Issue 4 **November 2007**

Laserlab Forum

Newsletter of Laserlab-Europe the integrated initiative of European laser infrastructures in the Sixth Framework Programme of the European Union

IN THIS ISSUE

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Editorial


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Entering the 7th Framework Programme

With the successful application for a coordination and support action to continue, part of the present activities through Laserlab-Europe 2008 has formally entered the 7th Framework Programme (FP7). Although the budget negotiations are still going on, it is safe to expect that both the Access and Networking activities will be financed in 2008, with the hope of a smooth transition towards the subsequent full 4-year FP7 Integrated Activity project which is currently under preparation.

So, good news for all users of our infrastructures: access will continue in 2008 as in the years before, so don't hesitate to submit new proposals!

In this context it is worth noting two articles in this issue: first, an example of a successful user experiment in a fascinating emerging field – laser-based short wavelength sources, performed by a Strathclyde (UK) group in Jena, Germany. Second, an article by the chairman of our Access Selection Panel, Professor Wolfgang Demtröder on his role as Chairman and the task of the panel. The external and fully independent selection panel, common to all Laserlab-Europe access providers, is one of the success stories of our network, and will certainly be continued in FP7.

Other than that there will most likely be major changes. Europe has now expanded to 27 member states, offering new opportunities for research infrastructure networks to meet the challenges of the future. As a consequence, Laserlab-Europe has issued an open 'Invitation to member state laser laboratories, presently not partners in Laserlab-Europe' to express their interest in joining the FP7 network. The call was directed mainly to laser infrastructures from new member states. With the large number of applications received before the deadline we may expect the next Laserlab-Europe to be present in considerably more EU countries than before.

Similarly, there was an internal call to identify scientific topics for new JRAs, and to assemble consortia of the best European laser laboratories to pursue them. As it may be deduced from several articles in this issue, Europe presently has a strong position in the global competition in the laser sector, and JRAs are absolutely essential for keeping it. The ECRI Hamburg conference in June (see report in this issue) focused on strengthening the European Research Area through innovative concepts for existing and new Research Infrastructures – a challenge which Laserlab-Europe is preparing to meet with a renewed consortium, new research topics and new access opportunities in FP7.

Professor Wolfgang Sandner
Laserlab-Europe Coordinator

New Deputy Director of CEA Cadarache

Formerly head of the Power Laser Departments at CESTA, Francis Kovacs managed a team of 300 people. He was responsible for ALISE (a 200J nanosecond laser), the prototype of the Laser MegaJoule (LMJ) on which PETAL (a high energy multi-petawatt laser) will be connected (7 PW IR), the Ligne d'intégration Laser (a sub-piece used in the LMJ), and the design and future operation of the LMJ.

Francis is now in charge of making sure that the scientific and industrial development at Cadarache complements the institute's fusion and fission research. He is now responsible for 5000 staff whose research programme centres on fission but also includes other alternative energy sources such as solar facilities and biomass. As Francis explains, "I switched from an operational and management position [at CESTA] to a more strategic and functional one. It is a very exiting time to be at Cadarache."

ERF takes shape

The European Association of National Research Facilities (ERF) has taken an important step forward with the signing of its charter document. The ERF will promote cooperation between nationally funded, large scale facilities including lasers. There are 14 member laboratories serving more than 13000 users.


Signing of ERF Charter, Hamburg 08 June 2007

The ERF provides a forum to coordinate the development of national facilities for European research and to develop mechanisms and best practices for international access to large-scale research facilities. It will act as a source of scientific and technical expertise for national and European policy making and, with a single voice, represent a large constituency of large-scale research facilities to decision makers. With the help of topic-oriented joint initiatives and consortia, ERF will make resources for large-scale research facilities available by cooperation.

30 Years of world-leading laser science

The past, present and future of the STFC Central Laser Facility (CLF) came together on 28 June 2007 when CLF Director Mike Dunne hosted an event to celebrate the 30th anniversary of the CLF at the Rutherford Appleton Laboratory.

In a light-hearted presentation, Mike charted the history of the CLF and its key role in the development of laser science from single beam interaction studies to particle acceleration and the possibilities of laser fusion. Trawls of the photographic archives ensured that many of the invited guests who had played a part in the CLF's success featured in the presentation, demonstrating that CLF has led the field in fashion as well as science!

The celebrations concluded with a reception which gave staff and visitors the opportunity to swap memories of the first 30 years of the Central Laser Facility.

Welcome to **Vicky Stowell**

I am pleased to welcome Vicky Stowell to the Laserlab team. Vicky has joined the STFC Central Laser Facility as a Communications Assistant and is the new editor of Laserlab Forum. She has taken over the role from Tracey Potts who is enjoying a career break and spending time with her two young daughters.

Vicky is looking forward to getting to know colleagues in LaserLab. She is particularly keen to receive news and contributions for inclusion in future newsletters. Vicky would also like to know what you think of the newsletter.

Please do not hesitate to contact her if you have any topics or news stories you would like to see in future editions.

