

A very busy start phase for the LA³NET project

Special Interest Articles

- Announcement of LA³NET Prize Winner
- First School in Laser Applications at Accelerators

The start of LA³NET is a very exciting phase for all involved in the project: no less than 17 highly qualified researchers need to be recruited for the research projects that will be carried out across the consortium. We received a very large number of applications and to date already **15 positions have been filled** with interviews for the remaining few already being scheduled for this summer. It thus looks as if the R&D activities can start as we all hoped for.

The project has already been put on show and was presented at the International Particle Accelerator Conference (IPAC) in New Orleans/USA, as well as at the 6th International conference on Laser Probing (LAP) in Paris/France. It was fantastic to see how positive the laser and accelerator communities reacted to this new initiative. At LAP, several prizes were awarded to early stage researchers and more details can be found in this edition of the newsletter.

The project has also awarded its first annual **LA³NET Prize** for outstanding work on laser applications and commends Sebastian Rothe for the important contributions he made to the RILIS laser system and ionisation research. He will be awarded the prize during the network's **first international school on laser applications** which will take place between October 15th – 19th 2012 in Caen, France. This

is the first ever school of its kind that closely links particle accelerator physics and laser sciences. The week-long event will cover all research areas that fall within the research scope of project: from laser particle sources and laser acceleration to laser-based beam instrumentation. We expect this to be a very interesting and stimulating training event and I would like to encourage you to participate – places fill up very quickly and I would strongly recommend you to register early to avoid disappointment.

This school will also be the first time that all LA³NET fellows meet and where the Steering Committee and Supervisory Board have their next meetings. Many additional events are already in the planning, ranging from **complementary skills training** for all LA³NET trainees next March in Liverpool/UK to **Topical Workshops** that shall bring together experts from across the world in focused research areas to discuss the present state-of-the-art and review challenges with the LA³NET scientists and trainees.

I think it is fair to say that we could not have expected more from this start phase and we really enjoy seeing our first fellows start their projects. I hope you will enjoy reading this newsletter edition and to see you participate in our upcoming events !



Prof. Carsten P. Welsch, Coordinator

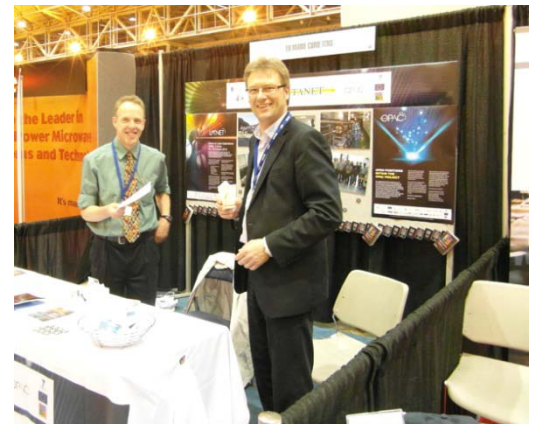
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The Project Profile and News Dissemination

International Platform for LA³NET at IPAC12

An industry stand was taken to showcase LA³NET at the International Particle Accelerator Conference (IPAC12) held in New Orleans from 21st-25th May. Rob Ashworth and Helen Williams were on hand throughout the conference to promote the network and answer enquiries along with Glenda Wall promoting the DITANET and oPAC projects. The LA³NET coordinator, Prof. Carsten Welsch, also presented a poster describing the training and research activities of LA³NET.



Arnd Baurichter from Danfysik visiting the project stand.

