

oPAC bidding for the academy awards, new Project TEAM members and exciting events

Scientific outreach is a very important element of oPAC's research and training activities. All of our Fellows are very committed to share their excitement for research with the wider scientific community, the general public and in particular school children. All Fellows have realized several visits to primary and secondary schools in numerous countries. The feedback they have received on accelerators in general and their research in particular was overwhelmingly positive and all found these visits very valuable experiences. The Fellows have also completed short videos about their research projects. These explain their R&D targets and can now be accessed via our [YouTube channel](#) and [website](#). The quality of these videos is very impressive and I strongly encourage you to have a look ! Finally, the Fellows will present their studies in form of posters during the project's review meeting and outreach symposium in Liverpool, UK on 26th June 2015.

I am delighted to welcome our new Project Manager, Dr Ricardo Torres, as well as Project Assistant, Mr Blaise Guénard, as members of the EU Project T.E.A.M., based at the Cockcroft Institute. Excellent administrative support is very important to make a large scale project, such as oPAC, work. Both will work closely with the Steering Committee and me during the final phase of the network and ensure that we can continue to provide strong support for our Fellows and project partners.

The CAoPAC workshop took place at GSI, Germany this month and was found to be a great success. Fully booked long before the registration deadline, the event showed that there is a high demand for workshops on computational aspects of accelerator optimization. This workshop was a very special event for us as it put our Fellows in charge of the event organization. They have put together an exciting program that triggered many interesting discussions during all three days. I would like to cordially thank them for the enormous effort they put in over the past year ! All presentations can be found on the [workshop indicio page](#).

There have not been any other research and training programs that link beam physics, diagnostics, control systems and numerical simulation tools as closely as this is the case in oPAC. The unique approach taken by the network has stimulated exciting research projects, many discussions between project partners and has initiated several new R&D initiatives. We would like to let the whole accelerator community benefit from this approach and will organize an international conference on accelerator optimization, linking all the above areas, at the National Accelerator Center (CNA) in Seville, Spain between 7-9 October 2015. Registration is now open via the project web site. *As usual, places will be strictly limited so register early to avoid disappointment !*



Carsten P. Welsch, Coordinator

Special Interest Articles

- CAoPAC Workshop held at GSI
- Fellows Activity – Stars of the Screen
- New to the Network

Individual Highlights

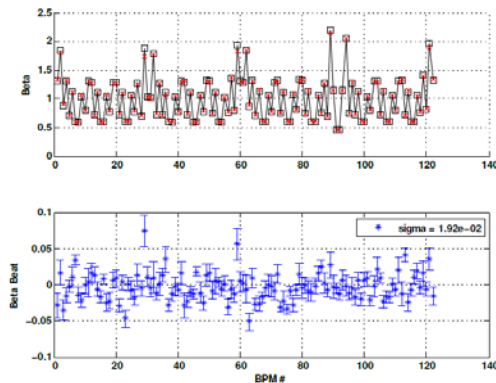
- Research News
- Upcoming Events
- Secondments

Research News

Turn-by-Turn Measurements at Soleil - Michele Carla



The magnetic structure of a storage ring defines the transverse movement of an electron travelling through the ring itself. Sampling the transverse beam position provides a lot of information to characterize storage ring optics properties. In order to observe the transverse dynamics two main requirements have to be accomplished: 1) The beam position monitor system has to be fast enough to resolve the beam position at each single turn, and 2) The transverse motion of the electrons in a bunch travelling through the ring has to be coherent.



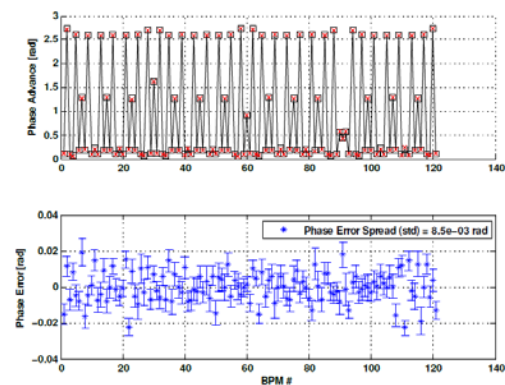
Measured betatron function compared to the one obtained from the nominal model.