Scientists meet to discus and emerging sources of

A foresight workshop to bridge the gap between European laser and accelerator communities was organised in Lund in June 2007 by MAX-lab, the Swedish national electron accelerator laboratory for synchrotron radiation research, and the Lund Laser Centre. The programme was based on visionary presentations by experts from the two communities and included a concluding panel discussion.

The participants before the workshop dinner in the Pillared Hall of Lund University.

Laser scientists are pushing the spectral range into new regions and the powers are increasing. The lasers are becoming able to accelerate ultra-short bunches of particles to relativistic energies. Simultaneously the accelerator physicists start to produce coherent X-ray pulses by Free Electron Lasers (FELs) and reach the femtosecond range.

In Europe, the laser and accelerator science communities are largely represented by the two clusters of Large Scale Infrastructures; the Integrated Infrastructure Initiative (I3) on Synchrotron and Free Electron Laser Science 'I3-IA-SFS' and the I3 for Laser Infrastructures (Laserlab-Europe). In order to increase the awareness of respective developments, to bridge the gap in terminology and to stimulate common research projects, this foresight workshop was arranged jointly by the two I3s. During three days in June, about 100 scientists from 13 countries, with approximately equal representation from the two communities, met, exchanged ideas and discussed the current and future developments.

The topics spanned a wide range including; ultra-intense lasers, free electron lasers, laser-driven electron acceleration, modern synchrotron radiation sources, plasma-based X-ray lasers, high-order harmonic generation, coherent X-ray sources and seeding with high-order harmonics, both FELs and plasma amplifiers, new electron sources and accelerators for novel radiation and ultrafast diffraction.

The workshop started out with an overview of ultra intense lasers and accelerators for novel sources of radiation followed by high-order harmonics and novel multi purpose accelerator sources.

A short poster and chat session on more detailed topics was followed by visits to both the high-power laser facility at the Lund Laser Centre and the MAX-lab accelerator facilities.

The following day saw presentations on x-ray lasers (novel results on laser accelerated electrons generating radiation in an undulator), coherent laser X-ray sources and further new results on how high harmonic generation are beginning to be used to seed free electron lasers.

A local touch was achieved by a presentation on the ideas for the proposed MAX IV accelerator project. The limits of ultrafast XUV pulses, including attosecond science were discussed, and in a session with technical updates, introductions to new technology of electron sources in the form of field emissions cathodes were presented. The 10PW Vulcan laser upgrade at the STFC Central Laser Facility (UK), the technology of generating short synchrotron radiation pulses by laser slicing and superconducting electron guns where also presented.

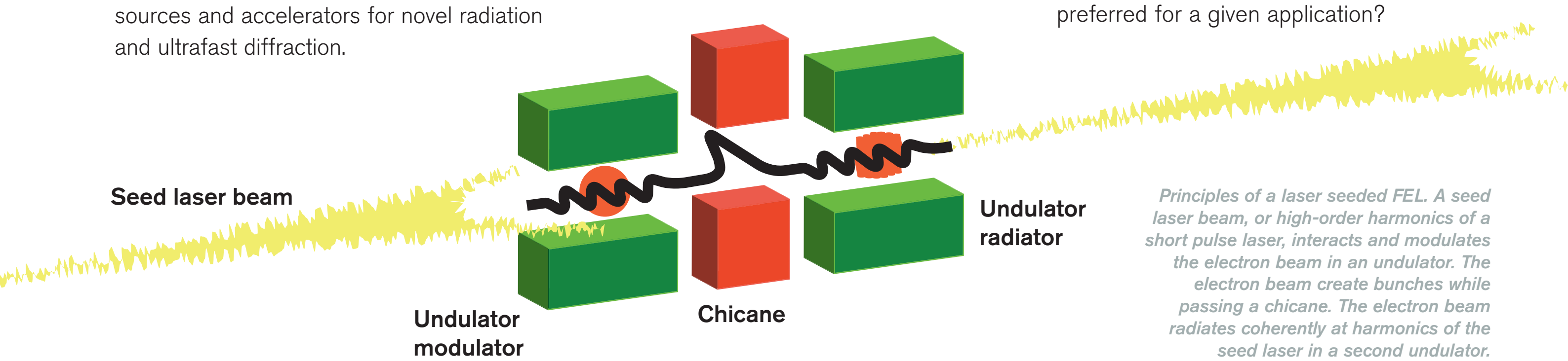
The evening was spent in the Pillared Hall of Lund University with a dinner, some music and lively conversations across borders (science, language and nationality).

The final day of the workshop progressed into the world of user applications where the experiences from FLASH as a user facility were covered and recent results on ultra fast diffraction measurements were shown.

The final discussions were centred around a panel from both the accelerator and laser fields. The discussions started out in the topic of laser acceleration of electrons, comparing the performance of these electron beams to traditional acceleration and the key areas for improvement to make them competitive. The question about in which areas these beams will first become useful was addressed, and issues on emittance and energy spread were also discussed.

