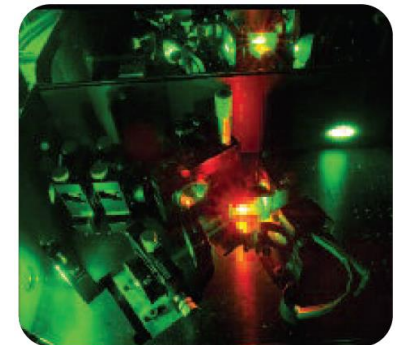


Laser Applications at Accelerators

Prof. Carsten P. Welsch

LAser Applications at Accelerators a european NETwork

- More than 30,000 accelerators in the world;
- Lasers are becoming increasingly important
 - Beam generation;
 - Acceleration;
 - Characterization, etc.
- Few experts trained in both fields;
- Large scale facilities: International collaboration is key !

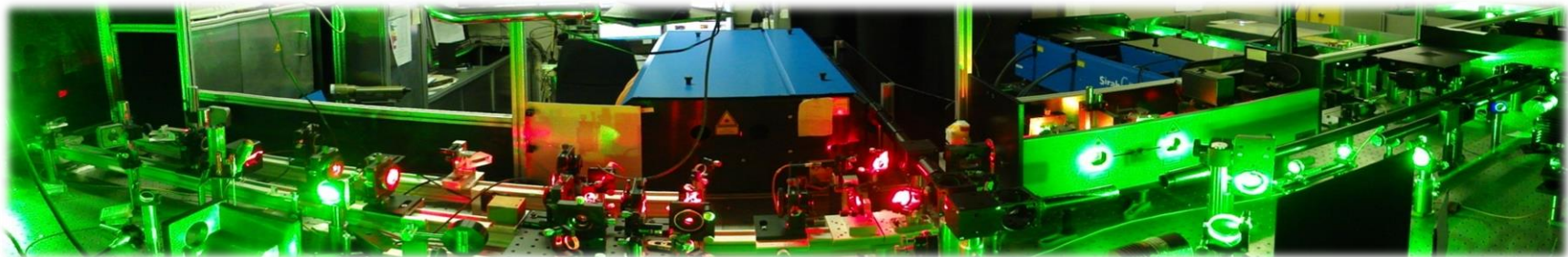


Multi-disciplinary field !

Research Program

■ Main areas:

- Particle Sources (WP2);
- Particle Beam Acceleration Schemes (WP3);
- Beam Diagnostics (WP4);
- System Integration (WP5);
- Laser and Photon Detector Technology (WP6).



Overview of Consortium

- Beneficiary partners



- Associated partners



Adjunct Partners

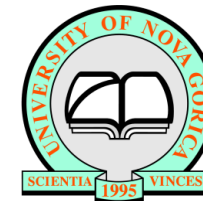
- Part of the long term strategy – LA³NET is growing






