## Network News

### oPAC in IBIC 2016

Sun-drenched palm trees and luxury cruise liners dawdling in the balmy waters of the port of Barcelona presented a splendid backdrop to this year's edition of the **International Beam Instrumentation Conference (IBIC)**, brilliantly organised by Francis Perez and colleagues from the oPAC partner ALBA from 11 to 15 September.



Representatives of two oPAC partners, ALBA and Instrumentation Technologies, opening the Conference IBIC 2016 in front of the University of Liverpool stand

The industrial exhibition, held in conjunction with the Conference, featured once more the University of Liverpool. The booth, manned by oPAC project manager Ricardo Torres, showcased the plethora of projects initiated by Prof. Carsten P. Welsch.

Information about oPAC and its sister network LA<sup>3</sup>NET was complemented with the new Initial Training Networks OMA – Optimization of Medical Accelerators, and the recently awarded AVA dedicated to accelerators for antimatter physics.

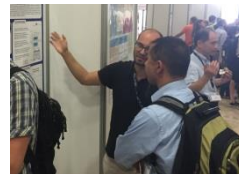


Prof Carsten Welsch and Miguel Fernandez attending one of the poster sessions.

The achievements of the oPAC and LA<sup>3</sup>NET training networks were further highlighted by contributions to the scientific program by former oPAC fellows Laura Torino, Michele Carla, Miguel Fernandes, Manuel Cargnelutti, and by Prof Welsch himself.

The stand also promoted the European design studies Eupraxia – for a compact European plasma accelerator with industrial beam quality – and EuroCirCol, for a future 100 TeV hadron-hadron circular collider.

**IBIC is the world's largest conference on particle beam instrumentation** and this year it was attended by some 400 scientific experts and industrial delegates, therefore it was a unique opportunity to showcase oPAC's achievements and boost the visibility of the project in the world of particle accelerators.



## oPAC's training model presented at Europe's largest higher education conference

**More than 5,000 higher education professionals from all corners of the world have participated in the 28<sup>th</sup> European Association for International Education's (EAIE) annual conference held in Liverpool, 13<sup>th</sup> - 16<sup>th</sup> September.**

LA<sup>3</sup>NET project manager Magda Klimontowska together with James Hunt, PhD student from the University of Liverpool, led the 'Accelerator Researcher Career' session at Europe's largest higher education conference. They were joined by Michael Holroyd, a managing director of Inventya Ltd, to explore the conflict between the standard training received by postgraduate students and the demands of the technology industry for highly qualified researchers.

In the session chaired by James Hunt, Michael Holroyd presented the specific industry needs and expectations in terms of highly qualified graduates and Magda Klimontowska responded to this with an overview of the postgraduate training model developed within several international training networks like oPAC that have been initiated and coordinated by oPAC Coordinator Prof Welsch. These presentations were followed by a set of questions from the audience.

Since 2008, Prof Welsch with support from his EU T.E.A.M., has coordinated four EU-funded Innovative Training Networks in the field of particle accelerators. A fifth network which will cover research into antimatter ([www.ava-project.eu](http://www.ava-project.eu)) is set to start in January 2017.



*Michael Holroyd, Magda Klimontowska and James Hunt*

## oPAC Book of Memories

**Being a former fellow of the largest European Training Network ever funded is not something that everybody can boast about.**

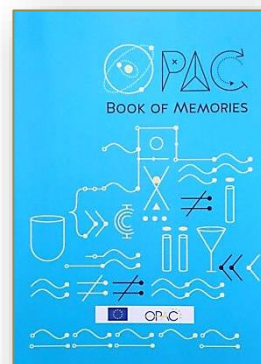
For most of the 23 members of this exclusive club, those three years of research and training in the optimisation of particle accelerators have left a profound impression dotted with countless memories worth remembering.

For this reason, Instrumentation Technologies' Dr. Nika Vodopivec has been kind enough to put together the oPAC Book of Memories, a limited-edition volume

containing a collection of pictures and testimonials from the fellows of the oPAC network.