Discussions also addressed a common reference frame on statements as: high repetition rate, small/compact, stable and low cost, where the views were quite diverse.

There was also a debate about the development of plasma amplifiers driven by high harmonic generation sources. The concept looks similar to the proposed VUV-FELs, but are they comparable? Are they interchangeable, and which is preferred for a given application?



Principles of a laser seeded FEL. A seed laser beam, or high-order harmonics of a short pulse laser, interacts and modulates the electron beam in an undulator. The electron beam create bunches while passing a chicane. The electron beam radiates coherently at harmonics of the seed laser in a second undulator.

s new radiation

Photo: A. Nyberg

During the workshop as a whole there was no intention to reach a consensus, but rather to have a discussion with views from both fields. As such the meeting was very successful. New contacts and new input have been achieved and the curiosity and awareness of activities and visions in the neighbouring fields have been increased.

The programme and some presentations available on the workshop web site http://www.maxlab.lu.se/emergingsources/

S. Werin and C-G Wahlström, Workshop co-chairs

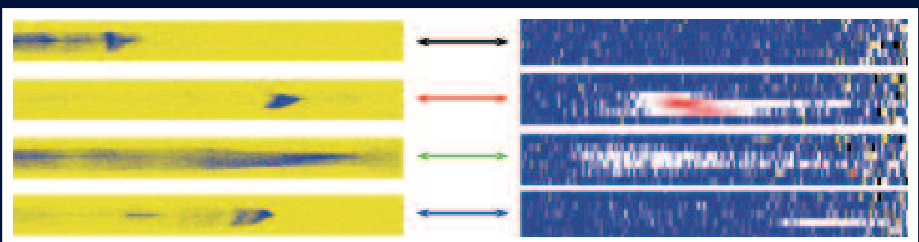
Towards a compact synchrotron source

Lasers have become ubiquitous tools for time resolved probing of the structure of matter. Exploring molecular and solid structure requires X-rays from today's powerful synchrotrons and free-electron lasers (FELs), which are based on particle accelerator technology. These modern light sources cover areas equivalent to several football pitches and are very expensive, with their construction alone costing many hundreds of millions of euros. Governments are prepared to meet these costs because they are the essential scientific tools which underpin progress in society.

Until now light sources have been driven by accelerators based on microwave cavities. This 'conventional' technology is not the only way to accelerate particles. Electrostatic forces of plasma can be harnessed to provide vastly higher accelerating gradients. By firing an intense laser pulse from a table-top terawatt laser into plasma, a density wake can be excited and its huge electric fields harnessed to drive electrons to very high energies *extremely* rapidly. The excellent properties of these electron beams provide an opportunity to build compact femtosecond light sources. Thus table-top *plasma wakefield accelerators* could herald a revolution in the way science is done – by making available compact sources at a fraction of the cost of large facilities.

As a first step in this direction, the ALPHA-X team at the University of Strathclyde, has teamed up with the Friedrich-Schiller-Universität, (Jena) and Stellenbosch University in experiments supported by Laserlab-Europe to demonstrate, for the first time, undulator synchrotron emission from an undulator driven by electron beams from a plasma wakefield accelerator at Jena. By measuring the brightness and the scaling of radiation wavelength with electron energy the groundwork has been laid for a brilliant femtosecond X-ray source based on wakefield acceleration. Rapid progress is being made around the world: GeV beams have been produced in a 3cm long wakefield accelerator by Lawrence Berkeley National Laboratory and Oxford University, a collaboration including ALPHA-X. This is 100 times shorter than conventional accelerators.

The next step is to pass GeV electrons through the ALPHA-X undulator at Strathclyde to produce X-rays in the water window. The high-current, femtosecond duration electron bunches from wakefield accelerators raise the encouraging prospect of a table-top X-ray FEL. However, the next less ambitious step in this series of experiments is to demonstrate the production of X-ray radiation.



Electron beam spectrum *Undulator radiation spectrum*

Professor Dino Jaroszynski, University of Strathclyde, Glasgow, Scotland, UK

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'Fascination of Light'

The interactive traveling exhibition 'Fascination of Light', which has been developed and displayed very successfully in Germany during the past three years, has now been put on a European level. As part of the European campaign, the exhibition travels through several European cities with the support of the European Commission. The tour is organised by institutions collaborating within the consortium Laserlab-Europe, with additional support from the NEMO Network of Excellence on Micro-Optics.

The exhibition is based on a multidisciplinary approach, where photonics and their pervasiveness in everyday life can be actively experienced. This can be through interactive, hands-on exhibition pieces, illustrative material and multimedia stations, functional models, visual aids, posters and simple experiments, all of which may provide inspirations for teaching.

In March 2007, the Fascination of Light exhibition was displayed in Brussels for two weeks on the campus of the Vrije Universiteit Brussel. The event was co-organised by the Department of Applied Physics and Photonics (TONA) of the Vrije Universiteit Brussel. All of the dates for guided tours were entirely booked. More than 1900 visitors, mainly school children, took the opportunity to see it.