The Soleil storage ring is equipped with 122 beam position monitors (BPM) able to sample and record the beam position at each turn for thousands of turns. Even if such BPM system guarantees a very high bandwidth, it is still lower than the ring revolution frequency, resulting in a mixing of the positions sampled at successive turns. This phenomenon is commonly known as turn smearing. To cope with this inconvenience a post processing of the data is required, where the response function of the BPM to a single turn signal is de-convoluted from the recorded signal.

The response function can be measured by injecting a short train of electron bunches in

the ring and dumping it out after exactly one turn. Such condition can be easily achieved by properly misfiring the injection kicker. This setup permits also to closely synchronize all BPMs together with the pass of the beam, condition that ensures the lower turn smearing.

Several tests to characterize BPM turn-by-turn performance were carried out. A first analysis of the data showed that it is possible to retrieve useful information about the linear optics errors in a storage ring, still the limited capabilities exhibited by the proposed approach called for some improvement, for example, by iterating the error estimation process. It has been shown how the optimization of the hardware setup plays an important role in measurement reproducibility, but a complete characterization of the up-upgraded BPM system was not possible due to the limited available BPMs. A tune frequency jitter phenomenon, common to other machines, has been pointed out. The source is still unknown but is currently under investigation.



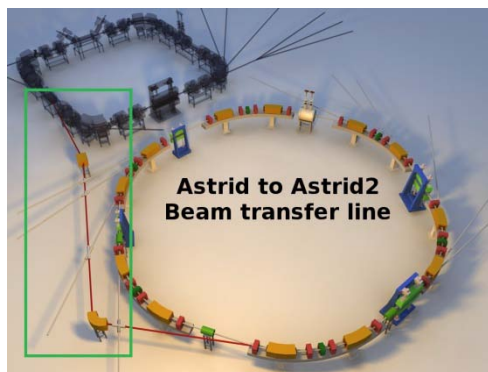
Measured phase advance between a couple of BPM's compared to the one obtained from the nominal model.

Beam loss monitoring in the transfer line between Astrid and Astrid2 - Michal Jarosz

The Centre for Storage Ring Facilities – ISA in Aarhus (Denmark) has two electron synchrotrons, Astrid (A) and Astrid2 (A2), connected with a transfer line which requires inspection to explain the slowly deteriorating performance, mostly in terms of transmission. Beam loss mechanisms should be explained, pin-pointed and solved to improve it. For that, a set of cameras measuring the visible light was used to observe the beam position and its stability. A quadrupole scan ensured that the beam passes the quadrupoles as close to their middle as achievable while using four pairs of corrector magnets and the images from the cameras. Also a pair of dosimeters (ionization chambers) were used to provide auxiliary data.

An online MATLAB model of the Astrid to Astrid2 transfer line was created and used to simulate and foresee the effects of corrector tuning in the actual machine. Simulations took the beam from Astrid synchrotron as an input and transported it through the model having output beam at Astrid 2 septum as final result.

Results showed that the bottleneck of the transmission could be caused by the first part of the analyzed machine. This was supported by the results of the beam loss monitoring which did not show any significant hot spots in the examined area. In the first place it was suggested that the beam loss monitors should be moved closer to the unexamined region to roughly detect areas with most of the beam lost. Then, additional beam diagnostic tools (beam current monitors) could be used to pinpoint the losses.



Institute for Storage Ring Facilities,
Aarhus University



Commissioning Results of the New BPM Electronics of the ESRF Booster Synchrotron - Manuel Cargnelutti

The 75 Beam Position Monitor (BPM) stations of the Booster Synchrotron at the European Synchrotron Radiation Facility (ESRF) have been equipped with new RF electronics from December 2014.

