LASERLAB-EUROPE

The Integrated Initiative of European Laser Research Infrastructures IV

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Intermediate report on Thematic Networks NEO, NEILS and NEBS

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Deliverable Type	
R = Report DEM = Demonstrator, pilot, prototype, plan designs DEC = Websites, patents filing, press & media actions, videos, etc. OTHER = Software, technical diagram, etc.	R
Dissemination Level	
PU = Public, fully open, e.g. web CO = Confidential, restricted under conditions set out in Model Grant Agreement CI = Classified, information as referred to in Commission Decision 2001/844/EC	PU

1 Objectives

The combined scientific and technical expertise of the project participants is a core asset of Laserlab-Europe, making it highly attractive for users and supporting a leading role of European science in photonics research. The objectives of this work package are i) to coordinate exchange on crucial scientific and technological issues of relevance for many partners, ii) to address the multidisciplinary applications of lasers and photonics technologies by bridging towards other ESFRI infrastructures and relevant networks, and iii) to pool know-how and good practice concerning essential operational issues such as security, laboratory management and data acquisition procedures.

Many outstanding scientific and technical skills and much premier know-how are distributed among the partners of Laserlab-Europe. Thematic Networks, dealing with best practices and knowledge sharing on specific facility operation issues and in fields of common concerns are an effective way to boost the overall effectiveness of the Consortium.

2 Network on Experiments and Operation (NEO)

Task leader: CNRS-ISMO

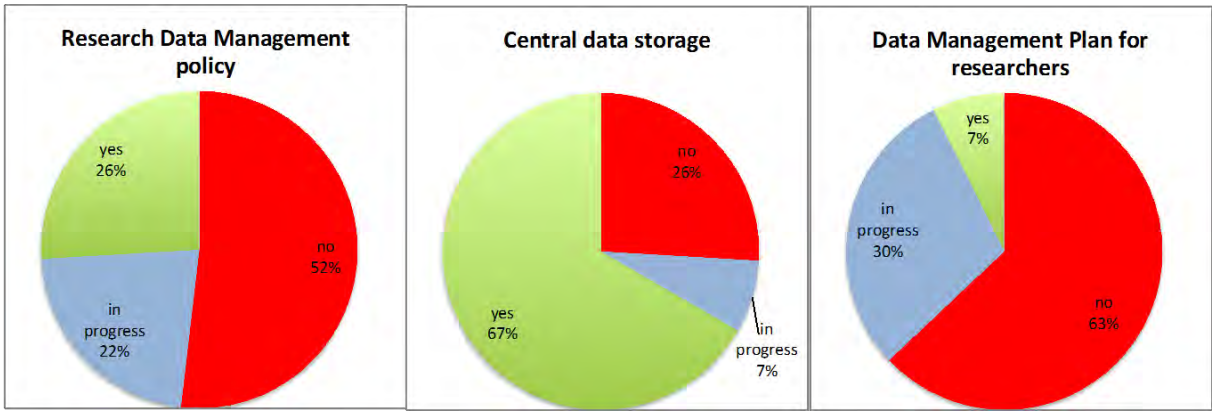
A number of concerns are universal to all laser infrastructures: guarantee user safety, optimise technical services to users, harmonise data acquisition procedures to allow for multiple campaigns in different infrastructures, data handling and long-term storage. Such issues are discussed within the Network on Experiments and Operation.

Laserlab Workshop on Data Handling and Open Data, 7 March 2017, Berlin, Germany

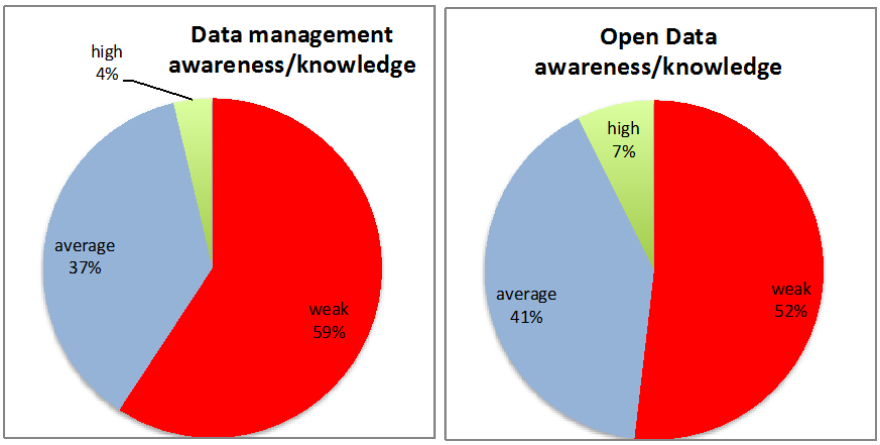
The topic of the first workshop was the management of large scale research digital data. This topic is not only timely in order to comply with the growing requirement for open access to research results, but it is also of strategic importance for all Laserlab partners. With the general trend of increasing laser and data acquisition repetition rates, the amount of data produced is also growing, forcing the necessity of a general plan for efficient curation and long-term preservation.

In preparation of the workshop, a questionnaire on data policies at the Laserlab infrastructures was distributed, completed and analysed.