On 5 March 2007 Commissioner Viviane Reding opened the exhibition. In her enthusiastic opening speech she specifically addressed the young people of today – boys and especially girls – who, as tomorrow's successful scientists and engineers, will have the opportunity to discover new knowledge and invent new ways to use that knowledge. "A career in science can be a very rewarding one. You will be the ones who will create a bright future with tomorrow's inventions."

Business decision makers and important players in the domain of science, innovation and education attended the opening event, as well as the most important target group of the exhibition – the children: several school classes were present and actively enjoying the exhibits. Commissioner Viviane Reding, Deputy Director General Peter Zangl and Director Rosalie Zobel were then guided through the different booths. Together with the children, they had the opportunity to experience 'light' in everyday life through a variety of hands-on exhibits.

www.fascination-of-light.net/

The task of the Chairman of the Select Committee

One of the key advantages of the Laserlab-Europe consortium is the support that it gives to scientists to spend time carrying out research at partner institutes. The scheme allows the guest researchers to plan experiments they could not perform at their home laboratories due to lack of suitable equipment or special laser setups. The opportunities for collaboration and knowledge transfer within the European laser science community are clear.

We asked Professor Wolfgang Demtröder to tell us about his role as Chairman of the Selection Committee.

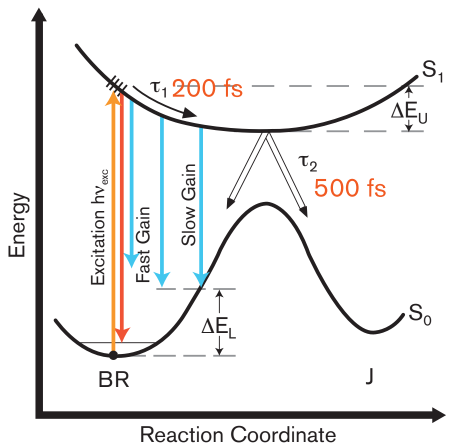
"Scientists who want to take advantage of the scheme have to write a short application in which they outline the scientific goals of the planned project and the equipment that they will need. I was elected Chairman of the Laserlab-Europe Selection Committee in 2002. Along with my two colleagues on the Committee, I am responsible for evaluating these applications and deciding which ones will be allocated experimental time.

Since 2004, Laserlab-Europe has received more than 400 applications of which we selected approximately 360. I think it is useful to give an insight into the process that we follow.

After an application has been submitted, the host institute selected by the applicant confirms that it has the staff expertise and equipment to enable the planned experiment to be performed. The host institute also suggests possible referees for the planned project. As chairman of the committee I have to take care that the selection of the referees for an application is consistent with their fields of research and that the burden of refereeing is, as far as possible, equally distributed. It is important that we do not put a referee under too much pressure with too many applications! To miminise delaying the approval procedure, I also try to avoid referees who have seldom answered requests for reports in the past. Nevertheless I often have to chase referees for outstanding reports.

When the reports of two independent referees arrive, I have to decide whether to accept or reject the application. Fortunately, in most cases the two referees will agree that the project is sound and of scientific interest or has important applications and they will support it. In these instances my job as chairman is easy. If the proposal is close to my field of experience, I form my own judgement, which generally agrees with that of the referees and I can give my final okay.

It is more difficult when one of the referees recommends acceptance and the other rejection. This rarely happens and I can now ask a third referee or, if the application is within my field, act as the third referee myself.



A schematic diagram of such a fast structural change of bacterio-rhodopsin is shown, as investigated by E Riedle at the Ludwig Maximilians University in Munich.

One of the positive aspects for the referee is that he or she gets insight into different fields of laser physics and applications varying from basic physics to live sciences or archaeology. For example, there have been projects proposing the restoration of ancient sculptures or paintings by laser cleaning, food inspection by spectral analysis of laser-induced fluorescence, environmental studies by LIDAR techniques and laser driven particle accelerators by lasers with extremely high intensity. The recent development of short laser pulses with pulse widths down to a few cycles of the optical wave have opened a new and fascinating field for investigations of ultra-short dynamical processes in nature. These investigations might include the time span for the dissociation of molecules or the primary steps of the visual process where absorption of light leads to structural changes of the biological molecules which act as antenna for the light.

I have found chairing the selection committee extremely interesting and I continue to be inspired by the breadth of the research proposals that we receive."

Ultracold atom their quantum

Helium-4 bosons bunch together, Helium-3 fermions ‘antibunch’

At temperatures close to absolute zero the quantum character of free particles becomes noticeable as their thermal de Broglie wavelength (inversely proportional to their velocity) becomes large. Atoms are either bosons, i.e. particles with integer spin, or fermions, particles with half-integer spin. In quantum statistics bosons are described by a Bose-Einstein energy distribution while fermions are described by a Fermi-Dirac distribution. An international team* at the Laser centre of the VU University in Amsterdam (LCVU) demonstrated the ultimate consequence of this difference showing that Helium-4 bosons at a temperature of 1 microKelvin above absolute zero bunch together while Helium-3 fermions ‘antibunch’ when these atoms are released from the same magnetic trap.