The book was presented at the 'Fellows reunion' event that took place during the Researcher Careers Workshop organised in Krakow in June by the oPAC and LA<sup>3</sup>NET networks.

Those fellows who were not fortunate enough to attend the event can still obtain a copy of their book by contacting oPAC's Project Manager [Ricardo Torres](mailto:Ricardo.Torres@opac-project.eu).



## Multimillion Euros Project on Antimatter Research announced

**AVA (Accelerators Validating Antimatter physics)** is a new European research and training network between universities, research centers and industry. Within the project a cohort of 15 Fellows will be employed to carry out cutting edge research and follow a highly innovative training program. The project was selected for funding in one of the European Union's most competitive funding schemes and will benefit from almost 4 M€ of funding over its 4-year duration. AVA targets new scientific and technical developments in antimatter research and aims at boosting the career prospects of its Fellows.

Antimatter is a rather exotic material composed of antiparticles, which have the same mass as particles of ordinary matter but opposite charge. Collisions between particles and antiparticles lead to the annihilation of both, giving rise to a release of energy, proportional to the total matter and antimatter mass. Low energy antiprotons are particles that are highly desirable for the investigation of a number of very basic questions on the fundamental laws of physics. The project will be coordinated by oPAC Coordinator Prof Carsten P. Welsch. Through the coordination of oPAC Prof Welsch and his EU TEAM have a proven track record in the coordination of large scale European networks. AVA will directly build up on experience and expertise gained within these earlier initiatives and train the next generation of researchers.

He said: "Antimatter experiments are at the cutting edge of science. They are, however, very difficult to realize and have been limited by the performance of the only existing facility in the world, the Antiproton Decelerator at CERN. This year the new Extra Low Energy Antiproton ring (ELENA) is being commissioned at CERN and will be a critical upgrade to this unique facility. This will significantly enhance the beam quality and enable new experiments. In addition, there are exciting long-term prospects through

opportunities a future low energy antimatter facility could provide as part of the FAIR research centre in Germany."

Within AVA, the project partners will pursue a closely connected R&D program across three scientific work packages. The first one focuses on facility design and optimization, addressing beam life time and stability issues in lowest energy storage rings, as well as beam cooling, deceleration and extraction processes. Work package 2 addresses the design, development and testing of novel beam diagnostics and in particular the establishment of a dedicated instrumentation and detector test stand, to fully determine the characteristics of an antiproton beam. Finally, novel low energy antimatter experiments will be carried out through involving beyond state-of-the-art beam handling, storing and analysis techniques.

A structured combination of local and network-wide trainings will also be offered within AVA. This will follow the example of the oPAC project and include courses at the different host institutions, alongside network-wide trainings which will be made available to the wider scientific community. The project comprises a lot of the European expertise in this research area and involves 4 universities, 8 national and international research centers with 13 partners from industry.

**AVA is offering 15 Fellowships** to talented, energetic, highly motivated early career researchers that will be employed by the different project partners across Europe. Possibilities for enrolling into a PhD programme exist. Each researcher will benefit from a wide ranging training programme that will take advantage of both local and network-wide activities. Excellent salaries will be offered. The application deadline is 31st January 2017.

More information about the project can be found on the project home page: <http://www.ava-project.eu>

*This project has received funding from the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 721559.*



The AVA project will allow cutting edge research and promote training innovations.



## oPAC Events

### oPAC Topical Workshop on Beam Loss Monitors



The latest Topical Workshop of the oPAC network has taken place in Barcelona on 15<sup>th</sup> – 16<sup>th</sup> September, right after the International Beam Instrumentation Conference (IBIC), and it was devoted to Beam Loss Monitors.

from the Stanford Linear Accelerator Center in California to the Australian Synchrotron down under, not forgetting European machines like XFEL, ESRF, and the LHC.