UPPSALA
UNIVERSITET



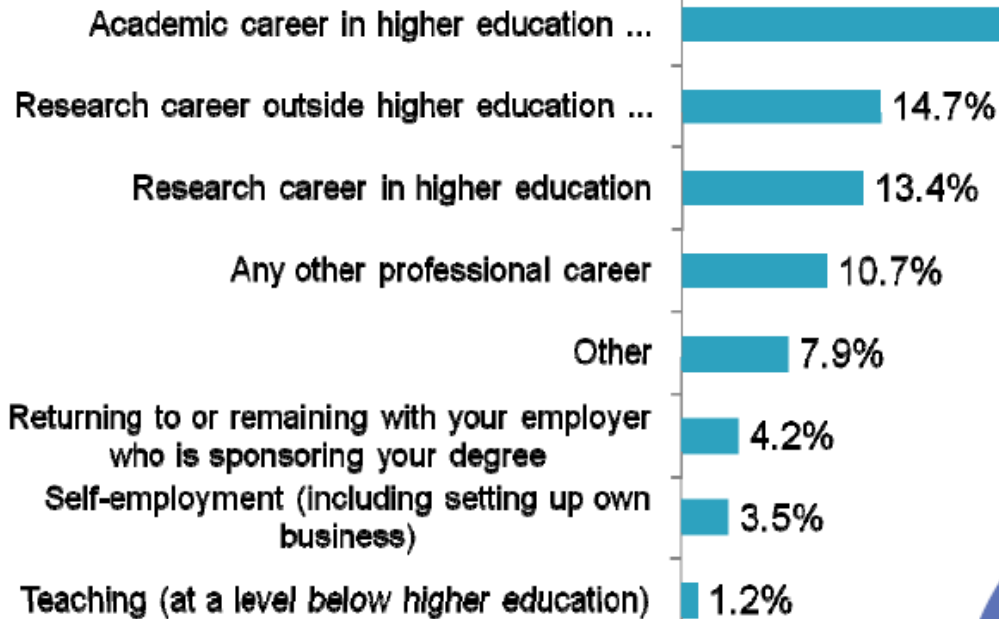


PAUL SCHERRER INSTITUT
PSI



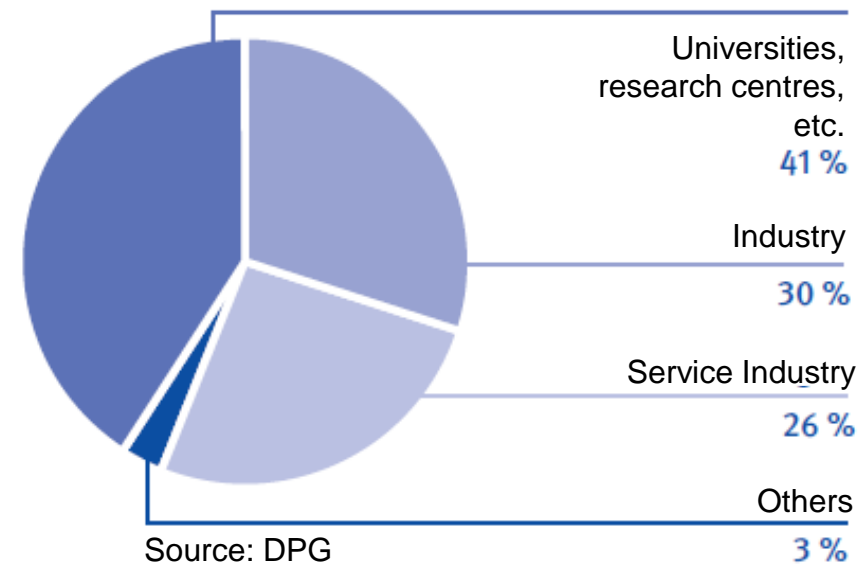

- MSc standard;
- PhD part of training in most countries;
- Broad skills;
- Blue sky research vs. applied physics.





Source: HEA - STEM

57.8 %



Source: DPG

,Classic' PhD training

- Focus on academic career path;
- Scientific papers as key quality indicator;
- Training through (often blue sky) research;
- Very little training in **complementary skills** – researchers often need to be (re)trained on the job;
- Students or researchers ?

Evolution: Marie Curie networks

Training – at each Network Node

- In accordance with national PhD regulations
- Provide trainees with broad skills base
- Enable secondments between nodes
- Promote knowledge exchange and collaboration across the network
- 100% focus on research project
- Initial plan fixed in CDPs, additional opportunities already taken (e.g. JUAS, IPAC, etc.)

Network-wide Training

- International Schools in Laser Applications and Complementary Skills
- Topical Workshops on focused research areas
- Conference and Symposium to summarize and disseminate research results internationally
- Provision of seminars, contributions to conferences, etc.
- Secondments between partners



- First major event;
- Held at GANIL, Caen/France;
- IndicoID: 177701
- 80 participants
- LA³NET prize.