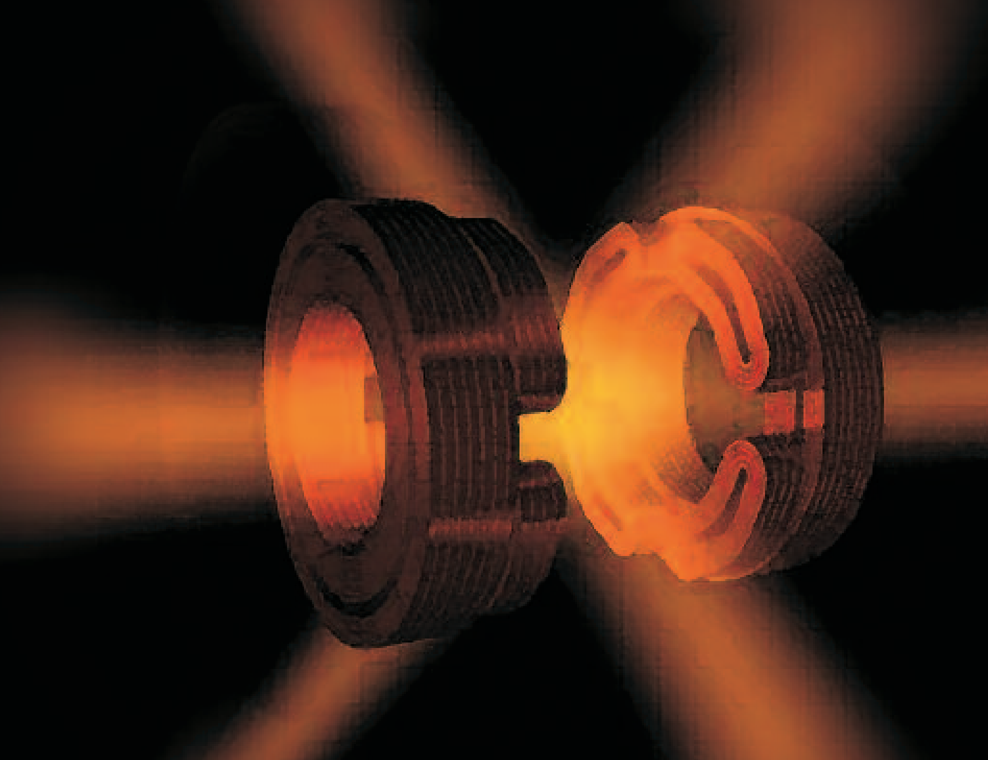


Figure 1. Experimental geometry allowing cooling and trapping of ultracold Helium atoms. The six laser beams, negatively detuned from atomic resonance, together with two of the coils in anti-Helmholtz configuration, allow magneto-optical trapping at a temperature of 1 milliKelvin. Subsequently the light is switched off, the atoms are optically pumped to a magnetically trappable state and trapped in a purely magnetic trap formed by 12 coils in a cloverleaf geometry. From there the atoms are further cooled to a temperature of 1 microKelvin.

50 years ago astronomers Robert Hanbury Brown and Richard Twiss demonstrated that photons from incoherent sources such as distant stars bunch together. They actually deduced stellar diameters from the distance over which this bunching occurs. This Hanbury Brown Twiss effect can be understood from classical electrodynamics. Looking at it from the perspective of individual photons arriving at a detector, it led to the birth of quantum optics. Glauber got the Nobel price for this in 2005.

Massive free particles such as Helium-4 atoms are, just like photons, bosons and are therefore also expected to show bunching when sufficiently cooled and confined. This was demonstrated by a group at LCFIO (Laboratoire Charles Fabry de l'Institut d'Optique) in Orsay (now Palaiseau) in 2005. They used bosonic Helium-4 atoms, brought them in a suitable quantum state (to allow laser cooling) cooled them with continuous lasers at 1083 nm to temperatures around 1 milliKelvin, trapped them in a

s reveal character:

magnetic trap and finally cooled them further by evaporative cooling to the required temperatures of 1 microKelvin. Then the cloud is so dense and cold that it is close to making the phase transition to a Bose-Einstein condensate (BEC), where a macroscopic number of atoms occupy the same quantum state. When these ultracold atoms (which can be considered completely free and noninteracting) are then released they fall due to gravity and their arrival time and position is detected on an 8 cm diameter microchannel plate (MCP) detector specially developed for this purpose. Bunching was indeed demonstrated.

In the LCVU group in Amsterdam a similar setup for cooling and trapping of helium atoms is available. This group can also cool Helium-4 atoms to BEC but has the extra option to cool fermionic Helium-3 to microKelvin temperatures. In Amsterdam, however, the dedicated position-sensitive MCP detector was not available to perform the Hanbury Brown and Twiss experiment with the fermions and demonstrate antibunching. A collaboration via the LLE access programme allowed both teams to transport the MCP detector from Orsay to Amsterdam in the summer of 2006, mount it under the ultrahigh vacuum (UHV) chamber of the LCVU group and detect antibunching in a two months collaborative effort. The results were published in Nature on January 25, 2007.