Many new contacts were established and the profile of LA³NET was successfully raised on the international stage for particle accelerators achieving dissemination objectives to:

- Advertise vacancies for Early Stage Researchers within the LA³NET project
- Publicise opportunities for organisations to join the network as adjunct partners
- Publicise future activities that are open for external participation such as the project schools and awards



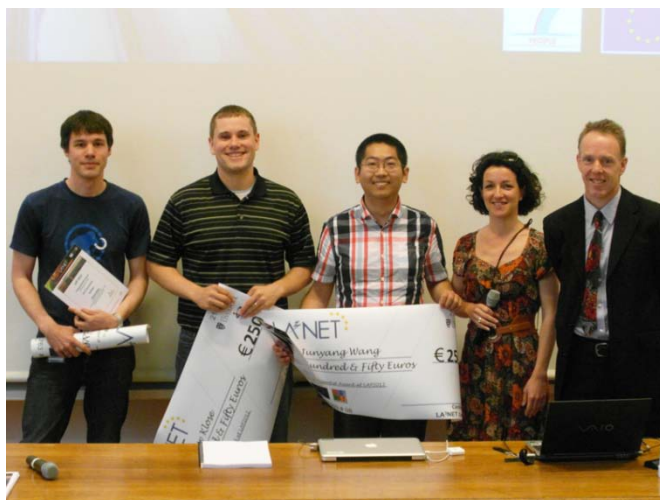
Helen and Rob at the project stand.

IPAC is the main conference for particle accelerator science held annually with over 1,200 top scientists and engineers attending five days of oral presentations, poster sessions and networking based around 85 industry exhibition stands.

LA³NET at International Conference on Laser Probing (LAP 2012)

LA³NET steering committee members **Nathalie Lecesne** from GANIL and **Rob Ashworth** from the University of Liverpool were pleased to present the LAP 2012 Young Scientist Award to worthy winners at the Laser Probing conference held from 4th-8th June 2012 in Paris. The award was sponsored by LA³NET to encourage contributions from

researchers in the early stage of their careers. Against high quality competition Patrick Ehlers was chosen for the oral presentation award receiving a certificate and 500€. Two posters were selected for recognition from the impressive poster session with winners Junyang Wang and Andrew Klose each receiving a certificate and 250€.



The winning presentations were:

- **Patrick Ehlers** (Umea University) - *NICE-OHMS - A laser-based spectroscopic technique for ultra sensitive detection of gases*
- **Junyang Wang** (Umea University) - *Dicke Narrowing and speed-dependent effects in dispersion mode of detection and NICE-OHMS. Theory and Experimental verification*
- **Andrew Klose** (MSU) - *Laser spectroscopy of stable 55Mn I using BECOLA at NSCL*

Following the awards ceremony Rob Ashworth gave a presentation on LA³NET describing how the training network functions and key activities. The posts available within the network were advertised as well as an open invitation to attend the First International School for Laser Applications at Accelerators to be held in GANIL in October. The LA³NET Early Stage Researcher prize was publicised and the opportunity for additional organisations to join the network as adjunct

partners was also promoted.

On behalf of the network we wish to thank the LAP 2012 joint organisers GANIL and IPN Orsay for inviting LA³NET to be represented at the conference. More photographs of the event are shown on the conference website:

lap2012.sciencesconf.org/resource/gallery?id=16



LA³NET Welcomes the Latest Trainees

There has been major progress in the recruitment of trainees since the last newsletter with five trainees in post and a further ten lined up to take their positions in the coming months. The latest four trainees to start are Pengnan Lu at HZDR, Cheng Chang at KIT, Kamil Nowacki at Foton and Irene Martin at CERN. Here are their profiles:



Pengnan Lu studied physics in Peking University from 2005 to 2009 as an undergraduate student. After that he chose accelerator physics for a further study in Institute of Heavy Ion Physics, Peking University and got his Master's degree in July 2012. In 2009 and 2010, he worked mainly on the topic of space charge compensation in high intensity low energy ion beams. He built a new model to simulate this effect and made clear improvements to parameters such as beam emittance, transport efficiency and beam focusing in both Argon and Krypton

compensation. In 2011 and 2012, he put forward new structures and developed a new emittance meter HIBEMU-5, which reduced the error from 16.4% to 3.7%. In these two topics he took charge of most of controlling and data processing for beam diagnosis experiments. Pengnan Lu joined the LA³NET program in 2012 and has began his work in HZDR on 23rd July 2012. He will mainly work on the development of a high brightness superconducting RF photo injector for electron-laser interaction experiments at the ELBE accelerator facility.