The analysis shows diverse levels of implementation of data policies among Laserlab infrastructures:



Knowledge about open data and awareness among researchers are weak to average in 85% of the answers:



The workshop consisted of training sessions by external experts, giving an introduction to what research data and data management are and to practical aspects of data publication, archiving and, eventually, making them retrievable and accessible, followed by examples from Laserlab partners regarding their experience with data handling and open data. In the final session, the relevance and applicability within Laserlab as well as possible next steps were discussed. About 35 participants attended the workshop, including representatives of the three ELI pillars.

Session 1: Data management in EU-funded projects

Sebastian Netscher, GESIS, Leibniz Institute for the Social Sciences and CESSDA, Consortium of European Social Science Data Archives

Data sharing is of increasing relevance in nowadays research. This development is at least partly driven by funders' requirements on open access and data management, e.g. in EU's Horizon 2020. Such requirements are challenging for many researchers, wondering about how to generate shareable data as well as how data management should support this process. Sebastian Netscher's presentation focusses on the background of these challenges, discussing the possible levels of openness of data, ethical and legal issues and constraints, and a systematic approach to data management plans. The dynamic nature of the latter was highlighted.

Discussion: For very large datasets the question is brought up whether it might be more appropriate to store only the setup and the parameters of the experiment, allowing reproduction but avoiding storage of Tbytes. Only storage of the data required for replication of a published result is mandatory, including also the tools needed to access and interpret the data. It might also help to define common standards for the interpretation of data, depending on the possibilities in different disciplines. Quality standards for data publications and the possibility of peer review are discussed to ensure trust in data produced by other scientists.

Session 2: Data archiving, sharing and publishing

Kirsten Elger, GFZ, German Research Centre for Geosciences

Open research data is increasingly required by scientific journals and funding agencies in Europe and many countries worldwide. In addition to fulfilling this requirement, Kirsten Elger explains that it can also be a benefit for individual scientists, e.g. by leading to new collaborations or by increasing impact and visibility as well as citation rates. The presentation

shows best practice of publication of datasets through data repositories with assigned persistent identifiers, according to the FAIR principles (findable, accessible, interoperable, re-usable). Metadata standards and options for selecting appropriate data repositories are explained. A registry of existing repositories is available at, e.g., www.re3data.org.

Discussion: The duration of preservation is discussed from a technical point of view. Currently, preservation is mostly guaranteed for five years but new technical solutions are expected to emerge that will make longer durations possible. The question is raised what the return on investment will be for researchers to make their data openly accessible. Potential benefits may be the creation of new interdisciplinary collaborations. For PhD students it may as an evaluation criterion. In some communities (geochemistry for instance), re-use is already seen as positive.

Session 3: Data policy, management and implementation at the CLF

David Neely, Central Laser Facility, STFC

David Neely reports on the example of CLF, where the topic of data management has been discussed already for more than 10 years. In 2011, the UK's Research Council established Common Principles on Data Policy for data resulting from publicly funded research, which are the basis for policies of the facilities involved (www.rcuk.ac.uk/research/datapolicy/). Good practice recommendations include that data underlying published papers (except CLF annual reports) should be openly available, following a reasonable period of privileged use. Data management through an institutional or subject repository should enable data to be findable, accessible, standardized and re-usable. Data should be retained for the longest possible period, with ten years after the end of the project being a reasonable minimum. STFC has signed up to DataCite in order to be able to allocate a DOI to any set of data. In addition, each STFC PhD student is requested to set up a Data Management Plan, which will be updated throughout the project. David Neely describes the experimental data repository at STFC, which may be used by external users, and facility data management tool (based on eCAT2). The open data policy also applies to users, who are required to accept the terms and conditions of access to the CLF (www.clf.stfc.ac.uk/Pages/Terms-and-Conditions-of-Access-to-the-CLF.aspx). The obtained data are usually not managed by STFC (apart from experiments led by STFC employees), but by the users' universities or institutions. An example of stored data can be found at https://edata.stfc.ac.uk/handle/edata/20. David Caroll is the new CLF data management portal responsible officer.

Discussion: A series of questions was raised: How do we ensure that the information on calibration and interpretation is properly recorded? How do we deal with failed-shot data? Will reviewers be allowed to request access to raw data while reviewing a paper for publication? Should access be granted to executable and post-processing codes? What happens when international/commercial users collaborate with academic publicly-funded users? On the first question, thesis manuscripts and reports may be of some help. The recommended duration of the embargo period before publishing data (12 months) may be too short, as publications often appear only 2 years after an experiment. Cost and benefit in return should be taken into account when deciding about storing and publishing data. In view of the problem to get structured metadata for a data publication, CLF uses a searchable abstract for the datasets.

Session 4: Data management at GSI-PHELIX

Bernhard Zielbauer, Helmholtzzentrum für Schwerionenforschung

Bernhard Zielbauer presents the example of GSI-PHELIX, where the PHELIX shot database (https://psdb.gsi.de/login), an in-house development of a Labview system, was established that provides long-term data storage including backups and easy access from everywhere (including backups and user access rights management). The shot analysis allows to search

and compare shots, to generate shot statistics, to group shots by experiment or by shot type. A typical experiment at PHELIX generates data of up to 7 laser shots per day with the related machine and experiment data stored in the database (~1Gb/shot). The data is accessible on demand also for the community. Key issues of the GSI data policy are also presented. The contractual obligations concerning open data remain under the responsibility of the researchers.

