



Federated Systems: the European Perspective (CALIPSO)

Cecilia Blasetti
Wayforlight coordinator

15/06/16

NUFO 2016 Annual Meeting

European Union & European Commission



1952 1973 1981 1986 1995 2004 2007 2013



governs the European Union
with the European Parliament



EC → Framework Programmes



Defines and implement



the Multi-annual
*Framework
Programmes* for
Research and
Innovation



MEMBER STATES

ASSOCIATED COUNTRIES

THIRD COUNTRIES

Innovation Union → Horizon 2020

→ a Europe 2020 flagship initiative



Horizon 2020: the financial instrument to implement IU

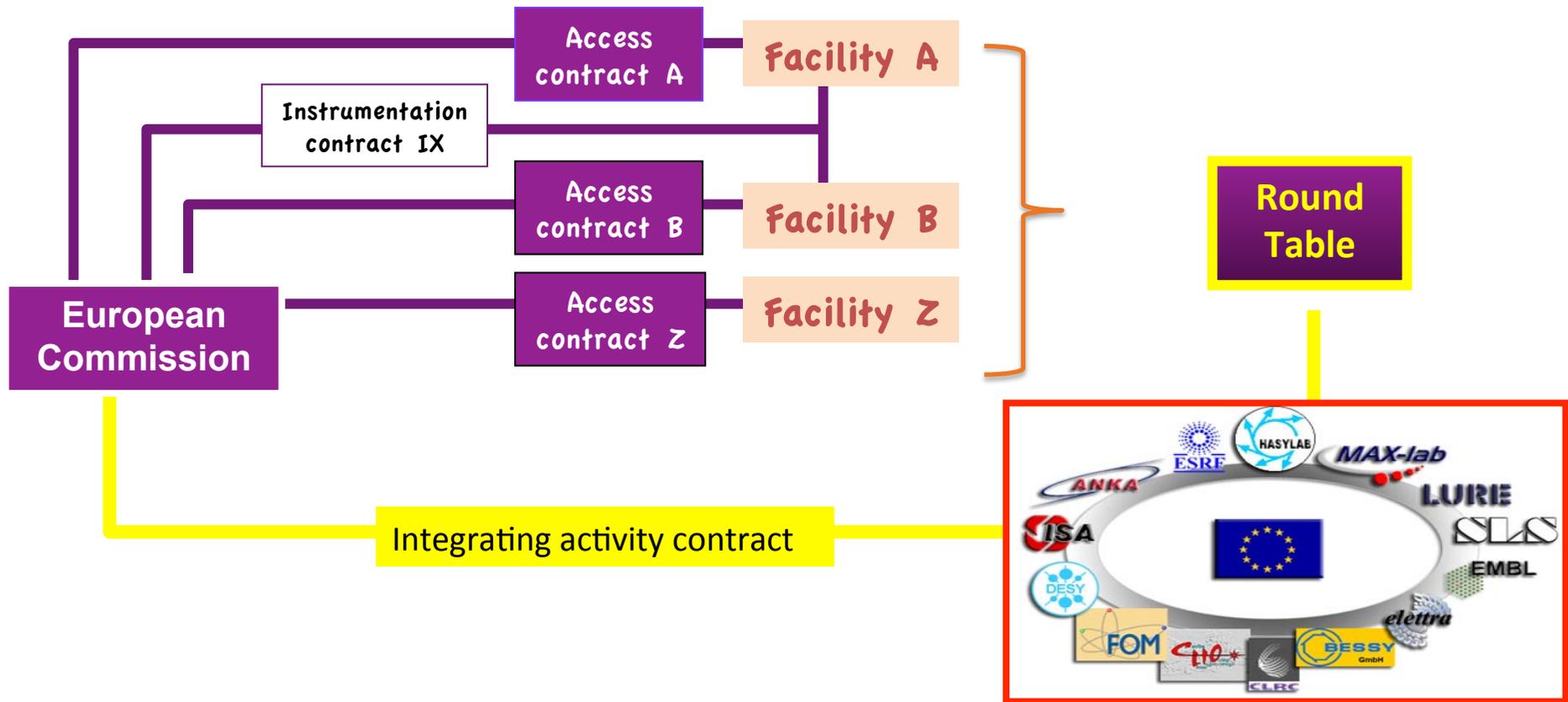
✓ 2014-2020

✓ Open Science, Open Innovation, Open to the World

✓ Cooperation with USA – through joint calls & events



Lightsources: from Round Table to I3



Integrated Activities (I3) model

0 Simple → Effective → Successful!

FP6 IA-SFS I3: 27M€, 5 years (2004-2009), 3440 (43%) experiments supported