Cheng Chang attained a bachelor of science in physics and a master of engineering in nuclear technology and applications, both from Peking University in China. His work for LA³NET is based around a PhD project on "Precision determination of electron beam energy with Compton backscattered laser photons" at the ANKA facility at the Karlsruhe Institute of Technology. He has previous experience in designing a Compton backscattering (CBS) X-ray source, based on the superconducting

technology and an energy recovery linac for his master's degree. It involves both analytical calculation and simulation, mainly concerning beam-laser interaction with a laser pulse storage cavity conceptually proposed and preliminarily calculated. Cheng also has a broad experience on Cs₂Te photocathode fabrication, superconducting cavity tuning, radio frequency (RF) studies, and applications.



Kamil Nowacki studied Electronics and Telecommunications at the Military University of Technology in Warsaw, Poland. As an alumnus of optoelectronics specialization, he received a thorough education in the field of photonics and had an opportunity to participate in many theoretical and practical classes. The specific areas of his education were focused on: designing and analysis of optical systems, optical materials, optical technologies, laser optics and electronics, laser-matter interactions, nanotechnology and detection of optical signals. In addition, during his education he developed a keen interest in the subject of

advanced power supply units and control systems. In his master thesis Kamil focused on developing a high power laser diode power supply with current and temperature stabilization for a project carried out by the Institute of Optoelectronics at the Military University of Technology in Warsaw. In May 2012 Kamil joined the LA³NET program. The program will enable him to continue his research as a trainee at the Foton company. His work will mainly be focused on computer-based modeling and experimental optimization studies into the subject of high voltage supplies and generators.

Irene Martini studied Physics Engineering at Politecnico di Milano (Italy). In 2009, she obtained the bachelor's degree and started a master's degree in Nuclear Engineering at Politecnico di Milano. The main subjects of her education are: physics, optics and lasers, solid state physics, interaction of radiation with matter and applications of radiation. In 2011 she completed an 11 month internship at CERN (European Organization for Nuclear Research) in the Vacuum Surface and Coating group. During the internship she performed electron stimulated desorption measurements of

copper in the framework of the CLIC (Compact Linear Collider) project, more precisely in the material studies for RF cavities. Part of her work was also dedicated to the study of hydrogen content measurement by laser ablation. Both are the topic of her master's thesis about copper for particle accelerators. In July 2012, after the MSc graduation, she joined the LA³NET project as a Marie Curie Fellow at CERN in the Source Target and Interactions group. Her work will be mainly focused on the research and development of photocathode sensitive to visible light for photo injector applications.



Vacancies in the Network

There are just two posts left to fill in LA³NET hosted by STFC in the UK and IFIN-HH in Romania. In order to allow these trainees to benefit from all training events, we would ideally like to have them in post by the 1st October. So, if anyone is aware of possible candidates we would be grateful if you could

alert them to these opportunities.

Also, if you are able to publicise these vacancies at your organisation to generate the non-UK or non-Romanian candidates required by the Marie-Curie rules then here are some more details:

Remaining Vacancies: ESR15. Ultra-stable Optical Timing Distribution for Accelerator Applications

STFC Daresbury National Laboratory and University of Manchester Photon Science Institute

The next generation of accelerators, both light source and particle physics linear colliders, require unprecedented stability and precision in the timing systems, with clocks with few femtosecond stability. The leading technological to providing such stability is based on mode locked laser optical clocks, and actively length stabilised optical fibre distribution. The requirement of ~1 femtosecond stability on distributed RF timing signals over distances of >100metres requires an in-depth knowledge and understanding of the physics of the of the optical transport and detection processes. This project will focus on the distribution systems, examining the physics of sources optical timing error which are encountered in accelerator environments, and the

fundamental limitations arising from distribution optical physics. The project will also seek to develop optical beam arrival monitors based on the distribution systems and with femtosecond level capability. The project will be a mixture of theoretical and experimental activities, requiring the fellow to understand linear and non-linear optics and the physics of mode-locked lasers and to apply this understanding to practical experimental tests.