Events to date

- Particle Sources, CERN, February 2013
- Complementary Skills School, March 2013, Liverpool, UK
- Mid-term review meeting, Copenhagen, Denmark
- Laser Technology and Optics Design, Aachen
 - 4-6 November 2013 (*now !*)

Time	Monday	Tuesday	Wednesday	Thursday	Friday
8.30 – 9.30	Introduction <i>Paired Introductions: Participants generate flip chart poster of interview partner then present them to whole group.</i>	Career Prospects in Industry & Academia Independent Teamwork Dreamer, Realist, Critic <i>Teams to come up with a response to the challenge</i> <i>Teams choose their project topic and plan the team-working process.</i>	Presentation skills <i>Introduction</i> <i>Participants will give 5 minute presentation in small groups about their PhD projects</i> <i>All presentations will be video recorded</i> <i>Feedback by:</i> (1) presenter, (2) (2) fellow students, (3) Tutor	Advanced Project Management Independent Team Work <i>Teams work on the project according to their plan</i> Chairs meeting <i>Present summary of report structure</i> <i>Teams review project following feedback</i>	Introduction to Peer Review The Presentation <i>(Followed by Questions)</i> Peer Review preparation Peer Review <i>Teams present assessment and feedback</i>
9.30 – 10.30					
10.30 - Break	Presentation skills <i>Basics of research presentations – an introduction to the Do's and Don'ts of conference presentation</i>	Target Setting Milestones & deliverables session – assessment of targets for the project	Lunch	International collaboration	Peer Review <i>Teams present assessment and feedback</i> Forward Planning
11.00 – 12.30					
12.30 – 13.30	Lunch				
13.30 – 15.00	Introduction to Project Management <i>Theoretical Background</i> <i>Action: Plan PhD project</i> <i>Update description</i> <i>Stakeholder analysis</i> <i>Milestones</i> <i>Deliverables</i>	Scientific Writing <i>Focus on writing research papers.</i> <ul style="list-style-type: none"> The writing process and structure Thinking about the audience Target journals Tips <i>Writing for the general public.</i>	Visit to Cockcroft Institute <i>Introduction</i> <i>Tour of facilities</i>	Network diagrams <i>(Understanding dependencies)</i> Independent Team Work <i>Teams continue collaborating on project.</i> <ul style="list-style-type: none"> Produce report Create presentation Assessing Risks	
15.00 – Break					
15.30 – 16.30					
16.30 – 17.30					

- PhD project-specific part
 - Presentation skills
 - Scientific writing
 - Project management

- Generic skills through outreach project
 - Team working
 - Proposal writing
 - Peer review
 - Working under (time) pressure



„Best practice“

“I hadn’t really thought of myself as a project manager until today!”

Future Events

- **Topical Workshops**
 - Novel Acceleration Schemes, Dresden, 28-30 April 2014
 - Beam Diagnostics (tbc)
 - More in the planning...

- **International Schools**
 - Advanced School on Laser Applications, Salamanca, Sept. 2014
 - Advanced Researcher Skills School, Liverpool, June 2015

- **Conference and Symposium**



LA³NET Web Site

UNIVERSITY OF LIVERPOOL

University: [Home](#) | [A-Z Index](#) | [Staff](#) | [Students](#)

Website Courses

You are here: [University Home](#) > LA³NET Home

LA³NET Home

- Network Structure
- Projects
- LA³NET Prize
- Vacancies
- News
- Events
- Press
- Downloads
- Dissemination
- Links
- Contact
- EU Project T.E.A.M.

News

12/06/2013
Visions for the future of accelerators...[read more](#)

22/05/2013
LA³NET contributes to IPAC13...[read more](#)


08/05/2013
LA³NET Prize 2013...[Apply now!](#)

24/04/2013
LMU joins LA³NET...[further information](#)

Vocal


[Sign in to Vocal](#)

LA³NET



The exploitation of **LA**sers for **A**pplications at **A**ccelerator facilities for ion beam generation, acceleration and diagnostics is the goal of the new **NET**work (**LA³NET**) within the FP7 Marie Curie Initial Training Network (ITN) scheme.

In this frame, research centers, universities and industry partners from across Europe will develop beyond-state-of-the-art techniques and technologies through a joint inter-sectorial training program for early stage researchers within a unique European partnership.