Discussion: Laserlab could support efforts to set up data management systems by defining (de facto) standards from the point of view of the community. Laserlab as a community could also jointly request from manufacturers of scientific detectors (e.g. CCD cameras) that a common standard format of storage should be adopted. The participants propose that the issues of data management and community standards should be discussed at the User Meeting in order to raise awareness within the community about data management and to inform about incentives, e.g. data citations.

Session 5: Discussion and next steps

For the final session, three topics are selected from the issues discussed after the preceding presentations. The participants discussed the topics in small sub-groups and took notes that were collected and put on the boards.

a) How long should research data be curated?

For the duration of preservation of research data, five, ten and also longer periods are discussed. The recommended or necessary duration depends on the associated costs and on the obligations according to the national and international funders; it may be chosen by the PI. Technology advances may help to ensure long-term storage at reasonable costs. Other factors that should be taken into account regarding the duration of preservation are the field of science, the type of data and the kind of experiment and not least the relevance and impact of the research data (are they unique, are they leading to a scientific breakthrough, are they of some historical interest?).

b) What could be standardized in our community: data format, analysis software, common diagnostics, …

The participants consider the use of custom-made open source software as an important factor for standardisation within the Laserlab community. Examples are proper and documented analysis software tools and methods for, e.g., interferometry, VISAR, RCFs, SOP, FROG, etc. A survey among the Laserlab partners on diagnostic methods and associated analysis tools is proposed. A Laserlab standard data format for exchange and for the documentation of data might be useful. However, standards should not be restrictive in order to preserve innovativeness in research projects. It is noted that Laserlab infrastructures differ from other large-scale infrastructures such as synchrotrons, where users perform their experiment with already implemented instrumentation. For Laserlab, guidelines for documentation and procedures rather than common standards may be proposed. As mentioned above, Laserlab could also jointly request from manufacturers of scientific detectors that a common standard format of storage should be adopted.

c) What should be next for Laserlab Data Management: propositions, incentives, …

The participants propose to define common ways to evaluate shot “success” or validity of results. Other communities, e.g. the synchrotron community, may be approached to learn about their standards. A pilot programme could be developed based on the example of facilities that already have data management in place. An open task is to assess the costs involved and funding opportunities. In general, the participants agree that the issue should be further discussed within Laserlab, e.g. in the form of a follow-up meeting. Information about the discussions at the present meeting should be provided at the joint JRA meeting, at user meetings and through the Laserlab newsletter. Finally it was proposed that Laserlab signs up

to DataCite in order to provide a DOI for the data generated by each approved trans-national access experiment.

The programme and the presentations of the external experts are available at https://www.laserlab-europe.eu/events-1/laserlab-events/2017/march-data-handling-berlin.

Participants:

Name	Affiliation	Country
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Verena Bier	MBI	Germany
Stefan Brohs	MBI	Germany
Rytis Butkus	VULRC	Lithuania
David Carroll	STFC-CLF	UK
Jiri Chudoba	ELI-Beamlines	Cz Rep
Mihai Ciubancan	ELI-NP	Romania
Victor Claessen	RU FELIX	NL
Jan Dostal	IoP-ASCR	Cz Rep
Kirsten Elger	GFZ	Germany
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Mark Wiggins	STRATH	UK
Philippe Zeitoun	CNRS-LOA	France
Bernhard Zielbauer	GSI	Germany

3 Network on Extreme Intensity Laser Systems (NEILS)

Task leader: GSI jointly with CLPU

Extreme intensity laser systems comprise various frontier technologies pushing peak power and peak intensity through either long pulse kilojoule energy class installations, or with ultrashort pulse petawatt class laser systems. All systems exhibit dedicated demands and very specific procedures for operation, instrumentation, metrology, safety and further development.

High energy systems in Europe are presently operated in the Czech Republic, France, Germany, and United Kingdom, providing a common basis for knowledge exchange on components such as large optics and complex opto-mechanical setups and on the specific requirements for instrumentation, data acquisition and even theoretical approaches. Ultrashort-pulse petawatt technology is a new frontier for laser infrastructures with several facilities becoming operational, among them facilities in France, UK, Germany and Spain, and at ELI. For such new installations it is essential to exploit the existing know-how and experience of high-energy laser facilities, especially in the field of short pulse intense laser technology where Europe is world leader.

While operating parameters between the laser facilities vary, core operational and technical issues such as pulse diagnostics, optics handling, or target fabrication are of crucial importance to all these laser facilities. The objective of this networking activity is to establish a regular laser science forum in which knowledge will be shared and best practices will be developed.

Network on Extreme Intensity Laser Systems NEILS Annual meeting, 9-11 May 2016, Darmstadt, Germany

The first NEILS meeting was held at GSI, Darmstadt Germany and gathered 31 scientific staff members from Laserlab partners and ELI-NP as well as the associated laboratory ORION in order to discuss subjects related to the operation of mid-to-large scale laser facilities. The topics discussed at this meeting were the electromagnetic pulse sources (EMP) in the target area and their measurement and mitigation, the alignment and operation aspects, the specification and management of large optical components and finally target area related issues.