The workshop attracted around 30 delegates to discuss the latest developments in the BLM systems of facilities from all over the world,



The comparatively reduced size of the meeting allowed for longer and more in-depth discussions that had been possible during the much larger IBIC conference, offering the delegates a better opportunity for exchanging ideas and expertise.

The workshop on BLMs culminated an intense week of discussions on particle beams instrumentation in Barcelona. The slides presented at the meeting can be accessed at <https://indico.cern.ch/event/527597/timetable/#all>



## Researcher Careers Workshop in Krakow

**oPAC organised a Researcher's Career Workshop and Fellow re-union hosted in the beautifully preserved city of Krakow, Poland, June 26<sup>th</sup> - 27<sup>th</sup>, 2016.** Expertly executed by LA<sup>3</sup>NET Project Manager Magdalena Klimontowska, the event simultaneously acted as an important opportunity for researchers to explore career options and as a reunion for LA<sup>3</sup>NET and oPAC Fellows.

Krakow greeted all participants with some stunningly sunny weather which paved the way for an active Sunday. Various Fellows flocked to a conference room inside of the Campanile Hotel for an interactive sightseeing game aptly titled "The Disappearance of Professor Einstein Jr." in which the participants were divided into teams and competed to solve the professor's disappearance by finding clues and completing intellectual challenges around Krakow's old town. The competition involved orienteering, riddles and even climbing 271 steps up to the trumpeteers room of St. Mary's Basilica. Completion of these challenges allowed the participants to discover the location of the elusive Professor who was waiting in the "W Starej Kuchni" restaurant, where the weary contestants were rewarded with a plentiful banquet of Polish cuisine.

Monday began with an early start as the attendants gathered on the panoramic top floor of Krakow's International Cultural Centre in preparation for the upcoming presentations. The workshop began with oPAC Coordinator Prof. Carsten P. Welsch, who introduced the meeting with a talk on researcher career pathways and also spoke later in the afternoon on careers in academia. Other contributions to the event included oPAC Project Manager Dr. Ricardo Torres' presentation about his personal experience on an alternative career path, and former Marie Curie Fellow Ms. Alexandra Alexandrova who spoke about running a spin-off company, using her own experiences as CEO of D-Beam Ltd. for reference.

The Careers Workshop covered an extensive range of career prospects presented by

people from various organisations and backgrounds. For example: Mr. Dawid Gacek (Regional Contact Point for EU Research Grants from the Tadeusz Kościuszko University of Technology in Krakow), Prof. Dr. Hagit Amirav (VU University Amsterdam) and Dr. Szymon Walczak, Dr. Marcin Hajduk, Dr. Marta Buchalska (National Science Centre, Poland) all gave excellent presentations regarding researchers applying for grants. Before lunch, Ms. Claudia Wegner-Wahnschaffe promoted Find Your Pension, which aims to assist mobile researchers find and organise information on their pensions, and Mr. Seamus Hagerty (CERN) spoke on pursuing a career in a large-scale research centre. The afternoon also included Dr. Janusz Harasimowicz (Elekta), who talked about career progression from academia to industry, Dr. Sławomir Wronka (National Centre for Nuclear Research, Poland) who gave a presentation on managing a spin-off company and finally Dr. Piotr Tracz (ELI – NP) who spoke in-depth about a new nuclear facility for research based in Romania.



The following day, after a successful workshop, the Fellows were treated to a visit to Solaris - the Polish National Synchrotron, which involved detailed talks on the Synchrotron from several members of the Solaris team. In addition to this, there was a comprehensive tour led by Machine Deputy Director, Dr. Adriana Wawrzyniak, which involved the group getting to see exactly what the Synchrotron consisted of and how it worked.

Overall, the entire excursion was found to be a resounding, and rewarding, success.