LA³NET

Upcoming Events

August 26th - 29th 2013
International Free-Electron Laser Conference ([EEL13](#))

September 2nd - 6th 2013
9th International Workshop on Adaptive Optics for Industry & Medicine ([AOIM2013](#))

September 16th - 19th 2013
International Beams Instrumentation Conference ([IBIC13](#))

September 23rd - 27th 2013
16th International Conference on RF Superconductivity ([SRF2013](#))

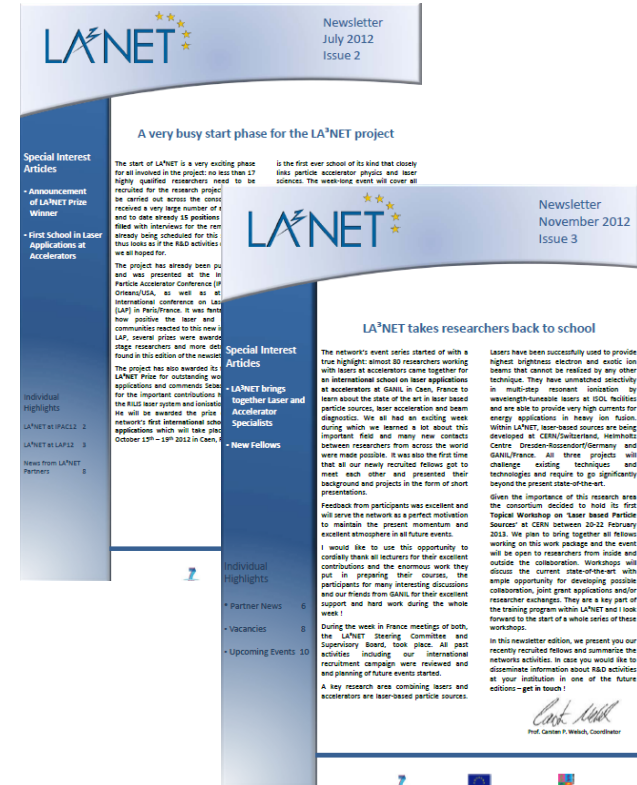
September 23rd - 28th 2013
18th Colloque GANIL ([GANIL](#))

[f](#) [YouTube](#)

(<http://www.la3net.eu>)

Quarterly Newsletter

- Part of the dissemination strategy
- Contribution from all network partners
- Announcement and review of activities
- > 500 recipients, growing
 - All available via home page.



Follow us on Facebook

Conference contributions

- Conferences 2012
 - IPAC stand
 - BIW, LAP, etc.
- Conferences 2013
 - FEL, IPAC, IBIC, HEA L&T, etc.
 - IBIC stand
- Conferences 2014
 - IPAC stand, ESOF
 - IBIC, IPAC
- Outreach Symposium 26 June 2015
- Own conference in 2015 – Mallorca



Beam Diagnostics R&D Within LA³NET
C.P. Welch, Cockcroft Institute and The University of Liverpool, UK
on behalf of the LA³NET Consortium

Abstract
Lasers have become increasingly important for the successful operation and continuous optimisation of particle accelerators. For beam diagnostics laser provide the highest time and spatial resolution for transverse and longitudinal beam profile measurements. They also allow the detection of slowly developing particle beam with high dynamic range and permit measurements of very important machine parameters such as the non-linear composition factor and beam emittance. The development of these laser diagnostic systems is dependent on the focus of the LA³NET project funded by the UK and EU governments. The IPAC (International Particle Accelerator Conference) is the only regular international conference that focuses on this field. This paper describes the work of the LA³NET project to date, with an emphasis on research projects at specific partner sites. In addition, the network will organise a number of international training events, seminars, an overview of the current research and training program in laser with members of all of the 11 research groups.

Research
Diagnostic systems are essential constituents of any accelerator. They need the properties of laser emission to measure and manipulate beam profile measurements. It is not always possible to measure and manipulate all beam parameters. The development of these laser diagnostic systems is dependent on the focus of the LA³NET project funded by the UK and EU governments. The IPAC (International Particle Accelerator Conference) is the only regular international conference that focuses on this field. This paper describes the work of the LA³NET project to date, with an emphasis on research projects at specific partner sites. In addition, the network will organise a number of international training events, seminars, an overview of the current research and training program in laser with members of all of the 11 research groups.