FP7 ELISA: 10M€, 2.5 years, 2000 (42%) experiments supported
→ Creation of **European Synchrotron User Organisation**



Other communities I3s

- o Today's talk: Synchrotrons and free electron lasers
- o Neutron and Muon sources: NMI3



- o Laser sources: Laserlab Europe

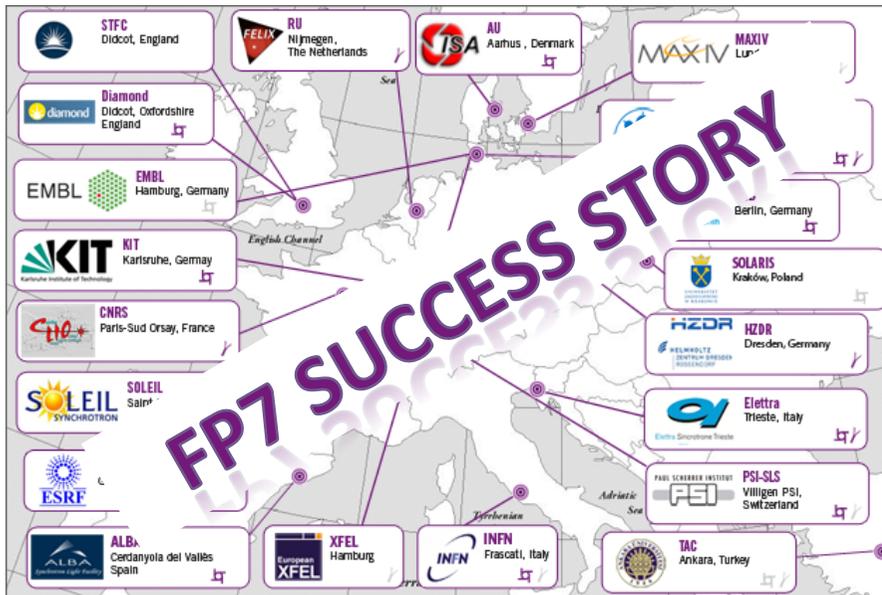
- o European soft matter infrastructure: ESMI



FP7 CALIPSO

Coordinated Access to Lightsources to Promote Standards and Optimization

FP7 CALIPSO I3: 7.5M€, 20 partners, 3 years (2012-2015)



- Offer TA support based on science excellence
- Improve user friendliness
- Strengthen industry participation

Through enhancing integration among lightsources

from CALIPSO to CALIPSOplus

CALIPSO's results

- Standardization effort – *wayforlight*
- 29 nations involved in ESUO
- Outreach to industry
- 3.000 supported users
- Detectors prototypes

Next steps



- **CALIPSOplus** H2020 proposal
- If funded: 2017-2020
- 10M€
- New coordinator: HZDR