A detailed meeting report may be found on pages 8-14.

Network on Extreme Intensity Laser Systems NEILS Annual meeting, 20 June 2017, Salamanca, Spain

The workshop organised in Salamanca within the networking activities in Laserlab aimed at gathering different European centres to reinforce collaboration and exchange of knowledge in “Target Area operation at high rep Rate for Peta/femto laser systems” that we have identified as one of the challenges of the HRR Petawatt science. The workshop was attended by 44 participants from several European countries and also from the USA.

A detailed meeting report may be found on pages 15-18.

Report – first NEILS Meeting

GSI Darmstadt, May 9th-11th 2016

Figure 1: Picture of the NEILS meeting participants (Picture: G. Otto)

Executive summary

The first NEILS meeting was held at GSI, Darmstadt Germany and gathered 31 scientific staff members from laserlab partners and ELI-NP on subjects related to the operation of mid-to-large scale laser facilities. Laserlab participating institutions were GSI, PALS/HILASE, LULI, LP3, RAL, CEA-CESTA. In addition, the associated laboratory AWE was represented. The meeting is centered on round table discussions tackling 4 subjects: electromagnetic pulse origin and mitigation, laser alignment procedures, component management and target area related issues. As an introduction to the meeting, each laboratory gave a short update on their laser system and enough time was granted in a dedicated session to address specific questions from the ELI-NP team that is in charge of building and operating the next generation of short-pulse laser facility. The core of the meeting was organized with round-table discussions moderated by representatives of the participating laboratories. These round-tables were prepared in advanced in the form of questionnaires that were circulated a few weeks in advance. The answers were compiled by the moderators and summarized for the audience during the meeting, triggering new questions and comments. For particularly complicated subjects, short presentations were used to support the discussion or distribute information. The topics discussed this year were the electromagnetic pulse sources (EMP) in the target area and their measurement and mitigation, the alignment and operation aspects, the specification and management of large optical components and finally target area related issues.

Detailed report

Session 1: Electromagnetic pulses (EMP)

Chair: Dr. Josef Krasa (PALS), **minutes**: Dr. Bernhard Zielbauer (GSI)

The presentations from CEA (D. Penninckx), RAL (D. Carroll), PALS (J. Krasa), LULI (N. Sévelin) and GSI (B. Zielbauer) have given an overview over the available know-how on target-generated EMPs, on both the theoretical and experimental sides. CEA has developed a multi-scale simulation approach which enables investigations from the assumed EMP source (charging of the target on shot) up to the propagation of the electromagnetic waves through the target chamber. This detailed analysis resulted in a set of target holder design rules which aim at reducing the target charge equilibration current and thus the EMP amplitude. At RAL, EMP measurements using Moebius loops have been performed during several full system shots and a method for Fourier analysis of the temporally changing pulse spectrum has been developed. The dependency of the signal characteristics on the pulse duration as well as the pulse energy seems to be rather weak, however, a stronger dependency on the target holder shape has been found. The PALS colleagues have performed several measurements of the target current temporal derivatives showing values of kA/ns. These strong currents have led to considerable damage of motors before they were properly protected. At LULI, commercial EM field probe measurements show field amplitudes of up to 200 kV/m. Considerable efforts have been spent on shielding system and measurement components from electromagnetic noise coming both from the pulsed power system discharge as well as target charging. At GSI, several simple loop probes have been installed in the target chamber as well as outside and are continuously recorded during all beam times. Closer data analysis is pending, but strong amplitude differences can be seen between experiments using different target holder geometries and levitating targets.

The mutual impression is that the EMP signals and effects seem to be similar in all participating laboratories even though the measurement techniques were different. A continuous monitoring as well as more dedicated EMP investigation campaigns is necessary to understand the creation mechanisms, the effects and refine the mitigation strategies.

Session 2: Alignment and Operation Aspects

Chair: Dr. Catherine Le Blanc (LULI), **minutes**: Dr. Stefan Götte (GSI)

The first session of the second workshop day started with three short presentations. In these, certain procedures concerning alignment and operation have been shown to seed the following discussion: First, Stephan Parker (AWE) presented facts about upgrades at Orion. These affect one short pulse beamline (enhancement of the 2^{nd} harmonic energy) as well as a long pulse beamline (wavefront correction). Raphael Clady (LP3) showed a few slides with a description, the alignment procedure and the on target peak intensity determination at the AZUR facility. Steve Hawkes (RAL) gave an overview about the operation of Astra Gemini (remarkable: the “run at risk”-mode in which trained experimentalists are allowed to use the system without supervision at night). The beam position is partly automatically aligned by a closed loop system.

Afterwards the questions asked by PHELIX have been discussed: The first subject dealt with operational aspects at higher repetition rates (this field was stressed by ELI already in a dedicated session before). It turned out that at least abort conditions must be defined on order to protect the laser system in operation. If necessary, the beamline position must be automatically corrected. Finally, switching between alignment mode (low energy) and high energy mode must become feasible while firing flash lamps to keep the system thermally stable: In alignment mode, this shall be possible by shifting the flash lamp timing to avoid unwanted amplification as well as suppressing certain laser pulses out of the chain.