This new BPM system is based on the commercial Libera-Spark system and now provides beam position data at various output rates, and with a possible time resolution even below that of the orbit-turn time (1 μ s). All modules are situated inside the Booster tunnel and powered by an Ethernet cable. This implies that the RF cables from the BPM blocks are less than 3 metres

long and a single trigger signal in a daisy chain is sufficient to keep the 75 stations in turn-by-turn phase over the full energy ramping (200 MeV to 6 GeV) time of typically 50 ms. The high sensitivity of the system yields excellent performance at very low beam currents down to 10 μ A. Full results of the system, including its application as a high quality betatron tune monitor, will be presented as a contributed talk at the IPAC15 Conference in Richmond, VA (USA) from 3rd to 8th May 2015.



Libera Spark instrument installed
inside the booster tunnel

Network News

oPAC Steering Committee met at ESS

The network's Steering Committee has held its most recent meeting at ESS on 12th December. During the daily-long meeting the committee reviewed ongoing research projects in detail and made plans for forthcoming events, such as a workshop on computer-aided accelerator optimization at GSI, Germany (March), a Symposium on Accelerators for Science and Society in Liverpool (June) and an international conference on the whole of oPAC R&D in Seville (October).



Pictured: A. Jansson, R. Jones, M. McAteer, P. Karataev, J. Gomez-Camacho and N. Vodopivec (photo: C.P. Welsch).

New to the Network

We have the pleasure of welcoming Dr. Ricardo Torres and Blaise Guénard to the network. Ricardo joined the EU Project T.E.A.M. at the University of Liverpool/Cockcroft Institute as oPAC Project Manager and Blaise will support the T.E.A.M. as Project Assistant. Welcome!



Dr. Ricardo Torres started his research career at the Institute of Chemical Physics – CSIC, working on excimer laser ablation of surfaces and ablation plume dynamics. He received the doctorate in Physics from Universidad Complutense de Madrid in 2003, and then moved to the Physics Department of Imperial College London where he did theoretical and experimental research on strong laser field interactions with molecules: molecular alignment, high-order harmonic generation, and attosecond science. He also did research visits and experiments in the Rutherford Appleton Laboratory (UK),

Instituto Politecnico di Milano (Italy), and RIKEN (Japan).

In 2010 he moved to the Centro de Láseres Pulsados in Salamanca (Spain), where he became head of the scientific division and lecturer in the Master of Laser Physics of University of Salamanca. In Salamanca he led the research on laser-driven ion acceleration, supervising one of the Fellows of the LA³NET network. He was also in charge of the management of medium and large scale projects.



Blaise Guénard graduated from the University of Caen Basse-Normandie, France with a Masters in European Project Management in September 2013. During his Higher Education journey, he has had the opportunity to travel and study in different countries, enabling him to discover the Other and reflect upon the Self. Blaise is passionate about how knowledge and resources can be shared on an international level and values

the importance of Mentoring and Mutual Learning.

Blaise worked for two years for another EU funded FP7 project, Science in Society Catalyst, at the International Centre for Excellence in Educational Opportunities, University of Liverpool, where Blaise played a role of coordinator for an international partnership programme.

oPAC Events

oPAC Workshop on Computer-Aided Optimization of Accelerators



The fourth oPAC workshop on Computer-Aided Optimization of Accelerators (CAoPAC) was held at the Institute for Heavy Ion Research (GSI) in Darmstadt, Germany from 10th – 13th March 2015.

This topical workshop was organised by the Fellows of the network, providing them with the opportunity to take charge of a whole event from scratch, with a limited time-frame, limited resources, and the challenge of offering an interesting event to attract a good number of participants. The organising committee was formed by Meghan McAteer (CERN), Xiangcheng Chen (GSI), Laura Torino (ALBA-CELLS), Michele Carlà (ALBA-CELLS), Charlotte Roose (ESS), Marcin Bartosik (CERN), Xavier Nuel Gavaldà (Soleil), and Manuel Cargnelutti (Instrumentation Technologies).