Transnational Access

18 running facilities (13 SR, 5 FELs) → 30.000 users base

✓ > 1.400 user experiments, > 130.000 hours of beamtime

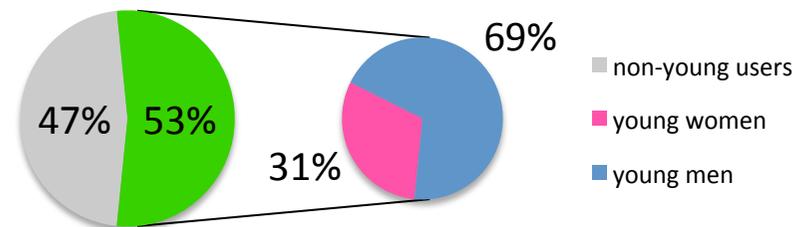
✓ > 3.000 visits, > 2.100 users from 31 countries

✓ > 400 peer reviewed publications

✓ 53% junior users (< 35 years old)

✓ High impact on countries with no national Lightsources

Junior (< 35 yrs) users and gender share

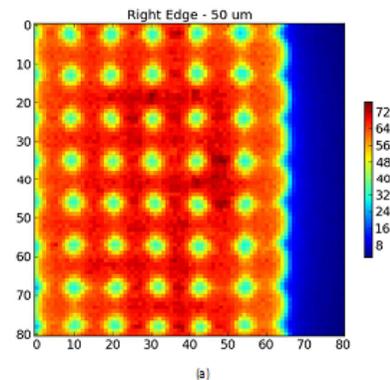
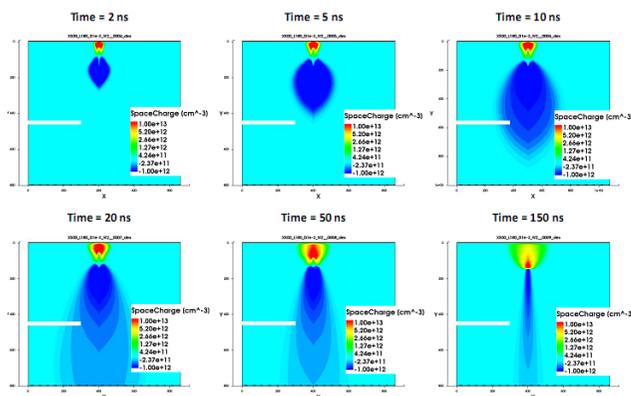




hiZpad²

X-ray detector performance: major challenge

- ✓ Joint development of High-Z Pixel Array Detectors
- ✓ x2.5 detection efficiency
- ✓ Links with industry





Focus on Industry

Increase industrial awareness of Lightsources

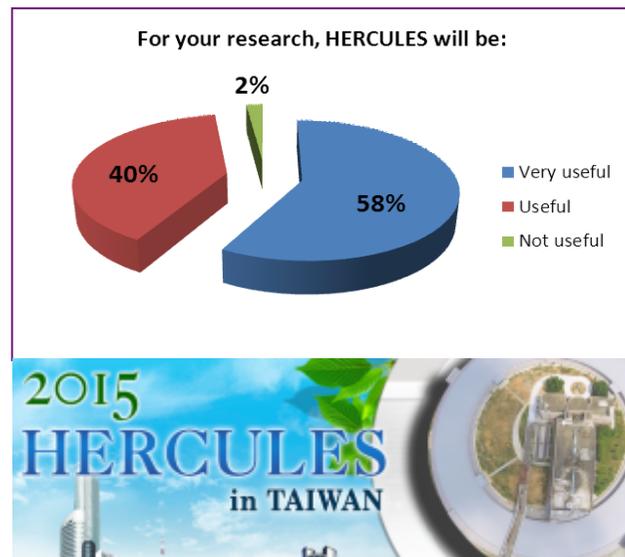
- ✓ Industrial Advisory Board (joint with NMI3)
→ “What engineers want: Reliable.Rapid. Standard. Price List.”
- ✓ Network of industry offices
- ✓ Marketing photons to industry: >20 local events targeting local innovation eco-systems
- ✓ Detectors industry workshop

Key to providing a European base for efficient industry access to the Analytical Research Infrastructure facilities.