## Fellows News

### Interview with Daria Astapovych

*Daria Astapovych was born in Sumy, Ukraine in May 1990 and gained her diploma in physics at the Sumy State Pedagogical University. She obtained a bachelor's degree in physics during which she undertook pedagogical practice in schools as a teacher of physics and mathematics within the course 'General Physics and Electromagnetism'. In May 2012 Daria obtained a master's degree in physics. She decided to focus on a computer simulation for beam dynamics, specifically in the electron cooling process using BETACOOL and worked at the Institute of Applied Physics of the National Academy of Science of Ukraine.*

*Daria joined the oPAC project as Marie Curie Fellow in 2013. Her research was focused on studying the single-bunch instabilities observed in the LHC, the verification of the accuracy of the impedance model, using HEADTAIL and NHTVS.*

**What did attract you to the oPAC network? Has it fulfilled your expectations?**

In 2012 I graduated from the University with Master degree and started to think about my future. I was and still interested in physics, especially in accelerator physics. I tried my luck searching the position in couple of famous organisations. And once I came across the oPAC project. Searching more information about the oPAC network I was surprised that it was so easy to apply, the application is open for everyone.

I can confidently say, that it was the best decision in my life to start working under the oPAC. As for me, the oPAC means meeting new people, mobility, improving knowledge through attending different conferences, schools.

I would never regret about the network. It gave as much as possible and helped me with the decision for my future.



**Why did you choose to go to CERN?**

In the University I was very interested in nuclear physics and tried to read more and more to understand how people do this — how do they understand the nature. I found a lot about the LHC and couldn't imagine that it's possible to build such a giant machine. I dreamed about the possibility to work there. And sometimes dreams come true.

**Can you explain in a few words what your project was about and what have you achieved?**

My project was related to the study of the single bunch instabilities in the LHC. Transverse collective instabilities are one of the most important limitations to achieve the highest luminosities in the LHC and have been regularly observed during the LHC Run I.

The goal of this study is to verify the accuracy of the impedance model to be able to make predictions for the future operation of LHC. It was done with the tracking HEADTAIL code using the LHC impedance model.

The result of this work was a published report at CERN External Notes under the supervision of Elias Metral and Nicolas Mounet.

**What has oPAC provided you professionally?**

I think the project gave me quite a lot. It helped me to strengthen my knowledge in physics, in particular, beam dynamics; improved my skills as a scientist; high quality trainings contributed a lot into my personal skills.

I would like to be objective in this question, but the oPAC gave me quite a lot: starting with improving my knowledge in physics, in particular, beam dynamics, and finishing with development of my personal qualities.

**What are your professional plans now that oPAC has finished?**

Three years is a quite long period and it was a time for me to think where I see myself in the future. I could definitely say that I still would

like to stay in the science and, probably, to become a professor in the later future

**What will be your most cherished memory from oPAC?**

It's really difficult to highlight just one think. But I would never forget two events. The first one is the ESOF 2014. Carsten Welsch proposed to go to Copenhagen and give a small talk about the oPAC. I was so overjoyed to meet on this forum the Nobel prize winner Prof. Dr. Serge Haroche and had a chance to talk with him. The second, but not least, is the Symposium on Lasers and Accelerators for Science & Society in Liverpool. It was so amazing to meet one of the great populariser of science Prof. Brian Cox.

## Partner News

### Centro Nacional de Aceleradores joins the RD50 collaboration at CERN



**The Centro Nacional de Aceleradores (CNA) from Seville, Spain, has recently joined the CERN/RD50 project as an observer partner.**

This collaboration gathers more than 260 scientists from 50 institutions in Europe, USA and Asia, including other oPAC partners, like the University of Liverpool and obviously CERN.

The objective of the CERN/RD50 project is to investigate radiation hard semiconductor devices for very high luminosity colliders. In particular, the aim is to develop a silicon tracker able to withstand radiation doses ten times higher than in the current LHC experiments. The detectors will then be used in the High Luminosity upgrade of the LHC.