It requires a dedicated setup (in part schematically shown in Figure 1) to cool both isotopes of helium to temperatures around 1 microKelvin and demonstrate the Hanbury Brown Twiss effect. Several ultrastable lasers at 1083 nm were used, stabilised in frequency, split into several beams to realise laser beams with, using acousto-optic modulators, a fixed offset frequency, and switched by shutters to allow timing of the different stages of cooling, optical pumping and detection. Once both isotopes are cooled and trapped at these low temperatures, the Hanbury Brown Twiss effect can be observed releasing one of the isotopes from the trap. One simply observes when and where they then hit the MCP detector. The detection setup and the concept of the Hanbury brown Twiss effect are schematically shown in Figure 2.

In Figure 3 the most important experimental result is shown. It shows the normalised correlation function $g^{(2)}(\Delta z)$, that is, the probability of joint detection at two points separated vertically by Δz, divided by the product of the single detection probabilities at each point of the detector. Statistically independent detection events result in a $g^{(2)}$ value of 1, a value larger than 1 indicates bunching, while a value less than 1 is evidence of antibunching. The measurements are performed at a temperature of 0.5 microKelvin, taking data from about 1000 separate clouds for each isotope. The contrasting behaviour of bosons and fermions is clearly demonstrated in the figure, and the contrast, although not 100% due to detector limitations, is large.

The observed differences can be understood as a pure quantum effect associated with symmetries of wavefunctions of indistinguishable particles. The technique may also be used as diagnostic tool in more complicated situations allowing for instance studies of dilute gas analogies of condensed-matter systems such as optical lattices.

**The international team gathered scientists from LCVU (Amsterdam, the Netherlands) and LCFIO (Orsay, France)*

Reference: Jeltes *et al.*, *Nature* **445**, 402 (25 January 2007).

Figure 2. A cold cloud of helium atoms is released from the magnetic trap (Fig. 1), expands and falls under the influence of gravity on a time-resolved and position-sensitive detector that detects single atoms. The inset shows how bunching and antibunching occur when two possible paths interfere: S_1 and S_2 refer to two source points and D_1 and D_2 to two detection points. For bosons the two amplitudes $\langle D_1|S_1\rangle\langle D_2|S_2\rangle$ and $\langle D_1|S_2\rangle\langle D_2|S_1\rangle$ have to be added, which yields a factor of 2 in the joint detection probability if the two amplitudes have the same phase (within the coherence volume). For fermions the two amplitudes must be subtracted, yielding a zero probability for the joint detection in the same coherence volume.

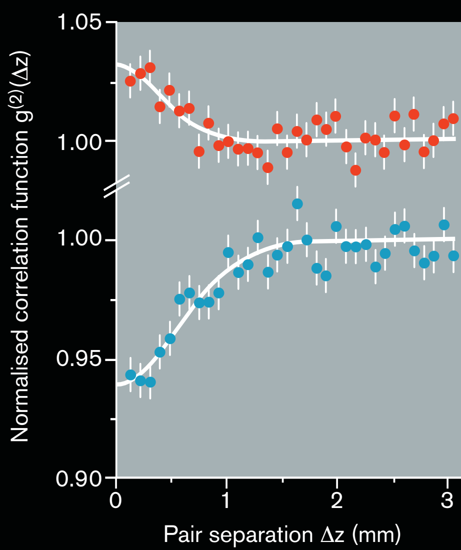


Figure 3. Normalised correlation functions for Helium-4 (bosons) in the upper (red) plot, and Helium-3 (fermions) in the lower (blue) plot as a function of vertical separation Δz. Helium-4 atoms are bunched and Helium-3 atoms are antibunched on a time scale that corresponds to a vertical separation of about 1 mm. The line shows a Gaussian fit. The antibunching correlation length for Helium-3 is expected and observed to be 4/3 times the bunching length for Helium-4 due to the smaller mass of the atoms.

ECRI Conference

The fourth European Conference on Research Infrastructures was held in Hamburg on 5 and 6 June 2007. It was jointly organised by the German Federal Ministry of Education and Research and the European Commission in co-operation with the European Strategy Forum on Research Infrastructures (ESFRI). It was hosted by DESY, the Deutsches Elektronen-Synchrotron, and was attended by more than 400 research stakeholders.

The launch of ESFRI in 2002 was a major step towards achieving excellence in research through the development of world leading research infrastructures at the European level. Last year ESFRI published a roadmap identifying 35 priority European-scale infrastructures needed in key scientific areas.

With a total estimated cost of €14 billion, these major infrastructures, on single sites or distributed, will need unprecedented mobilisation of national, private and alternative sources of funding, the development of strong partnerships across national borders and scientific disciplines.