Continuation in several Horizon2020 projects (SINE2020)

User Friendliness: Training

- o Coordination of www.fels-of-europe.eu
- o Schools for PhD/Postdocs and Training of Engineers/Technicians (Science@FEL, PhotonDiag)
- o Joint measurements campaigns at different facilities



- o HERCULES Annual Session + Specialized Courses
- o Going global: after Brazil session in Asia, Taiwan 2015



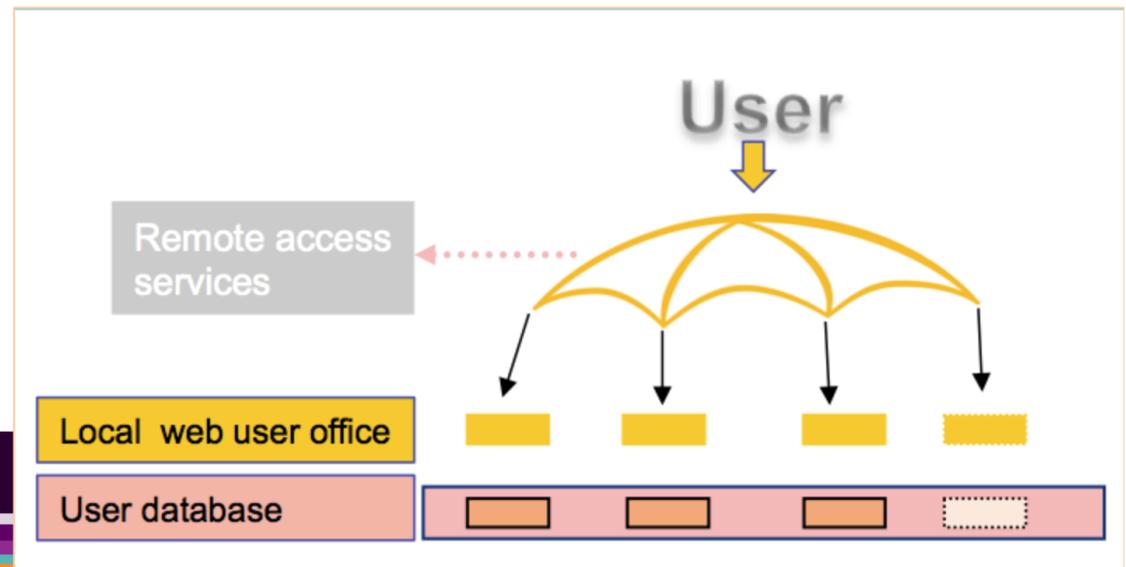
User Friendliness: Umbrella

Federated Identity Management System: <https://umbrellaid.org/euu/>

- o Unique persistent identifier at EU scale, life-long, **single-sign-on**
- o **Jointly developed** by several EC funded projects