The successful candidate will be based at STFC Daresbury National Laboratory and will be enrolled for a PhD at the near-by University of Manchester.

For further details or a flyer to advertise the position contact: steven.jamison@stfc.ac.uk



Remaining Vacancies: ESR17. Development of a 3D Neutron Detector for Complex Geometries.

Institutul National pentru Fizica si Inginerie Nucleara Horia Hulubei



This project requires an integral approach into the simulation of the experimental conditions, i.e. the events triggered by the laser system, and the response of the full detector matrix.

The trainee will carry out numerical studies and experimental work on extremely fast electronics and data acquisition systems. They will be embedded into an international

collaboration and will profit from the experience at IFIN-HH and INFLPR, where two Terawatt lasers are in operation that will be exploited during the project. The trainee will also be trained in the development of latest control system technologies, an important element of the overall system integration.

The scientist in charge for this project is Horia Petrascu: hpetr@nipne.ro

LA³NET Early Stage Researcher Prize 2012

Sebastian Rothe earns LA³NET ESR Prize with contribution to the RILIS laser system and ionisation research

The LA³NET ESR Prize is an annual award open to all researchers in the early stages of their careers both from within or outside of the network. For 2012 the Steering Committee are pleased to award the 1,000€ prize and certificate to worthy winner Sebastian Rothe for his contribution to the RILIS laser system and ionisation research.

Sebastian Rothe has been acting as principal investigator for the installation of the novel all-solid state tuneable laser system at the world leading production plant for exotic radio nuclides, ISOLDE at CERN, Geneva. He has also made a major contribution to a ground breaking experiment in fundamental research: the first-ever laser spectroscopic investigation on the heaviest, all radioactive halogen element astatine. This investigation was made possible by the combination of the novel laser system operated by Sebastian with the well established ISOLDE dye laser system. This research also initiated a collaboration between 16 institutions and

triggered complementary studies at TRIUMF, Vancouver, Canada, for which Sebastian was invited as most actively contributing co-worker.

The complementary laser system for upgrading RILIS was based on Ti:Sa lasers originally developed at the University of Mainz. The design was further improved and tested at the ISOLDE OFF-LINE mass separator prior to the installation alongside the RILIS dye laser system. The new modes of RILIS operation investigated on-line showed that the system strength lies in the compatibility of the two laser types. This means that most synergies are released using the laser systems in a geared way where wavelengths are created by the most convenient laser available. The Ti:Sa system was involved in 9 out of 16 elements produced in over 2500 h operation in 2011. For Ni, Zn and At the new laser system was an essential ingredient to provide most stable and most efficient beams to the ISOLDE users.

In further fundamental research, in-source laser spectroscopy was used to develop an efficient and selective ionization scheme for the production of radioactive ion beams of astatine isotopes. The RILIS lasers were used to scan the lasers across two known transitions applying a two-colour single resonance ionization scheme. These transitions were confirmed to be transitions from the ground state. A scan of the second step laser revealed an onset of ionization, from which the ionization potential (IP) could be determined for the first time experimentally. At the radioactive ion beam facility ISAC/TRIUMF (Vancouver, Canada) the widely tuneable Ti:Sa lasers available at the TRILIS laser ion source were used to scan for

possible second excited states applying a three-color ionization scheme. Back at CERN astatine beams were taken to study beta-delayed fission of light astatine isotopes comparing and testing six possible ionization schemes using the new Ti:Sa laser system under on-line conditions for the first time.

Sebastian is currently finalizing his PhD work at CERN in collaboration with the University of Mainz (Germany) under the supervision of Dr Valentin Fedosseev (CERN) and Prof Dr Klaus Wendt (U. Mainz). On behalf of the network we wish Sebastian good fortune for his future research efforts and career. **Congratulations !**



The photograph shows the Dual RILIS laser setup. Three Ti:Sa laser cavities (front) are simultaneously pumped by a frequency doubled Nd:YAG laser (right, front). Two of the three dye lasers as well as the dye pump laser were placed on extensions to the main laser table (right, top).