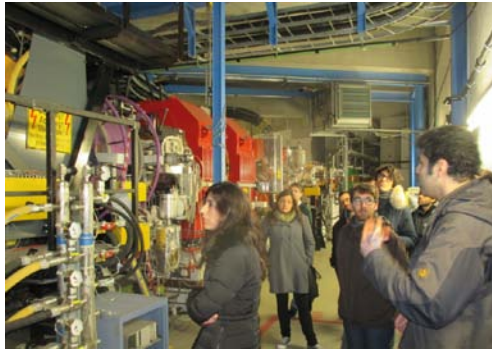
Starting more than a year ago, and after 11 skype meetings, 11 doodle polls, countless emails and lots of energy, the Fellows finally succeeded in putting together an excellent workshop, attracting 51 participants from 18 institutions across Europe.

The workshop started off on Tuesday evening with a welcome reception for participants.

Monday morning began with a session of talks about optics and beam dynamics modelling, organised and chaired by Meghan McAteer, followed by a session focusing on control systems and data analysis, organized and chaired by Michele Carlà. The day concluded with a poster session during which participants discussed their work over coffee.



The Thursday session began with a guided tour of GSI experimental facilities, including the ion trap SHIPTRAP in which many of the heaviest elements were first created and observed, and the facility in which carbon ion radiotherapy techniques for cancer treatment were first developed.



The day continued with a session about techniques for modelling accelerator components, organized by Marcin Bartosik and chaired by former DITANET Fellow Adam Jeff, and concluded with a session discussing particle physics simulations for accelerators, organized and chaired by Charlotte Roose.



Thursday evening ended with a dinner for all participants at a typical Hessian restaurant in Darmstadt. The final day of the workshop began with a session about modelling the generation and propagation of synchrotron light, organized and chaired by Laura Torino, followed by an in-depth tutorial about CST.

The workshop ended with concluding remarks by Manuel Cargnelutti in the name of the organising committee, commenting on the process and the experiences of the Fellows who had worked to plan and executed the workshop.

The organising committee would like to thank everyone who participated and contributed to making this workshop a great success, especially the speakers for their excellent talks, the local oPAC Fellows Xiangcheng Chen and Martina Sofranac for their considerable efforts in organizing the event, and GSI for hosting us.

More information can be found on the [CERN Indico page](#).

Unexpected connections between Darmstadt and Liverpool



Some scholars believe that this old Linac, on display at GSI Darmstadt, may have had some influence on the music of the Liverpool band The Beatles.

Upcoming Events

Symposium on Lasers and Accelerators for Science and Society Liverpool Convention Centre, 26th June 2015



World-renowned scientists will present highlights in accelerator and laser research at this Symposium and the enormous impact these tools have had on science and society.

They will be joined by Fellows from the European networks oPAC and LA³NET who will present the results of their research and share their fascination for science.

International Conference on Accelerator Optimization Centro Nacional de Aceleradores, Seville (Spain) 7th - 9th October 2015

This International Conference will promote the research outcomes from oPAC and feature talks about the network's work packages by Fellows and research leaders from across the world. It will also present the opportunity for contributed talks and to discuss follow-on activities between the oPAC partners and participating scientists from outside the network. The proceedings will be published in a special edition of Physical Review STAB.

The registration fee of 600 € includes hotel accommodation with breakfast, conference documentation, 3 lunches during the conference, a cocktail reception, the conference tour and formal dinner on Thursday, as well as daily transport from the hotel to CNA. Places will be strictly limited and early registration is strongly recommended.

More information will appear soon on the [oPAC web page](#).



Fellows Activity

Stars of the screen

So you're a fan of films? You thought you had watched all the good movies of this year? The oPAC Fellows have produced an impressive series of videos, some of them really worthy of an Oscar. Using different techniques, animation or real footage, and addressing different audiences, technical or general public, the Fellows explain the objectives of their research projects in less than 5 minutes. Showing an unbounded

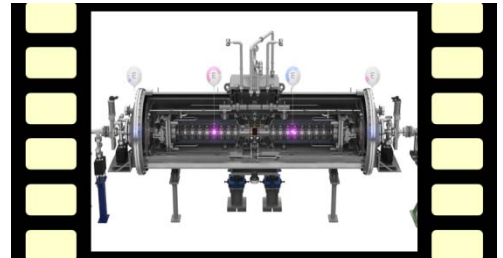
creativity, these videos demonstrate that our Fellows are not only excellent researchers but they may also become Hollywood filmmakers!