- o MoU signed May 2015 → 14 partners, cooperation goes on



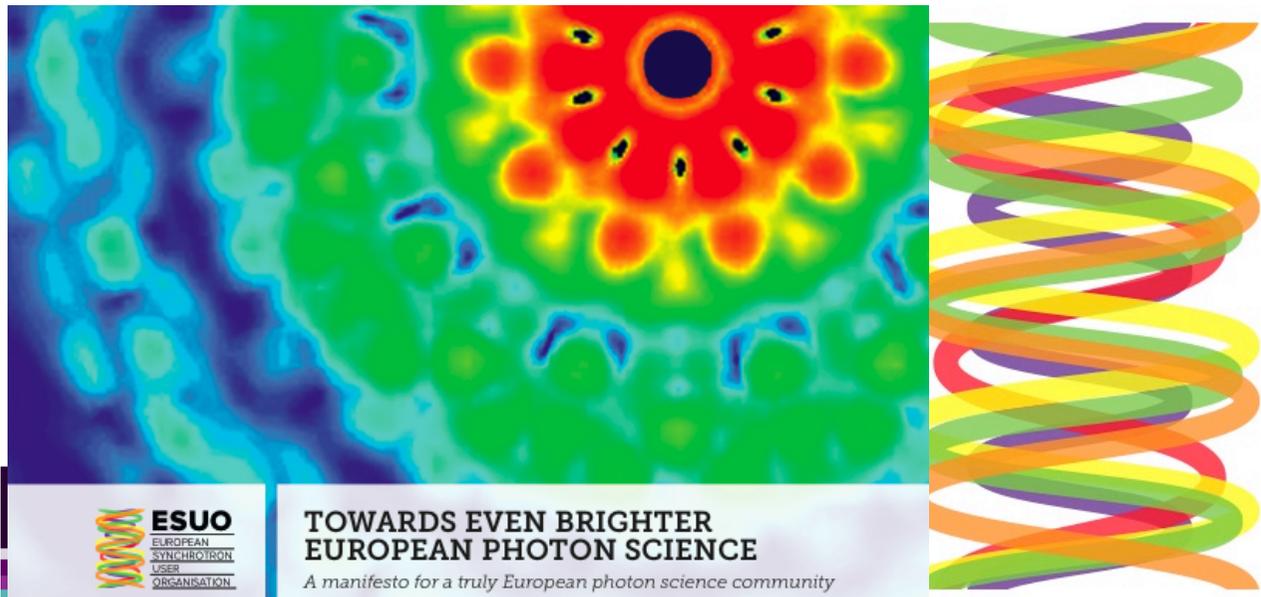


User Friendliness: European Synchrotron and FEL User Organisation

- Created in 2010 under FP7 “ELISA” project
- Manifesto in 2015 “Towards even brighter European Photon Science”

Mission:

- Coordinate user activities in Europe
- Provide support to the users



ESUO
EUROPEAN
SYNCHROTRON
AND FEL USER
ORGANISATION

 **ESUO**
EUROPEAN
SYNCHROTRON
USER
ORGANISATION

**TOWARDS EVEN BRIGHTER
EUROPEAN PHOTON SCIENCE**
A manifesto for a truly European photon science community

National User Organisation

SILS - Italian synchrotron radiation society



The Società Italiana Luce di Sincrotrone (SILS) has been established in 1992. It is a non-profit organisation since 2014. It organises a yearly conference with young scientists awards, and a biannual SR and FEL school (jointly with Elettra). It represents the Italian SR and FEL community of more than 1100 users.

[Visit SILS Website »](#)

SILS executive committee

The executive committee is formed by:

- Chair: **Andrea Di Cicco** Università di Camerino, Camerino, Italy, andrea.dicicco@unicam.it
- **Rossella Arletti** Università di Torino, Torino, Italy, rossella.arletti@unito.it
- **Massimo Ferrario** Laboratori Nazionali di Frascati, INFN, Frascati, Italy, massimo.ferrario@lnf.infn.it
- **Cinzia Giannini** IC-CNR, Bari, Italy, cinzia.giannini@ic.cnr.it
- **Silvia Gross** CNR and Università di Padova, Padova, Italy, silvia.gross@unipd.it
- **Sakura Pascarelli** ESRF, Grenoble, France, sakura@esrf.fr
- **Beatrice Vallone** Università di Roma "La Sapienza", Roma, Italy, beatrice.vallone@uniroma1.it



Discover www.wayforlight.eu

the european lightsources single entry point

umbrella login



wayforlight

synchrotrons
the European
Synchrotrons

fels
the European Free
Electron Lasers

esuo
European Synchrotron
and FEL User
Organisation

stories
experiences with
light

events
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*Information,
coaching and
training*

ESUO



results of the

user survey



write your standardized
proposal



list of proposal

call deadlines



find your
beamline



Search Beamline...