Taking stock of progress made since the publication of the roadmap, the conference looked at critical issues such as the development of existing infrastructures, financing new installations, partnerships between various actors, management and governance models and the international dimension.

A revolutionary new instrument to finance research, technological development and innovation (RDI) has been officially launched simultaneously at the headquarters of the European Investment Bank (EIB) in Luxembourg, and the conference on Research Infrastructures in Hamburg. The Risk-Sharing Finance Facility (RSFF) aims to improve access to finance for participants by sharing the risks taken by the financial institutions between the 7th Research Framework Programme of the EC (FP7) and the EIB. The EIB will match the FP7 financial contribution to this instrument (i.e. provide up to €1 billion for the period 2007-2013). This translates into a total estimated value of loans covered by the RSFF equal to €10 billion.

The new European X-ray Free-Electron Laser (XFEL), is one of the 35 research infrastructure projects identified in the

It's a GO for ELI!

The Extreme Light Infrastructure (ELI), has been one of the very first infrastructures out of the 35 selected by ESFRI to be on the roadmap, authorised by Brussels to start its preparatory phase.

ELI in a nutshell

Among the most important scientific enquiries defined by Science (July 2005) was whether or not scientists will be able to build a laser intense enough to "rip photons into electron-positron pairs". ELI will be the first infrastructure to approach this limit. It will be dedicated to the fundamental study of laser-matter interaction in a new and unsurpassed regime of laser intensity: the ultra-relativistic regime (I_L 10^{23} W/cm^2). At its centre will be an exawatt-class laser at least 100 times more powerful than any existing or planned lasers.

ELI will attain its extreme power from the briefness of its pulses (femtosecond 10^{-15}s and attosecond 10^{-18}s). The infrastructure will serve to investigate a new generation of compact accelerators delivering energetic particle and radiation beams of femtosecond to attosecond duration.

Relativistic compression will provide a new avenue to ultrafast attosecond to zeptosecond (10^{-21}s) studies of laser-matter interaction. ELI will strive to be a

Roadmap. The 3.4km long X-ray laser will run from the DESY site in Hamburg-Bahrenfeld to the city of Schenefeld and as such, it will be the world's longest artificial light source. The formal launch of this exciting project took place on 5 June 2007 at the invitation of the German Minister, Annette Schavan, and in the presence of Research Ministers of some of the countries participating in the XFEL project.

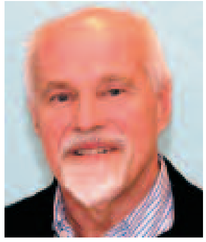
highly multidisciplinary platform, through specialised beam lines dedicated to European users and their international collaborators. Its scientific offering will encompass most of the physics branches: atomic, particle, nuclear, gravitational, and cosmology. ELI will bring wide benefits to society touching on lifescience, with improved oncology treatment, medical imaging, on nanotechnology, on material science to better our understanding of material subjected to particles and radiations or on the environment by conceiving methods for nuclear waste processing. ELI will also strive to foster technology transfers towards industry. However, where it will be the most fitting will be its training in most modern disciplines at all levels.

In the preparatory phase the 13 countries associated with the project will address, not only the technical issues, but also problems related to strategy, organisation, governance, financial, legal, safety and networking.

The power available with ELI will range from the PW at its front end to greater than 100PW at its duty end. Its cost is evaluated at 350M€. Although it will be available at intermediate powers, the first light at full power is planned for 2015.

The countries associated with ELI are: Austria, Belgium, Bulgaria, France, Germany, Greece, Hungary, Italy, Lithuania, Portugal, Romania, Spain, United-Kingdom.

Wim **Hogervorst**



Wim Hogervorst turned 65 in February, but does not like to call this a retirement. Indeed he will remain active with several issues concerning the Laser Centre VU, in particular the discussions (on behalf of LCVU) on the new FP-7 LASERLAB-Europe. He still has a part-time position at the Faculty of Sciences at VU University Amsterdam. There are also still some students that prepare for PhD under his supervision.

Wim was the founder of LCVU in 1992 after convincing the (then) Departments of Physics and Chemistry to unite the laser-based activities at the VU-campus in one institute. The Board of Directors then provided the space and the finances to build an in-house infrastructure. Wim was director there until 2002, brought LCVU into the LIMANS cluster of Laser Centres and later into Laserlab-Europe. Through his driving activities LCVU became a well-recognised centre on the VU-campus, in the Netherlands research setting and within Europe.

On March 9th 2007 the event of his birthday was celebrated with his good friends from within the physics community; Prof. Ted Hansch (Nobel Laureate - with whom he spent several months in Munich for a collaboration), Prof. Sune Svanberg (Postdoctoral work in Sweden in the 1970s), Prof. Wolfgang Ertmer (collaboration during his Alexander von Humboldt fellowship period), Prof. Massimo Inguscio (works on similar projects) and Prof. Wolfgang Sandner (Laserlab-Europe Coordinator).

The high quality of the speakers attracted a large audience from atomic and laser physicists from within the Netherlands.