All the videos have been posted on [YouTube](#) and our [web page](#). Here is a selection of some.



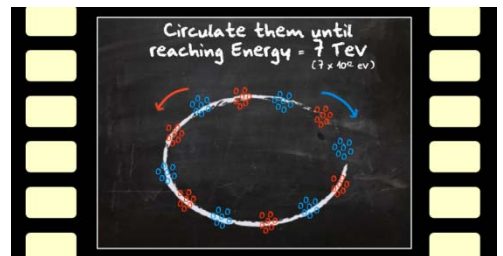
The LHeC Large Hadron electron Collider – Alessandra Valloni

Alessandra Valloni, from CERN, is looking into the challenges associated to a future electron-proton collider, the LHeC. Her video gives a motivation for this demanding machine and explains the research she has been doing.



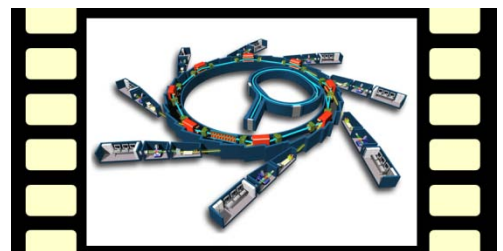
Upgrades of the Large Hadron Collider – Emilia Cruz Alaniz

The Large Hadron Collider is the highest energy accelerator in the world. Fellow Emilia Cruz, from the University of Liverpool, is studying upgrade options of this unique machine through beam dynamics simulations. Her video explains the goals of the LHC and what the future might bring.



Device Control Database Tool – Pavel Maslov

Pavel Maslov is based at the Slovenian company COSYLAB where he is developing advanced accelerator control systems. His video explains how a centralized data base approach can help these important systems to become more powerful, versatile and user friendly.



OPAC Fellows hit the classroom

After almost three years doing research abroad, some of the OPAC Fellows have gone back to their academic roots to share the experience with schoolchildren from their own countries, and perhaps relive some memories of their childhood.

Héctor García Morales, from Royal Holloway University of London, visited five secondary schools around the Barcelona area. His talk about CERN, the LHC and the origins of the Universe, caused a great deal of amazement among the students. “They were a great experience and a funny time!” says Héctor.



Emilia Cruz Alaniz, travelled from the University of Liverpool to her hometown in Mexico. There she visited a secondary school and gave three talks about her work, prompting lots of questions. “Students were very interested, there were far more questions than I expected, especially with the older students, and the teachers!” she recalls.



Daria Astapovych, from CERN, visited a high school in Sumy, Ukraine. She gave a talk about the importance of particle accelerators to study the Universe, highlighting the LHC project in particular. An interesting discussion followed the talk about the origins of the Universe, dark matter, the standard model, and applications of accelerators, demonstrating the far reaching implications of the research carried out with particle accelerators. Perhaps *too* far-reaching as shown by a student who posed the dreaded question: “Are you sure that you won’t create a black hole at CERN?”



Another Fellow from CERN, **Alessandra Valloni**, visited two high schools in the Italian region of Abruzzo, including the one she had attended herself, in the town of Pineto. She started by talking to the students about the fundamental laws of physics, with special regard to the world of LHC, and also described the history of CERN from its inception in the late 40's up to today through videos and images. "I enjoyed teaching to students that showed curiosity for physical science", says Alessandra.



The Fellows from ALBA, **Laura Torino** and **Michele Carlà** visited a secondary school near the synchrotron. They gave a talk to 16 year old students on how an accelerator works and about the application of synchrotron radiation. After the talk, Laura reckons, one of the girl decided to prepare a science project in ALBA! In May last year Laura also participated in the Barcelona day of science, showing their home-made Van der Graaf generator.