**browse
by technique**

Photoelectron emission

Imaging

Scattering

Next Events

[View all](#)



You are in: Home / Synchrotrons / BESSY II

BESSY II

BESSY II applications

Insight into inner magnetic layers

Messages from Space

Graphene towards 2D superconductivity

Hydrogen stability in hydrogenated amorphous carb... -2

BESSY II events

BESSY II - Imaging Workshop

BESSY II beamlines browse by techniques

- [Photoelectron emission](#)
- [Imaging](#)
- [Scattering](#)
- [Emission or Reflection](#)
- [Absorption](#)
- [Diffraction](#)
- [Lithography](#)

The third generation storage ring BESSY II is in operation since 1999 and provides ultrabright photon beams from the long wavelength Terahertz region to hard X-rays with complete control of the energy range and the polarization of the radiation. The facility is operated by the Helmholtz-Zentrum Berlin. ALINAC (LINear ACcelerator) injecting into the full energy synchrotron booster is currently under commissioning, in preparation of the implementation of full top-up mode scheduled for the second half of 2012. In order to further improve the stability of the beam, a fast orbit feedback system will be implemented in 2012. With its more than 50 beamlines, BESSY II offers a multi-faceted mixture of experimental opportunities: unique undulators provide circular and rotating-linear polarization; world record energy resolution (e.g. > 100.000 at 60 eV) has been demonstrated by BESSY II beamlines. Experimental facilities include state-of-the-art x-ray microscopy, x-ray polarimetry, spectromicroscopy, high-resolution photon and electron spectroscopy, nanotechnology (e.g. x-ray lithography), and pump-probe spectroscopy with temporal resolution ranging from 50ps down to 100fs at the unique slicing facility. Recently, HZB has extended its suite of state-of-the-art experimental chambers for the studies of liquids by the new measuring chamber for x-ray emission spectroscopy of free micro-liquid jets, LiXEdrom. The combination of brightness and time resolution makes BESSY II the ultimate microscope for space and time, since both femtosecond time and picometer spatial resolutions are available.

Photon beam parameters	BESSY II
Energy [GeV]	1.72
Current [mA]	300
Circumference [m]	240

CONTACTS

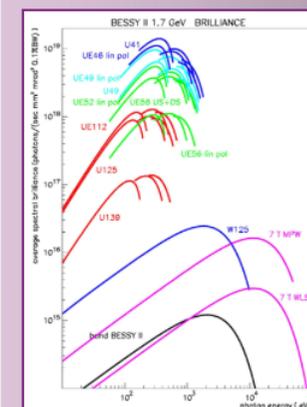


Helmholtz-Zentrum Berlin
User Office Photons /
Albert-Einstein-Str. 15
12489 Berlin, Germany

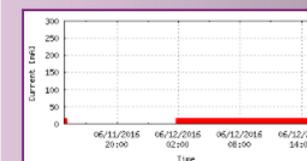
Visit BESSY II Website »

photons@helmholtz-berlin.de
Tel. +49 30 8062-12931
Fax. +49 30 8062-14746

BESSY II brilliance



BESSY II beamstatus



BESSY II call for proposals

www.wayforlight.eu tools

You are in: Home / Synchrotrons / Elettra / BL 1.2 L - Nanospectroscopy

Elettra

BL 1.2 L - Nanospectroscopy

general

photon source

endstations

monochromator

Nanospectroscopy @ Elettra

The **Nanospectroscopy beamline** at Elettra operates the Spectroscopic and low energy electron microscope (SPELEEM), a state-of-the-art **photoemission electron microscopy (XPEEM)** providing a wide range of complementary methods with structural, chemical and magnetic sensitivity. The lateral resolution of the microscope approaches 20 nm in XPEEM and 10 nm in LEEM. The SPELEEM is coupled to a high photon flux beamline that deliver elliptically polarised photons in the range 50 eV to 1000 eV. **applications** are targeted to Surface and Materials Science and related to chemical and magnetic characterization of surfaces, thin films and nanostructures.