Besides the Alexander von Humboldt Prize, Wim Hogervorst also received an honorary Doctorate from the University of Uppsala, Sweden.

Wim Ubachs

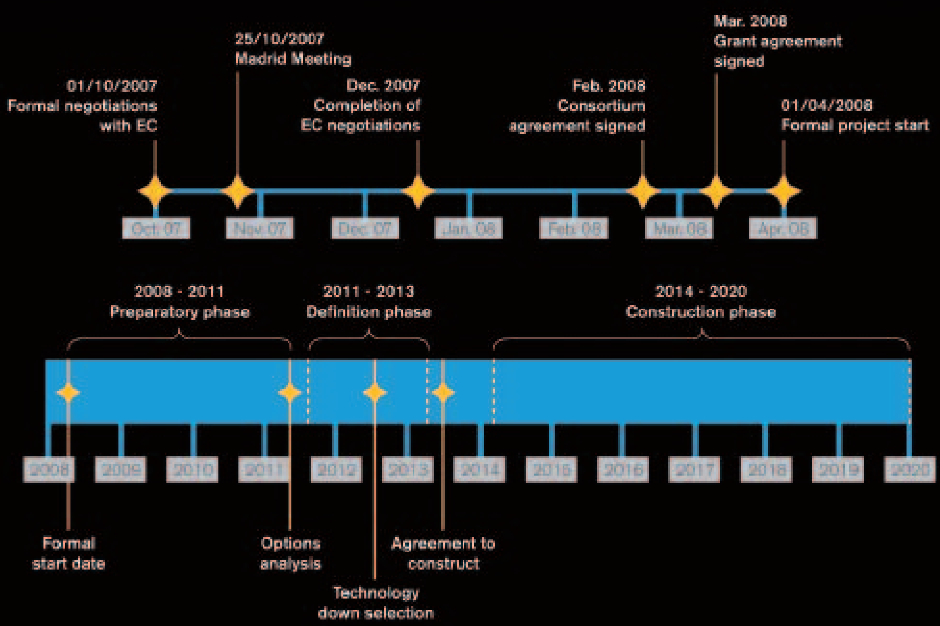
HiPER progresses to preparatory phase

The HiPER project will advance to the next stage in its development, the preparatory phase, having passed the FP7 independent peer review process.

Negotiations with the EC started formally in October 2007 and are expected to conclude by Christmas. The EC Grant Agreement is expected to be signed in March 2008 and the HiPER preparatory phase project is expected to formally commence on 1 April 2008, for a period of three years. A two year Definition phase will follow, to define the specifications of the facility. The p reparatory phase will progress the technical challenges associated with a facility of such magnitude, such as the targetry and high repetition rate laser development, and will also proceed with many essential non-technical aspects such as the communications, finance, legal and governance work.

A plenary meeting of all HiPER participants was held at UPM in Madrid on 25-26 October to discuss and ratify key elements of the preparatory phase – the deliverables, timescales, budget and the management structure.

The timelines below show some of the key short-term and long-term milestones of the project.



Short-term (upper timeline) and longer-term (lower timeline) milestones of the HiPER project

Announcements

Forthcoming events 2007-08

Laserlab meetings

'Fascination of Light' exhibition, Amsterdam, The Netherlands
3-18 October 2007

Laserlab N4 Workshop 'Interaction of Short Petawatt Laser Pulses with Plasma – Theory and Simulations' at the Georg-Christoph-Lichtenberg-Haus and GSI in Darmstadt, Germany
14-17 October 2007

'Fascination of Light' exhibition, Prague, Czech Republic
31 October - 8 November 2007

'Fascination of Light' exhibition, Warsaw, Poland
14-28 November 2007

Laser User Meeting 'Frontiers in the Generation of Short Laser Pulses and Laser-Matter Interactions', Madrid, Spain
28-29 November 2007

Laserlab Strategy Meeting, Madrid, Spain
30 November 2007

Laserlab Participants Council 2008 and final proposal conference, CESTA, Bordeaux, France
24-25 January 2008

How to apply for access

Interested researchers are invited to contact the Laserlab-Europe website at **www.laserlab-europe. net/access/**, where they find all relevant information about the participating facilities and local contact points as well as details about the submission procedure. Applicants are encouraged to contact any of the facilities directly to obtain additional information and assistance in preparing a proposal.

Proposal submission is done fully electronically, using the Laserlab-Europe Electronic Proposal Management System. Your proposal should contain a brief description of the scientific background and rationale of your project, of its objectives and of the added value of the expected results as well as the experimental set-up, methods and diagnostics that will be used.

Incoming proposals will be examined by the infrastructure you have indicated as host institution for formal compliance with the EU regulations, and then forwarded to the Users Selection Panel (USP) of Laserlab-Europe. The USP sends the proposal to external referees, who will judge the scientific content of the project and report their judgement to the Users Selection Panel. The Users Selection Panel will then make a final decision. In case the proposal is accepted the host institution will instruct the applicant about the further procedure.

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