Training
Training of all fellows will mostly be through research on dedicated individual projects related to the network's main objectives with specific requirements to other partners for specialist techniques and/or software assistance. In addition, the LA³NET consortium will also organise a number of network-wide events that will be open to the wider scientific community.

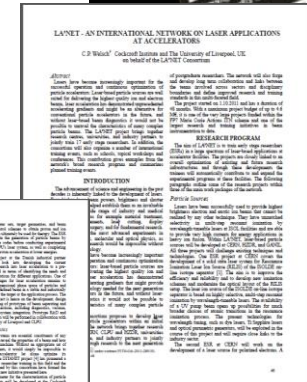
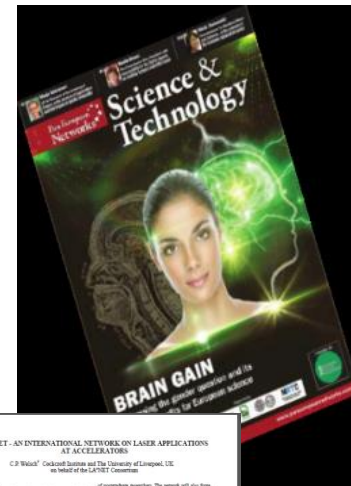
International Schools
The network will organise a series of International Schools during the first and third year of LA³NET. The first school will be held in October 2012 at DESY, Germany. The second school will be held in October 2013 at DESY, Germany. The third school will be held in October 2014 at DESY, Germany. The schools will be open to all researchers in the field of laser technology and will provide a unique opportunity for researchers to meet and work with other researchers in the field. The schools will be held in the form of a series of workshops and seminars. The schools will be held in the form of a series of workshops and seminars. The schools will be held in the form of a series of workshops and seminars.

Workshops
The network will organise a series of Workshops that will also be open to external participants. A typical workshop will bring together 20-30 experts in a particular field. The workshops will be held in the form of a series of workshops and seminars. The workshops will be held in the form of a series of workshops and seminars. The workshops will be held in the form of a series of workshops and seminars.

International Conference on Laser Applications
The network will organise an International Conference on Laser Applications in the first year of LA³NET. The conference will be held in the form of a series of workshops and seminars. The conference will be held in the form of a series of workshops and seminars. The conference will be held in the form of a series of workshops and seminars.

Publications

- IPAC 13: fellows publications
- Pan European Networks, Science and Technology 6 (2013)
- STFC's UK news from CERN 2013: Issue 14 on LA³NET
- Higher Education Academy's Annual Learning and Teaching Conference in Birmingham, UK
- LA³NET Brochure and Booklet



Outreach

- Conference – Symposium *(26 June 2015)*
- Fellows:
 - Webcasts about projects
 - Engagement with local schools
 - Specific opportunities
- Annual prize

LA³NET Prize

- Annual prize of 1 k€ for E(S)R;
 - Within first 5 years of career;
 - Original contribution;
 - Letters of recommendation.

- Not limited to LA³NET partners.

- Application deadline: 30 June each year.



1st prize awarded at GANIL



- ⦿ **Name**
 Sebastian Rothe
- ⦿ **Institution**
 University of Mainz /
 CERN
- ⦿ **Research**
 Installation of the novel
 all solid state tuneable
 laser system at ISOLDE
 and laser spectroscopic
 investigation of astatine

Administrative Support

- Promotes LA³NET research, training and administration internationally
- Contributions to IPAC, HEASTEM, IBIC, etc.
- ‚Best practice‘ in Europe (EC)





LANNET



International Partnership



Prof. Carsten P. Welsch – Laser Applications at Accelerators, ILT, 4. Nov 2013



Summary

- LA³NET R&D program now running at full speed;
- Unique combination of research areas;
- Many **events** will be organized – join in !
- Consortium is planning **future initiatives** at the interface between accelerator and laser communities – participate !

Thanks for your attention !