Beamline energy range 50 - 1000 [eV]

Beamline flux 1.5×10^{13} @ 400 [eV]

Energy Range Min = 10 Max = 1000 [eV]

Max Flux On Sample 1.5×10^{13} [Ph/s] @ 150 [eV]

Spot Size On Sample Hor Min = 20 Max = 50 [μ m]

Spot Size On Sample Vert Min = 3 Max = 8 [μ m]

Angle of incidence light on sample value Min = 16 Max = 16 [mrad]

[Nanospectroscopy website »](#)

TECHNIQUES

Photoemission Spectroscopy Resolved PES

Imaging

- X-ray microscopy
- Photoemission EM

Absorption

- NEXAFS
- XMCD
- Time-resolved studies

CONTROL/DATA ANALYSIS

Control Software Type

Java

Data Output Type

images, spectra

Data Output Format

tiff 16 bit, ascii



Unprecedented Standardization Effort #1



www.wayforlight.eu tools

the european lightsources single entry point

umbrella login



wayforlight

synchrotrons
the European
Synchrotrons

fels
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Electron Lasers

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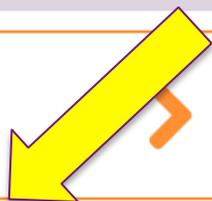
stories
experiences with
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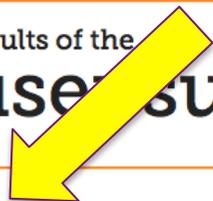


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by technique**

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How does SPF works ?

- o SPF to be filled on *wayforlight*
- o Output (XML/PDF) to be uploaded/sent to chosen facility for proposal finalization
- o Umbrella login available on *wayforlight* for authentication
- o Pilot developed under CALIPSO
→ scaling-up within CALIPSOplus, discussion ongoing among EU User Offices



General part ^

Scientific part ^

Technical part ^

Sample n. 1

Substance

This field is required, max 100 characters (100 left)

Chemical formula

Physical state

Size [mm3]

Mass [mg]

Risk in sample or equipment

Radioactive Yes No

Oxidising Yes No

Corrosive Yes No

Contaminant Yes No

Combustive Yes No

Biological hazard Yes No

Carcinogenic / Mutagenic / Teratogenic Yes No

1

Optional: Umbrella login

 umbrella login

A. General part

B. Scientific part

C. Technical part



wayforlight
calipso

How to proceed – 2

- o Download XML/PDF on your computer → step 2
- o Finalize submission at chosen facility(ies) → step 3

1. Write your proposal

2. Submit to facility(ies)

2. Submit to facility(ies)

Select the facility(ies) you want to apply for.

Warning!

The only available facilities at the moment are ESRF, Elettra and FELIX.

Synchrotrons ▼

FELIX ▼

IR ▼

a) Facility with Web Interface

e.g. Elettra: the XML file is generated on the web interface

1. Upload XML file on the web interface
2. Download XML file
3. Download XML file
4. Download XML file
5. Download XML file
6. Download XML file
7. Download XML file
8. Download XML file
9. Download XML file
10. Download XML file

1. Upload XML file on VUO

b) Facility without WUO

e.g. FELIX: PDF

1. conversion on wayforlight
2. sent via email
3. (additional form)

Unprecedented Standardization Effort #2



Future - 1: ESUO-wayforlight agreement

After the end of CALIPSO

- ✓ To continue base-level support of
 - ✓ European Synchrotron User Organisation
 - ✓ *wayforlight* portal

- ✓ Achievements:
 - ✓ EU User Survey
 - ✓ ESUO section on *wayforlight*
 - ✓ ESUO meetings
 - ✓ Dissemination and networking