Cristina Battaglia went to visit two high schools in Seville, to share her experience about the European OPAC project. She spoke about the network and also about the research that she is carrying out at the National Centre of Accelerators in Seville, on application of nuclear physics to radiobiology studies. She explained in a very simple way the applications of nuclear physics in the medical field, and ended the presentation showing the experiments that her research

group is carrying out. "I must say that I was surprised of the interest that the students showed while I was talking. They actually didn't know about the applications of physics in the medical field" says Cristina. "I enjoyed the experience and I hope to have transmitted the message that physics is not just scary formulas and complicated theories, but it has a direct application in our daily life and that research is very important to improve everybody's quality of life."

After a successful visit to a high school, **Michał Jarosz** wanted to popularise the accelerator science amongst younger students. In October he visited a primary school in Warsaw where he conducted 45 minutes of classes for 7 year olds. This experience was very different from the previous one in terms of level of depth, but the kids were as much interested, if not more,

as their older colleagues. “One thing for sure – they asked much more questions! Most probably it had nothing to do with the lollipops offered to the inquirers” says Michał. The class consisted of few quizzes and open questions from Michał which resulted in long minutes of loud discussions and Michał’s throat being out of business for another week after the school visit!



Finally, **Grazia Scognamiglio**, chose the school she attended before going to University, in a town close to Naples. She prepared a presentation about particle accelerators and she presented it to students attending the last year of High School and to many teachers. “I noticed a great enthusiasm

among the kids and the teachers, who followed my talk with interest and asked me a lot of questions about particle physics, uses of accelerators and scientific research with incredible curiosity. I have to say they really impressed me” says Grazia.

These talks and demonstrations, as well as the ensuing debates, demonstrated that young students may show a keen interest in accelerator science if presented in an attractive manner. As Daria Astapovych says: “It’s so important to arouse interest of young and talented people in the nature science! That’s why the presentation was about a

rather new field in physics – Accelerator physics, which could help to understand the world order and many other interesting things”. By sharing the excitement of scientific discovery with school children, the oPAC Fellows will inspire a new generation of accelerator scientists.

Secondments

Xiangcheng Chen – Training in the land of the rising sun



Xiangcheng Chen, oPAC Fellow at the GSI Helmholtz Centre for Heavy Ion Research, has recently undertaken his secondment within the training framework of the oPAC project at RIKEN, in Japan. RIKEN is Japan's largest comprehensive institution recognized for high-quality research in a diverse range of scientific disciplines, including accelerator physics.

During Xiangcheng's one-month-long stay, he was mainly collaborating with experts at the RIKEN Nishina Center on the RF cavity characterization. The newly constructed cavity will soon be mounted in the Rare-RI

Ring of the RIKEN Nishina accelerator complex, and be used as a Schottky noise detector for very low beam intensity. Prior to the installation, several off-line tests should be accomplished.

Through that month Xiangcheng has communicated intensely with his Japanese colleagues regarding existent expertise and future challenges of the Schottky resonator. He has certainly gained a lot from that memorable experience. Xiangcheng acknowledges the warm hospitality of the Japanese friends!

Manuel Cargnelutti – ESRF gets a boost from oPAC



The European Synchrotron Radiation Facility (ESRF) is currently in the process of upgrading its electron booster ring with new Beam Position Monitoring (BPM) readout electronics. Quite often booster rings are not equipped with readout electronics, or these systems are there just for basic monitoring purpose.

The new BPM machine is based on the commercial Libera-Spark system developed by the oPAC partner Instrumentation Technologies. This system will be able to measure the beam position at various output rates, with a possible time resolution even below that of the orbit-turn time ($1 \mu\text{s}$), providing an unprecedented amount of fast high-resolution data and helping to monitor and optimize the booster operations.

oPAC Fellow Manuel Cargnelutti, from Instrumentation Technologies has spent four weeks at the ESRF in Grenoble. Manuel has participated in the commissioning and upgrading of the booster ring, fine tuning and calibrating the electronics for all the 75 BPM stations. His work has contributed to the integration of the readout system with the accelerator control system and the validation of a beam-loss monitor prototype.