Like us and Feed us your News

Feed us your news via the EU Project T.E.A.M. We would be grateful to receive any relevant stories or news from partners or other project stakeholders. We can upload this onto [Facebook](#) or the project website as appropriate and publish in future newsletters.

In addition to this we are pursuing routes to promote LA³NET activity via press offices and other media. Again, we would appreciate any

help with this and we would be pleased to hear about any public exposure of the project and research that falls within the R&D carried out by LA³NET partner institutions. This will help raising the profile of our research area further and will also contribute to a continuous knowledge exchange.

News from LA³NET Partners

Extended warranty from 12 to 24 months on the Cobolt 05-01 Series visible and NIR DPSS lasers

Cobolt AB, Swedish manufacturer of high performance lasers, announces an extension in their standard warranty of 12 months to 24 months on all single frequency, high power, and ultra-low noise Cobolt 05-01 Series visible and NIR DPSS lasers.

The company's proprietary HTCure™ manufacturing technology, introduced in 2007, has proven to exceed all expectations in terms capability to provide outstanding robustness and reliability for high performance DPSS lasers. This has allowed Cobolt to offer market-leading warranty terms of 24 months on their compact SLM 04-01 series of lasers since several years. Based on collected statistics on reliability in the field combined with internally recorded life time data, Cobolt is now able to offer the same generous warranty terms on their single-frequency higher power 05-01 series of lasers in the visible and near-infrared range, starting from 30th May 2012. The 05-01 Series lasers in the visible and NIR range include the Cobolt Samba 532nm, Cobolt Jive 561nm, Cobolt Flamenco 660nm and Cobolt Rumba 1064nm, which are now offered with 24 months

warranty & unlimited number of operation hours.



Lasers built using the HTCure™ Technology have shown to withstand multiple 60G mechanical shocks in operation without any sign of degraded performance. They can be exposed to extreme temperatures (>100 °C), and are insensitive to pressure and humidity. HTCure™ Technology is an advanced manufacturing technique for high-performance solid-state lasers that can provide exceptional reliability and performance for today's demanding applications.

www.cobolt.se/news.html?news=13990

Commissioning Commendation for Research Instruments

RI Research Instruments GmbH has been awarded a Certificate of Commendation for initial commissioning of the linac for the Brookhaven National Laboratory (BNL) National Synchrotron Light Source II. The NSLS-II ring building and installation of the linear accelerator (linac) is complete and it achieved major beam parameters ahead of schedule. This linac represents the first key element of third generation synchrotron light sources. It generates, accelerates and delivers

an electron beam of superior quality to be used in a storage ring for generating x-rays, ultraviolet light and infrared light for research in such diverse fields as biology and medicine, chemistry and environmental sciences, physics, and materials science.

www.researchinstruments.de/frontend/press/id/38



1,000 W Femto-Second Laser

EdgeWave started the development of industrial-suited >1,000W fs-lasers on 1 March 2012. The project is being supported by the BMBF as a part of its funding initiative 'Ultrakurzlasers für hochpräzise Bearbeitung' and as part of the collaborative project 'Femtosekundenlaser höchster Leistung (FOKUS)'. The collaborative project will be coordinated by EdgeWave, while the controlling agency is the VDI-TZ from Düsseldorf.

The focus of the project is the implementation of a reliable, compact, cost effective fs-laser suited to industry with an average power of >1000W and a pulse duration in the range from 200fs to 1ps. For the processing of materials – e.g. fibre-reinforced plastics for lightweight designs – the beam sources of the target power class will enable a significant decrease in processing time.