The four lines of work of the project are:

- Characterization of defects and microscopic properties of materials after irradiation.
- Characterization of silicon detectors by structural and defect tests.
- Investigation of new detectors (3D, new structures, avalanche detectors).
- Detector systems.

The collaboration will exploit the capabilities of the accelerators at CNA. These accelerators may be used to induce high flux radiation damage in materials, simulating the effects of the radiation on the detectors of large facilities after several years of operation. On the other hand, the techniques of analysis of materials developed at CNA, like Ion Beam Induced Current (IBIC), are very relevant for the study of irradiated detectors.

## Accelerators workshop for teenagers at the Cockcroft Institute

The project manager of oPAC, Dr Ricardo Torres organised over the summer a series of oPAC-inspired outreach workshops on accelerator science for teenage school children at the Cockcroft Institute, in Daresbury Laboratory.

The project, funded by the Royal Academy of Engineering and the Science and Technology Facilities Council, was carried out with the help of members of the Quasar group and a handful of volunteer scientists.



Building a "salad bowl accelerator"

Over six days in June and July the Institute was overrun by more than 200 school children aged 13 – 14 and their teachers for a day filled with hands-on experimental demonstrations, talks, and mingling with scientists.

The event began with an informative and enthusiastic talk from oPAC co-ordinator Carsten Welsch, appropriately titled "Accelerating you". The talk highlighted the

key and most important areas of accelerator science which included: medical applications (OMA), antimatter and the Large Hadron Collider.

The students then set out to build and test their own instruments with the materials given: a salad bowl accelerator, a Van der Graaf generator, a rail gun, a dc motor and a homopolar motor. They filmed the experiments on video and showed them at the end of the day, after a short presentation of their experience.

The Quasar team passionately set out to create an exciting and challenging day for the 14 year olds in an effort to encourage the pursuit of science as a career choice. The videos displayed the students success, creativity (and a healthy dash of Liverpoolian humour), which left the students, teachers and volunteers in high spirits at the end of the day.



Participating school children showing their home-made Van de Graaff generator

Two summary videos of the outreach days have been posted on YouTube.

Check them out:



<https://youtu.be/EuLyjzfP6K8>



<https://youtu.be/3zOpikkOZE4>

## oPAC Coordinator takes new role as Head of Liverpool Physics

**oPAC Coordinator Prof Carsten P. Welsch has just taken up a new role as the Head of the Department of Physics of the University of Liverpool.** Following an international search process, he will take up this important position for a 5-year term.

Professor Welsch's research covers the development and experimental exploitation of particle accelerators and light sources. He has a particular focus on the design and optimization of Frontier Accelerators, such as the Large Hadron Collider at CERN and its upgrade programs; Novel Accelerators, including dielectric laser accelerators and particle-driven plasma wakefield accelerators; Accelerator Applications with a focus on medical applications, laser applications and compact radiation sources. He has also initiated and coordinated the European Innovative Training Networks DITANET, oPAC, LA<sup>3</sup>NET and OMA from the Cockcroft Institute and has successfully completed a number of

multimillion pound projects that link him to the world-wide accelerator community.

Prof Welsch said: "I am delighted and honoured to accept this new role. It brings with it a number of challenges and I am keen to consolidate the work that the previous Head of Department, Prof Touramanis, has already done."

He went on to say that "Liverpool is one of the UK's leading centres for physics research, with a proud history of discovery that goes back more than 100 years. The department is internationally known for its excellent research in particle and nuclear physics, condensed matter physics and accelerator science. I look forward to building on our reputation to enable world-class research, provide excellent teaching and continue to attract the very best students and researchers."

**Congratulations!**

## Carsten Welsch named co-editor of Instruments



*instruments*

**oPAC Coordinator, Prof Carsten P. Welsch has recently been inducted into the Editorial Board of the journal Instruments.**

*Instruments* is a new peer-reviewed, open access journal focused on scientific instrumentation and on the related methods and theory.