Second, an important working horse at laser labs has been discussed: cameras. Obviously, GigE cams are going to become the follow-up standard after FireWire. Concerning the network architecture, both solutions are in use: A dedicated network to which the cams can be connected to as well as the connection to computers that are connected to a network.

The discussion was fruitful, all labs contributed with experiences and related questions. Several labs prepared the answers in written form to make it easier to get in contact about certain aspects also later on.

Session 3: Specifications and Component Management

Chair: Dr. Laurent Lamaignère (CEA), **minutes**: Dr. Udo Eisenbarth (GSI)

During the second session of the second workshop day, four main issues have been addressed.

- **Laser damage test procedures**
  The optics laser damage resistance is a critical issue for the operation, maintenance and performances of high power facilities. One point is its measurement in order to qualify the optics and to operate the laser. Measurements are realized off-line with specific and dedicated benches. CEA has developed two procedures related to damage testing for the compressor, gratings, mirrors and focusing parabola: first a new single-shot testing procedure for the Laser Induced Damage Threshold (LIDT) determination; secondly damage densities, related to defects, are measured by scanning a larger area of the optics. LULI has developed a dedicated damage test bench. The tests are performed with stretched pulses (approx. 500 ps).
- **Supervision of damage occurrence and growth on-line**
  After qualification, it is necessary to track and follow the optics damage on-line, it means directly on the facility. Different lightening and inspection are used. LULI uses a special side illumination of optics (like PHELIX) and analyses with a specialized program. On APOLLON facility: the damage observation on the gratings will be done by means of cameras through chamber windows (not yet tested). The attendees agree that a correct illumination for the damage detection is difficult and it is necessary to have criteria for changing the gratings (how much damage is tolerable?). On VULCAN facility, the inspection of the gratings (no windows in the compressor chamber) can only be monitored online using the nearfield profile after the compressor. On PHELIX: the damage tracking is based on images stored in the shot database. The LULI team has reported a laser damage incident due to wrong energy and pulse length mistakes at the injection (several large-size optics were damaged). The laser beam parameters have to be double-checked before operating the laser.

- **Vacuum and cleanliness related issues**
  All laboratories apply specific attention on optics cleanliness. CEA/PETAL made a presentation of cleanliness procedures of optics. On APOLLON, mass spectrometer measurements are carried on each time a new component is brought / exchanged in the chamber. Nevertheless, a systematic question dealing with the contamination level to be considered as "clean" is reported. Separate testing chamber for testing outgazing and pollution control has also been presented. The ELI-NP team has a specific question about the difference of LIDT of optics in air and vacuum. Literature reports a LIDT 10 % higher in vacuum (Alessi et al, Proc. Of SPIE **9345** (2015); Vulcan experience: No difference between air and vacuum.
- **Metrology tools and optics specifications**
  Optics specifications are difficult to define for these particular facilities. The PETAL team designs and calculates by itself the coating layers and expected damage threshold before the fabrication by vendors (they work closely with vendors). For example, an improvement of LIDT by a factor of two has been obtained with the optimization of electric field distribution inside the coating layers. Then document about standard optics specifications are sent to the manufacturer together with the particular specifications (PETAL/LULI). VULCAN has presented an example of a typical optics specification document. A question by PHELIX has been asked concerning the use of ISO 10110 definitions for setting up optics specifications. It seems that this is not very common (yet). Many labs still partly use MIL specifications (e.g. scratch/dig) and sometimes have peculiar specifications.

The overall discussion was rich and the difficulties were presented without any reserve. The labs have reported their own experiences, their questions and solutions too. The teams keep sharing on these issues.

Session 4: Target area related aspects

Chair: Dr. Bernhard Zielbauer (GSI), **minutes**: Dr. Florian Wagner (GSI)

In this session three topics of interest were discussed: debris mitigation, on-target beam requirements and parallel system use issues. B. Zielbauer started with a presentation about debris in the PHELIX target chamber. At present, a copper parabola and no debris shield is used because the refurbishment of the copper parabola is cost effective. But the parabola must be regularly refurbished. To mitigate debris experimentalists at PHELIX are asked to use large angles of incidence for thick targets while micrometer scale targets can also be shot at angles close to 0°. An implementation of a glass parabola is planned for the future and a debris shield will be required. The use of a Schott glass plate is currently investigated. J.P. Zou then summarized the solutions at LULI and plans for Apollon. At LULI 250-300 µm thick coated Schott glass is used as debris shield which must be replaced 1-2 times per year due to damage. For Apollon the three different materials: Schott glass, polypropylene and polystyrene were tested with respect to transmitted wavefront, birefringence and spectral transmittance. The results of these tests can be found in J.P. Zous' presentation slides. S. Parker showed findings from AWE. There debris/material also appears behind the debris shield and even far away from TCC and causes damage there. As a possible reason ricochet effects or air movement when the chamber is let up is considered. At VULCAN glass pellicles are permanently used as debris shield as pointed out by D. Carrol. These pellicles show a broad coating and localized impact from high velocity debris. The focusing parabola is not polished but only recoated. This results in a drop of the lifetime from five to two years.