Lately ultra-short-pulsed laser technology has become more and more economical not only

in micro machining but also in macro machining of materials while in the medical sector ultra-short-pulsed lasers enable entirely new therapeutic approaches such as highly precise cuts of the eye with minimal damage. The fundamental feature of these laser beams are their extremely high peak intensities with low pulse energy enabling highly precise ablation processes and processing of temperature sensitive materials without causing thermal damage. In the production of LEDs or computer chips the yield per wafer will increase and in one of the most performed surgical operations, the therapy of cataracts, new significantly more efficient and cheaper methods will be implementable. Those new therapeutic methods for age-related long-sightedness will be rivalling the classical reading glasses in near future.

www.edge-wave.de/web/en/1000w-femtosekunden-laser/



Upcoming LA³NET Events

First International School in Laser Applications at Accelerators

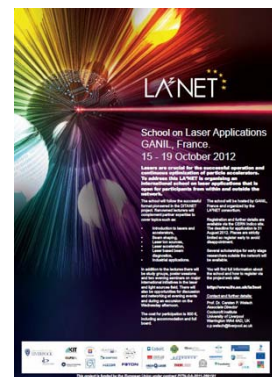
The Laser Application School is open to all and will bring a diverse range of renowned international speakers to GANIL to provide a unique training environment. This is the first time that the international accelerator and laser communities have been brought together in such an event and is an unmissable opportunity for scientists and engineers working in this field. Delegates from outside of the LA³NET project are welcome and already places are rapidly being taken up. We have also received a number of applications for the scholarships available to cover the conference fee for deserving researchers from outside the network. Places have been reserved for such applications and will be allocated in August.

The school will be the first opportunity for all of the recruited fellows to meet each other and representatives from the partner organisations in the consortium as well as

speakers and other delegates. This will add value for all participants in addition to the structured presentations, workshops and study sessions. A tour of the GANIL facilities and social activities will also help delegates to get to know one another and feel more part of a widening network - it promises to be a highly productive week. The cost to attend this packed week of training activity and networking opportunity is 800€, including accommodation and full board. You will find more information about the School, scholarships to cover fees and registration on the CERN Indico website:

indico.cern.ch/confId=177701

Note that there are a limited number of places available and the event is likely to be full before the deadline set.



The schedule for the School to be held from **15th-19th October 2012 at GANIL in Caen, France** is now almost complete. The confirmed speakers and headline topics are shown in the following table:

	Monday	Tuesday	Wednesday	Thursday	Friday
8:30 9:30	Welcome / Introduction	Characterisation of the laser output: David Walsh, UDUN	Beam Diagnostics using lasers I: Laura Corner, John Adams Institute, Oxford	Laser optical clocks and accelerator timing systems: Trina Thakker, STFC	Supervisory Board (SB) Annual Meeting
9:30 10:30	Introduction to Lasers I: Luis Roso, CLPU	Laser Ion Sources I: Bruce Marsh, CERN	Beam Diagnostics using lasers II: Allan Gillespie, UDUN	Optical laser requirements, developments and simulations at the European XFEL: Max Lederer, European XFEL	SB intro to ESRs/ Q&A guided by senior scientist for non-SB and non-ESR attendees
11:00 12:00	Introduction to Lasers II: Jonathan Billowes, Manchester Uni	Laser Ion Sources II: Bruce Marsh, CERN	Non-linear optics techniques in laser- accelerator systems: David Walsh, UDUN Laser irradiation and processing of materials for accelerator systems and laser/accelerator diagnostics: Allan Gillespie, UDUN	Ultrashort pulsed lasers: TBC	What's in it and how do we get there - industrial applications of laser acceleration: Arnd Baurichter, Danfysik Cooperation between industry and research institutes: Mark Plesko, Cosylab
12:00 13:00	Beam Shaping: Marta Divall, PSI	Laser Acceleration I: Aria Irman, HZDR	Laser materials: Hervé Gilles, CIMAP laser development group	Study Session <i>split in smaller groups</i> (Steering Committee members)	Solutions to the photonics industry: from a customer's idea to an off-the-shelf product: Angelika Karlowatz, THORLABS Challenges in industry: TBC
LUNCH					
14:30 15:30	Introduction to accelerators: Carsten Welsch, ULIV	Laser Acceleration II: Michael Bussmann, HZDR	Visit GANIL 2 h 30 m 4 groups of up to 25	Poster Session	School conclusion
15:30 16:30	Applications of accelerators: Allan Gillespie, UDUN	Study Session <i>split in smaller groups</i> (Steering committee members)		Poster Session / Steering Committee (SC) meet	
17:00 18:00	Q&A Guided by Luis Roso, CLPU	Seminar LCLS / XFEL: Thomas Barends, Heidelberg		Seminar ELI installation: Taking European research to the next level: Ken Ledingham, Strathclyde Uni / SC meet	
Eve	Reception in GANIL guesthall. Cocktail/dinne r.			Dinner at Le Domaine de la Baronnie including ESR Prize 2012 presentation	