Image courtesy of Instrumentation Technologies

Pavel Maslov – Breaking the ice with DESIREE

Pavel Maslov, from Cosylab, has spent two weeks at The Double ElectroStatic Ion-Ring ExpEriment (or DESIREE), which is based at the Albanova research center for Physics, Astronomy and Biotechnology in Stockholm, Sweden. There he has studied the physics of cold ion-ion collisions and inspected ConSys – a control system that is running the facility. Pavel helped with implementing two devices into LabView for diagnostics, namely Agilent 33250a (arbitrary waveform generator) and BNC555 (delay pulse generator). In the

second week he gave a 30 minute technical presentation to physicists and instrumentation engineers on "Adaptation of existing open-source control systems from compact accelerators to large scale facilities". He enjoyed working in a truly international scientific team from Sweden, Denmark, USA, Poland, Ireland, Brazil, Australia, Hungary... and had a unique chance to play curling for the first time in his life.

AlbaNova
FYSIK ASTRONOMI BIOTEKNIK



Pavel Maslov had a unique chance to play curling.

Michele Carla – Sunny days at SOLEIL

Michele Carla, from ALBA, spent a period of three weeks at the synchrotron Soleil, during which two machine shifts were dedicated to turn-by-turn studies. The main purpose of the study was to verify the feasibility of turn-by-turn measurements with the installed

hardware and measure the achievable accuracy in the reconstruction of quantities of interest for linear model.

SOLEIL
SYNCHROTRON



Michał Jarosz – Up close and personal with Astrid

Michał Jarosz, from the European Spallation Source, spent a few weeks at ISA studying the beam loss mechanisms. For that, a set of cameras measuring the visible light was used to observe the beam position and its stability. A quadrupole scan ensured that the beam passes the quadrupoles as close to their middle as achievable while using four pairs of corrector magnets and the images from the cameras. Also a pair of dosimeters (ionization chambers) was used to provide auxiliary data. The experience was very positive as Michał says: “As most of my every day’s work consists of tedious simulation running and computer data analysis, I was really excited

about visiting Aarhus and gathering some hands-on experience on a real, carved-in-metal machine. The staff there, especially Niels Hertel, Jorgen Nielsen and the director of the secondment Søren Pape Møller was extremely helpful and very organized, providing all necessary materials and insight knowledge necessary for the task. I learned a lot of new things for me concerning beam physics and finally got to experience some actual machine operation, which is invaluable for me. I would rank this secondment in the top of my oPAC contract experience list.”

Grazia Scognamiglio – AMS: Andalusia meets Switzerland

Grazia Scognamiglio’s secondment took place at the ETH-Zurich laboratories, where she spent two weeks working as a part of the Accelerator Mass Spectrometry (AMS) team and participating in many ongoing tasks. The research activity of the Swiss polytechnic extends from the design and the construction of facilities, or part of them, strongly optimized for the AMS to the investigation in all the fields strictly related to this powerful technique, such as archeometry, geology and environmental sciences. “This experience gave me the opportunity to visit the impressive laboratories located at the ETH, where many apparatuses based on low energy accelerators are under study” says Grazia.

Part of the work related to the Grazia’s project consisted on the installation of a compact particle detector as the final stage of the AMS facility placed at the Centro Nacional de Aceleradores, in Seville. The detector, optimized for AMS applications and characterized by excellent performance, was designed and built at the ETH-Zurich. During the period she spent there, she met the researchers who worked on that detector,

who showed me how they work and the tools they normally use to perform simulations. She also had the possibility to take part in some tests on a new detector consisting of calibration and resolution measurements. Furthermore, Grazia could assist a whole AMS process, from the preparation of samples to the measurements with the accelerator, ending with the data analysis. The main purpose of the researchers was to understand the distribution of Uranium and Plutonium isotopes in the Arctic Ocean using many water samples collected in different places. The water samples need to pass through a long series of chemical processes before being ready for the AMS. Once in the facility, as in every AMS measurement, the interesting information consisted of relative ratios among the isotopes contained in the samples, so the acquisition was focused on both majority and minority isotopes. The raw data resulted from the acquisition were subject to a complex analysis and compared and crossed with previous ones. She also took part in beryllium measurements and learnt the techniques they are developing to improve its detection.