As a contribution to the second topic B. Zielbauer showed a possible solution to evaluate the on-shot intensity by measuring 3ω radiation from the focus, which was implemented at PHELIX for an experiment in the past (details can be viewed in B. Zielbauers' slides). V. Bagnoud also reported on an experimental campaign which was dedicated to measure the on-shot focus after a plasma mirror. The participants concluded that measurement of the on-shot focus in the target chamber is very complex and therefore requires a dedicated beamtime. Hence using this as permanent diagnostics is not practical and users rely on the far field profiles from the laser diagnostics. S. Parker contributed by showing a study of the pointing stability at AWE. As a source of instabilities, vibrations in the compressor hall were identified. A much bigger effect was observed for the 2ω beam than for the 1ω beam as can be reviewed in Parkers' presentation slides. In addition an alignment drift was observed after moving the focusing parabola. This was attributed to the mounting of the parabola. B. Zielbauer complemented that movement of the crane next to the PHELIX building that enormous effect on the beam pointing in the target chamber.

Finally the topic parallel system use was discussed. D. Carrol and M. Galimberti reported that at VULCAN two experiments in two different target areas are typically undertaken in parallel. There are morning meetings where the two experimental teams communicate with each other and with the laser team and plan the use of the laser during the day. Switching the beam between the different target areas can be done within a few minutes. According to M. Galimberti the parallel use enables a larger number of shots since the experimenters typically need a lot of time in between the shots for setup and other purposes. Gemini usually runs two target areas at the same time by switching the 10 Hz pulse into two parts. At PHELIX no parallel use is planned. ELI-NP plans parallel beamtimes for the future.

Annex 1: Program

Monday 09 May 2016

18:00 -21:00 Welcome Reception:
BBQ near the GSI pond, Foyer of the guesthouse

Tuesday 10 May 2016

08:30-09:00 Registration at GSI gate
09:00-09:15 Welcome address
09:15-10:30 Facility Updates I: 3 updates (LULI,CLF,CEA)
09:15 Appollon and LULI facilities - Dr. SÉVELIN-RADIGUET, Nicolas, Dr. ZOU, Jiping
09:40 CLF Update - Dr. GALIMBERTI, Marco
10:05 CEA Update - Dr. BLANCHOT, Nathalie

10:30-10:50 Coffee Break and Group-Photo at GSI pond
10:50-12:10 Facility Updates II: 3 updates (PALS, GSI, ELI-NP)
10:50 PHELIX - an update – Dr. BAGNOUD, Vincent
11:15 PALS Overview, HILASE - Dr. JUHA, Libor; Dr. DOSTAL, Jan
11:50 ELI-NP - Dr. URSESCU, Daniel

12:20-13:30 Lunch break
13:30-15:00 Workshop discussion I: EMP
Conveners: Dr. Krasa, Josef

15:30-17:00 Questions and answers with ELI-NP
Conveners: Dr. URSESCU, Daniel

17:00-18:30 Facility visits
19:30-21:30 Conference Dinner
Braustübl, Goebelstraße 7, 64293 Darmstadt, phone: +49 6151 876587

Wednesday 11 May 2016

09:15-10:30 Workshop discussion II: Alignment and operation aspects
Conveners: Dr. LE BLANC, Catherine

11:00-12:30 Workshop discussion III:
Specifications and component management
Conveners: Dr. LAMAIGNERE, Laurent

12:30-14:00 Lunch break

14:00-15:30 Workshop discussion IV:
Target area related aspects
Conveners: Dr. ZIELBAUER, Bernhard

15:30-16:00 Conclusion and departure

Annex 2: List of participants

Dr. BAGNOUD, Vincent	GSI, Darmstadt
Dr. BLANCHOT, Nathalie	CEA-CESTA
Dr. BRABETZ, Christian	GSI, Darmstadt
Dr. CARROLL, David	STFC
Dr. CERNAIANU, Mihail Octavian	Extreme Light Infrastructure - Nuclear Physics(ELI-NP)
Dr. CLADY, Raphael	CNRS
Dr. DANCUS, Ioan	IFIN-HH/ELI-NP
Dr. DOSTAL, Jan	Institute of Plasma Physics - PALS
Dr. EISENBARTH, Udo	GSI, Darmstadt
Dr. GALIMBERTI, Marco	CLF, STFC
Dr. GUGIU, Marin Marius	IFIN-HH/ELI-NP
Dr. GÖTTE, Stefan	GSI, Darmstadt
HŘEBÍČEK, Jan	IoP AS CR
Dr. JUHA , Libor	Institute of Physics ASCR
Dr. KRASA, Josef	Institute of Physics, CAS
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Dr. LAMAIGNERE, Laurent	CEA
Mrs. LE BLANC, Catherine	CNRS
Mr. PARKER, Stefan	AWE
Mr. PATRIZIO, Marco	TU Darmstadt
Dr. PENNINCKX, Denis	CEA-CESTA
REEMTS, Dirk	GSI, Darmstadt
Mr. ROUYER, Claude	CEA - CESTA
Mr. SCHANZ, Victor	GSI, Darmstadt
Dr. SMRZ, Martin	Hilase center, Institute of Physics AS CR
Dr. SÉVELIN-RADIGUET, Nicolas	LULI
Dr. URSESCU, Daniel	ELI-NP
Dr. WAGNER, Florian	GSI
Mr. WEGRZYNSKI, Lukasz	Institute of Optoelectronics
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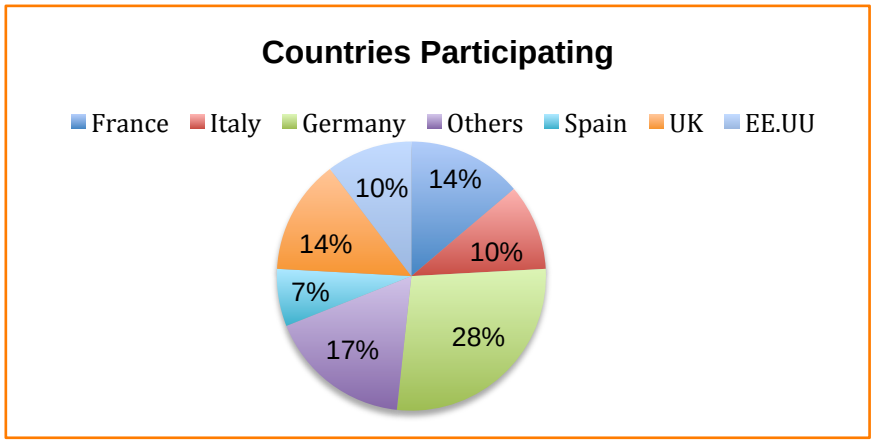
Network on **E**xtreme **I**ntensity **L**aser **S**ystems **NEILS 2017**
Annual meeting, @ Centro de Laser Pulsados, Salamanca Spain, Tuesday 20th June 2017