results of the
user survey >



European Lightsources Users Survey

Realized in December 2015

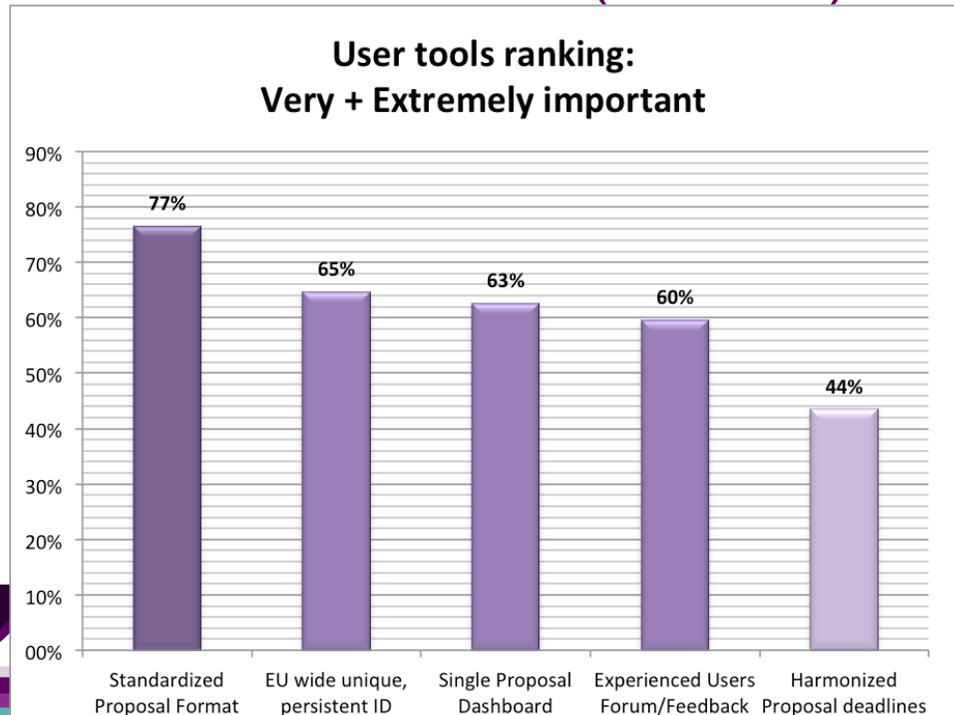
- ✓ 1.400 answers: significant !
- ✓ 5 questions about:
 - ✓ *wayforlight* knowledge
 - ✓ # proposals submitted/year to different facilities (55% >2)
 - ✓ Ranking of user tools

results of the
user survey >

#1: SPF

#2: Umbrella

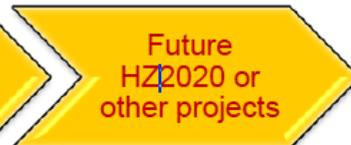
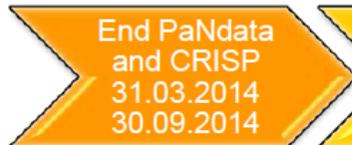
#3: Proposal dashboard



Future - 2: Umbrella collaboration



Umbrella roadmap



15/06/16



Future - 3: from CALIPSO to CALIPSOplus

EC launched **European Charter for access to Research Infrastructures** (March 2016):

- ✓ **Facilities** contributed and adhere to it
- ✓ living document with **guiding principles**

https://ec.europa.eu/research/infrastructures/pdf/2015_charterforaccessto-ris.pdf



CALIPSO

a **benchmark** in European science **integration**
a starting point towards a **brighter future**



H2020 CALIPSOplus (2017-2020)
Long-term sustainability challenge



Future – 4: Photon Science Strategy Panel

Lead by prof. Dosch, DESY Director, Germany

- ✓ **Roadmapping** exercise for **next \approx 20 years**
 - ✓ **Integration**
 - ✓ **Facilities' upgrades**
- ✓ **All European Synchrotrons and FELs involved**
- ✓ **6 Work Packages** (proposal and evaluation standardization, performance metrology, industrial use, training and mobility, technology, governance)

Conclusions

- ✓ European synchrotrons and free electron lasers represent **one of the largest research networks in the world**
- ✓ Thanks to **support from the EC**, we structured and strengthened our community
- ✓ Next challenge: **long-term sustainability** of state-of-the-art facilities and integrated services to users (incl. industries)



Thank you for your attention !

Questions welcome