Partner News

Nordic countries to cool up accelerator science

One of the partners of the oPAC project, the European Spallation Source, is co-organising a summer school for accelerator physics and technology, in Lund University from August 17th to 21st, 2015. The BAS2015 summer school is primarily intended for students from Northern Europe at levels between the bachelor's and master's degrees. The objective is to broaden the opportunities for education in accelerator physics and technology and to introduce students to the field of accelerator physics, showing that this is an interesting and broad subject, carried out in an international environment. The

initiative shall encourage students to pursue a career in accelerator physics and technology. This first edition of the Baltic Accelerator School also aims to develop a partnership between European universities in order to establish this school as a regular event. The school will be organised by MAX IV Laboratory, European Spallation Source (ESS), Lund, Uppsala, Aarhus, Oslo and Jyväskylä Universities, together with a partnership of several European universities. The contact person for the BAS2015 Summer School is Christine Darve (christine.darve@ess.se).



Vacancies

Post-doc position in the QUASAR group

A post-doc position is available in the QUASAR group (University of Liverpool) for advanced beam diagnostics R&D. If you have a background in beam instrumentation, are familiar with commonly used accelerator design codes and have a track record in designing, building and operating cutting

edge monitors, then you should apply !

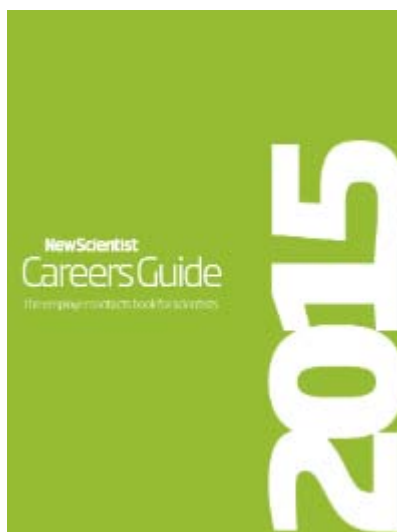
For further information about the project or how to apply, please send an email to the oPAC coordinator, Prof. Carsten P. Welsch.



Don't know what to do next?

New Scientist magazine has put together an online magazine full of career advice for scientists: New Scientist Careers Guide 2015 UK digital edition.

Follow this [link](#) to launch the digital edition.



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oPAC Events

June 22 nd – 23 rd 2015	4 th oPAC Topical Workshop Technology Transfer, Liverpool, UK
June 24 th – 25 th 2015	Advanced Researcher Skills School, Liverpool, UK
June 26 th 2015	Symposium on Accelerators for Science and Society, Liverpool, UK
Oct 7 th – 9 th 2015	International Conference on Accelerator Optimization, Seville, Spain

Events

March 23 rd - 27 th 2015	First Annual Meeting of the FCC study, Washington D.C., USA
March 23 rd – 24 th 2015	LA ³ NET Topical Workshop on Beam Diagnostics, Mallorca, Spain
March 25 th – 27 th 2015	Laser Applications at Accelerators Conference 2015, Mallorca, Spain
May 3 rd – 8 th 2015	IPAC15, Richmond, Virginia, USA
Aug 23 rd –28 th 2015	FEL 2015, Daejeon, South Korea
Sep 13 th -17 th 2015	IBIC 2015, Melbourne, Australia

NOTICE BOARD

DEADLINE FOR REGISTRATION FOR THE SYMPOSIUM **15th May 2015**
 DEADLINE FOR CONTRIBUTIONS TO THE NEXT NEWSLETTER **19st June 2015**

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.

This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 289485.



www.opac-project.eu