The main objective of *Instruments* is to provide a forum for advanced research on instruments, experimental apparatus, techniques and data processing for fundamental science and its applications. Transcending the specialised field for which a particular instrument was developed, the journal will aim at a broad interdisciplinary public.

The editor's ambition is to select high quality papers presenting major achievements and truly innovative results in instrumentation for various research fields, such as physics, engineering, chemistry, material science, biology, medicine, etc. This broad spectrum of disciplines should naturally promote the submission of trans-disciplinary papers.

On behalf of the Editorial Board, Carsten Welsch would like to invite you to choose *Instruments* to submit your high quality, innovative papers. They will be subject to a rigorous peer-review process and, if accepted, published online within a short time.

## Miscellaneous

### FindyourPension – Navigating within the European Pension Landscapes

**Findyourgym, Findyourphone or Findyourlove; but FindyourPension?** This topic is not expected to be the first on the list of google's most favourite websites. In fact, many people do not consider their old-age provision during younger years. They rely on their career and a somewhat growing prosperity until the time has come to retire. However, this strategy might change when you are a mobile researcher - changing your jobs and pension systems frequently. In this case, it is crucial to understand a bit of the workings of pension systems in order to not forget who will pay your old-age pension someday...

FindyourPension is a website dedicated to mobile researchers working for universities and publicly funded research facilities. It helps you to find orientation and guidance in your pension biography by:

- Providing basic knowledge about the different sources of pensions in general and the different pension landscapes in the various European countries
- Finding your pension providers related to the listed research employers
- Giving answers to the most frequently asked questions in terms of professional mobility and pensions in the Pensions ABSs of the incorporated systems

As of July 2016 the new feature FindyourPension – My Track

After the log in users can save and track their career- and pension biographies. This tool helps to document your pension path and also serves as an explanation tool on how pension entitlements are accrued. Here, it is also possible to add up the different pension claims accrued and thus better estimate the expected pension income. My track is available at [www.findyourpension.eu](http://www.findyourpension.eu).



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## Vacancies

[Fellowship opportunities within the QUASAR Group](#)

Cockcroft Institute / University of Liverpool

[Marie Curie Early Stage Career Fellowship – OMA project](#)

Several locations around Europe

[Marie Curie Early Stage Career Fellowship – AVA project](#)

Several locations around Europe

## Selected Publications

[\$^{13}\text{C}\(n,\alpha\_0\)^{10}\text{Be}\$  cross section measurement with sCVD diamond detector](#)

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Phys. Rev. Accel. Beams 19, 064701 (2016)

[Dosimetry for low energy protons with ionization chambers and EBT3 films in the BRAGG peak region](#)

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**Events**

Oct 24 <sup>th</sup> – 26 <sup>th</sup> 2016	LA <sup>3</sup> NET Topical Workshop on Novel Accelerating Techniques, Paris, France
Oct 24 <sup>th</sup> – 25 <sup>th</sup> 2016	LA <sup>3</sup> NET Topical Workshop on Laser Ion Sources, Paris, France
Oct 25 <sup>th</sup> – 28 <sup>th</sup> 2016	PCAPAC 2016, Campinas, Brazil
May 14 <sup>th</sup> – 19 <sup>th</sup> 2017	IPAC'17, Copenhagen, Denmark
Aug 21 <sup>st</sup> – 25 <sup>th</sup> 2017	IBIC'17, Grand Rapids, MI, USA

**NOTICE BOARD**

DEADLINE FOR CONTRIBUTIONS TO THE NEXT NEWSLETTER 30<sup>th</sup> November 2016



**About oPAC**

The optimization of the performance of any Particle ACcelerator (oPAC) is the goal of this new network within the FP7 Marie Curie Initial Training Network (ITN) scheme. oPAC aims at developing long term collaboration and links between the involved teams across sectors and disciplinary boundaries and to thus help defining improved research and training standards.

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[www.opac-project.eu](http://www.opac-project.eu)