Complementary Skills School in Liverpool 25th – 29th March 2013

Who needs complementary skills?

A good set of complementary skills will help you gain the greatest impact from any technical or scientific knowledge you may have. Complementary skills also make you more attractive to employers and could give you a valuable advantage in the competitive jobs arena. These skills are transferable and so make you more robust and flexible. They could help you take advantage of cross-sector opportunities between industry and academia or to work better at an interdisciplinary level.

This is the reason why EC-funded Marie Curie Actions incorporate mandatory complementary skills training in their projects. This is implemented in LA³NET through an established quality programme of complementary skills training developed and tested during the delivery of the DITANET project.

The LA³NET Complementary Skills School will take place in Liverpool from 25th-29th March 2013. The network's early stage researchers are privileged to be going to attend this to develop their competencies and build links across the network.

This school will provide the LA³NET early stage researchers with the non-technical skills that will be invaluable for their future careers whether that be in academia or industry. Training will be based around the following topics:

- Presentation skills;
- Group presentation sessions;
- Scientific writing;
- Group discussions on working within an international network;
- Building bridges with industry;
- Patent issues and IPR (Intellectual Property Rights);
- Project management;
- Time management;
- Problem solving;
- Self management and work-life.

Note that the UK is not within the Schengen area and so non-EC visitors working outside of the UK will need to apply for a UK visa in addition to their work permits.

Joke Box

Two atoms were walking across a road when one of them said,
"I think I lost an electron!"

"Really?" the other replied, "Are you sure?"

"Yes, I'm absolutely positive."

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LA³NET Events

Oct 15 th - 19 th 2012	First International School on Laser Applications, GANIL, France
February 2013	Particle Sources Topical Workshop, CERN, Switzerland
Mar 25 th – 29 th 2013	Complementary Skills School, Liverpool, UK

Other Events

Sept 16 th – 21 st 2012	2012 ICUIL Conference, Mamaia, Romania
Oct 7 th - 10 th 2012	23 rd IEEE International Semiconductor Laser Conference, San Diego, California, USA
Dec 9 th – 12 th 2012	International Conference on Fibre Optics and Photonics, Madras, India

NOTICE BOARD

AFTER APPOINTING FELLOWS PLEASE PROVIDE THE EU PROJECT T.E.A.M. WITH:

- Declaration of Conformity
- New starter form
- Profile of fellow with photograph (for web and newsletter)
- Copy of signed contract showing start date (for future audits)
- Signed Career Development Plan (CDP)

DEADLINE FOR CONTRIBUTIONS TO THE NEXT NEWSLETTER
September 30th 2012

About LA³NET

The exploitation of Lasers for Applications at Accelerator facilities for ion beam generation, acceleration and diagnostics is the goal of this new Network within the FP7 Marie Curie Initial Training Network (ITN) scheme. In this frame, research centres, universities and industry partners from across Europe will develop beyond-state-of-the-art techniques and technologies through a joint inter-sectoral training program for early stage researchers within a unique European partnership.

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www.liv.ac.uk/la3net