"Target Area operation at high rep Rate for Peta/femto laser systems"

On June 20th 2017 the meeting: "Network on Extreme Intensity Laser Systems" NEILS within LaserLab-Europe IV has been organized by the Centro de Láseres Pulsados (CLPU) in Salamanca, Spain Chaired by Dr. Luca Volpe.

Workshop Name: NEILS Annual Meeting 2017 'Target Area operation at High Rep. Rate Peta/Femto laser system'
Date: 20th June 2017
Venue: U-Talent Room – Science Park of University of Salamanca–
Number of attendees: 44
Number of participants: 10 drivers
Fee: NO
Project: European Laserlab IV
Program: The workshop organised in Salamanca is following a first meeting that was organised in 2016 at GSI Laboratory in Darmstad Germany within network activity in Laserlab. The aim of such network activity is to gathering together different European centres to reinforce collaboration and exchange of knowledge in this point that we have identified as one of the challenges of the HRR Petawatt science.



The participation to the workshop was uniformly spread around European countries with relevant insertions from USA. This was permitting exchange of knowledge between EU countries as well as between EU and USA scientific groups

The workshop has been organised as a series of 4 "Round table" discussions each of them focused on a different scientific and technological issues in the field of High Intensity Ultra short laser-Plasma interaction. Each "round table" was driven by 3-4 experts on the field (the "drivers") that also were providing an initial short presentation on the status of the art in the discussed field. The total drivers were 10 and the issues were scheduled as follows.

1 Solid target development, motion for replenishment and micro-positioning and EMP

Chairs
- Chris Spindloe (Science and Technology Facilities Council)
- Gabriel Schaumann (Technical University Darmstadt)
- Piotr Lutoslawski (ELI Beamlines)

Topics

a) Status of the technological development of fast motorised target holder and the related alignment procedure
b) EMP prevention in High Intensity HRR experiments in the fs regime.
c) Levitated targets to avoid EMP

2 Near critical density targets development for particle acceleration and vacuum technology

Chairs
- François Sylla (Source Lab)
- Dominykas Gustas (Technical University Darmstadt)
- Matteo Passoni (Politecnico)
- Alain Girard (CEA)

Topics

a) Stability of liquid target surface at HRR (liquid)
b) Foams targets, the problem of the HRR
c) Demonstration of efficiently proton acceleration in gaseous targets
d) Vacuum stability at HRR for both liquids and gaseous targets
e) Comparison between pulsed and continuous fluids targets

3 *Rep rate targets for applications: Debris, plasma mirrors:*

Chairs
- Dougglas Shumacher (Ohio State University)
Patrick Pool (Ohio State University)
- Rodrigo lopez (Laboratoire d'Optique Appliquee)

Topics

a) Status of the HRR plasma mirrors development and connected issues
b) Alignment procedure of both target and plasma mirrors at HRR
c) Technical solutions for debris protection in HRR solid interaction and what about liquids?

4 Targetry networks and Fabrication

Chairs
- Gabriel Shaumann (Source Lab)
- Joerg Schreiber (Technical University Darmstadt)
- Irene Principe (Politecnico)

Topics

a) How the network can help the community?
b) Intra and extra EU networks relations
c) Microstructure target
d) Singular target geometry (like coils or cones) is HRR possible?

Annex 1 (The program)

Network on Extreme Intensity Laser System – NEILS–

Target Area Operator at HRR for Peta/femto Laser System

09:30 – 10:00	Welcome Coffee
10:00 – 11:30	S1.- *Solid target development, motion for replenishment & micro-positioning & EMP*
11:30 – 12:00	Coffee Break
12:00 – 13:30	S2.- *Near critical density fluid targets development for laser plasma interaction and vacuum tech.*
13:30 – 15:00	Lunch & Free Discussion
15:00 – 16:30	S3.- *High repetition rate targets for applications: Debris & Plasma Mirrors*
16:30 – 17:00	Coffee Break
17:00 – 18:30	S4.- *Targetry networks & Fabrication*
18:30 – 19:00	Move to Salamanca

Annex 2 (Participants)

NAME	INSTITUTION
Christopher Spindloe	Science and Technology Facilities Council –STFC–
Gabriel Schaumann	Technical University Darmstadt –TUD–
Piotr Lutoslawski	ELI Beamlines
François Sylla	SourceLAB
Dominykas Gustas	ENSTA ParisTech
Matteo Passoni	Politecnico di Milano
Alain Girard	CEA
Douglass Schumacher	Ohio State University
Patrick Poole	Ohio State University / LLNL
Rodrigo Lopez-Martens	Laboratoire d'Optique Appliquée –LOA–
Gabriel Schaumann	Technical University Darmstadt –TUD–
Christopher Spindloe	Science and Technology Facilities Council –STFC–
Irene principe	Helmholtz-Zentrum Dresden-Rossendorf –HZDR–
Nico Neumann	Technical University Darmstadt –TUD–
Markus Hesse	Technical University Darmstadt –TUD–

Luca Fedeli	Politecnico di Milano
David Dellasega	Politecnico di Milano
Jose Luis Henares	CENBG-CNRS-IN2P3-Universite de Bordeaux
Paul Bolton	LMU Munich
Joerg Schariber	LMU Munich
Sebastian Goede	European XFEL
Henryk Fiedorowicz	Institute of Optoelectronics, Military University of Technology
Enam Chowdhury	Ohio State University
Sam Atsbury	Science and Technology Facilities Council –STFC–
Rui Silva	Universidade de Coimbra
Jorge Pereira	Universidade da Beira Interior
Dan Levy	Weizmann Institute / LOA
Camilo Ruiz	USAL
Ramiro Contreras	UNAM
Juan Carlos Llorente	GMV
Miroslav Krus	PALS
Vass Csaba	ELI-ALPS
Alvaro Antolin	USAL/CLPU
Marine Huault	Centro de Láseres Pulsados –CLPU–
Sofia Malko	Centro de Láseres Pulsados –CLPU–
Carlos Salgado	Centro de Láseres Pulsados –CLPU–
Luca Volpe	Centro de Láseres Pulsados –CLPU–
Luis Roso	Centro de Láseres Pulsados –CLPU–
Giancarlo Gatti	Centro de Láseres Pulsados –CLPU–
Cruz Méndez	Centro de Láseres Pulsados –CLPU–
Yaiza Cortés	Centro de Láseres Pulsados –CLPU–
Jose Antonio Pérez-Hernández	Centro de Láseres Pulsados –CLPU–
Jon Imanol Apiñaniz	Centro de Láseres Pulsados –CLPU–
Xavier Vaisseau	Centro de Láseres Pulsados –CLPU–
Mauricio Rico	Centro de Láseres Pulsados –CLPU–
Diego de Luis	Centro de Láseres Pulsados –CLPU–
Jose Manuel Álvarez	Centro de Láseres Pulsados –CLPU–
Javier Lozano	Centro de Láseres Pulsados –CLPU–
Mario García-Lechuga	Centro de Láseres Pulsados –CLPU–

4 Network on Experimentation and Best Practices in Biology and Life Science (NEBS)

Task leader: UC

The increasing number of experimental campaigns in the field of laser applications to life sciences gives rise to new challenges in Laserlab-Europe: It has to increase its awareness and expertise in dealing with ethical issues, living cells handling, animal experimentation, joint experiments of correlative microscopies with non-laser systems such as X-ray sources, NMR, or electron microscopy. The requirements for life science experiments and operation of equipment are very different from atomic and molecular physics experiments or investigations into plasma physics. The objective of NEBS is to develop links with external partners and networks, such as Euro-BioImaging and representatives from medical centres, in order to share best practices and know-how and to discuss procedures and issues in experimentation, handling and ethics.

In the framework of the Joint JRA meeting in May 2017, the participants provided an overview of their approaches to collaboration with hospitals and medical centres. Based on advice from the Industrial Advisory Committee, a workshop is planned on support for scientists in the field of biology and life sciences on the options offered by using laser techniques for bio-related research, e.g. by applying the techniques to living cells, and, thus, to enhance cross-community collaboration. Proposals were collected to choose a suitable conference or event in the life sciences or bio-related research, at which the workshop may be held as satellite meeting in order to reach the targeted audience and to minimise additional travel.

The Laserlab-Europe Networking Board approved the proposal to explore synergies with the European Society for Molecular Imaging and agreed on a Laserlab-Europe session at the Society's annual meeting, the 13th European Molecular Imaging Meeting, on 20-23 March 2018 in San Sebastian, Spain. The session will discuss aspects of life science experiments in the context of a vibrant conference within the community of biomedical imaging, which will increase the impact due to interaction with specialists in the field. A committee of Laserlab-Europe members and ESMI representatives has been set up that takes the lead in finalizing the programme of talks and select and invite the speakers.