PSI

How to Write Synchrotron Beamtime Proposals?

School on Synchrotron Light Sources and Their Applications
ICTP online training event

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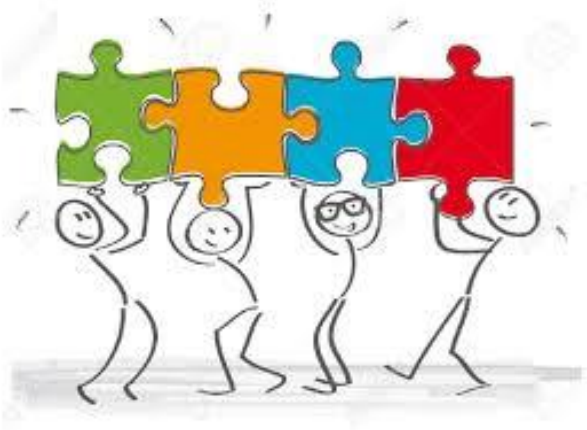
23. 01. 2025

Outline of the talk



- Synchrotron landscape
- Synchrotron science
- Call for proposals, deadlines
- Proposal for beamtime request – Preparation phase
- Proposal writing
- Proposal submission
- Proposal evaluation

Synchrotron landscape

Synchrotron light for science

Synchrotron facility = powerful source of light = large accelerator-based source that generates intense photon beams called **synchrotron radiation**.

Synchrotron distribution in the world (> 50):

Orange pins on the map represent members of the lightsources.org collaboration.

https://lightsources.org/lightsources-of-the-world/

Synchrotron light for science

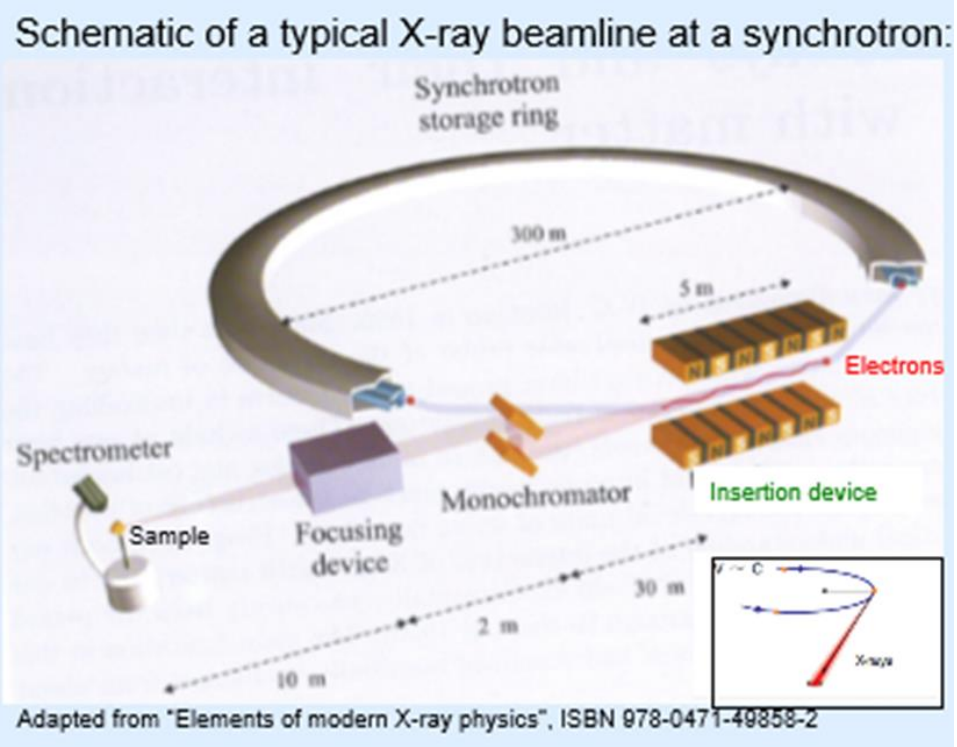
Synchrotron distribution in Europe and the Middle East (> 20):

Orange pins on the map represent members of the lightsources.org collaboration.

https://lightsources.org/lightsources-of-the-world/

Synchrotron science

Towards the production of synchrotron radiation



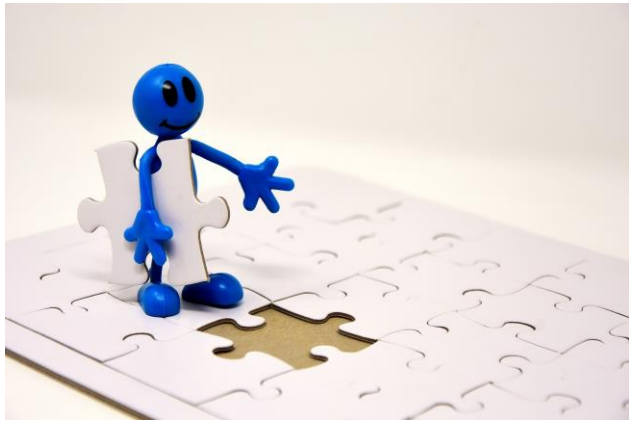
- **Electrons** which circulate in a storage ring are used to produce synchrotron radiation.
- A synchrotron storage ring is composed of **insertion devices**, i.e. elements inserted into the storage ring that produce radiation.
- How? The lattice of magnets in an insertion device forces the electrons to execute small oscillations. The magnetic fields cause acceleration to the relativistic electrons, causing them to emit **synchrotron radiation**.
- This radiation is then passed through a number of **optical elements** (monochromator, focusing device) so that an intense beam of radiation is delivered to the sample.

Various scientific researches are enabled at synchrotrons for a large user community.

- Physics
- Life sciences
- Engineering
- Chemistry
- Earth sciences
- Material science
- Science of art
- Cultural heritage
- …

Very attractive facilities for a **large user community**

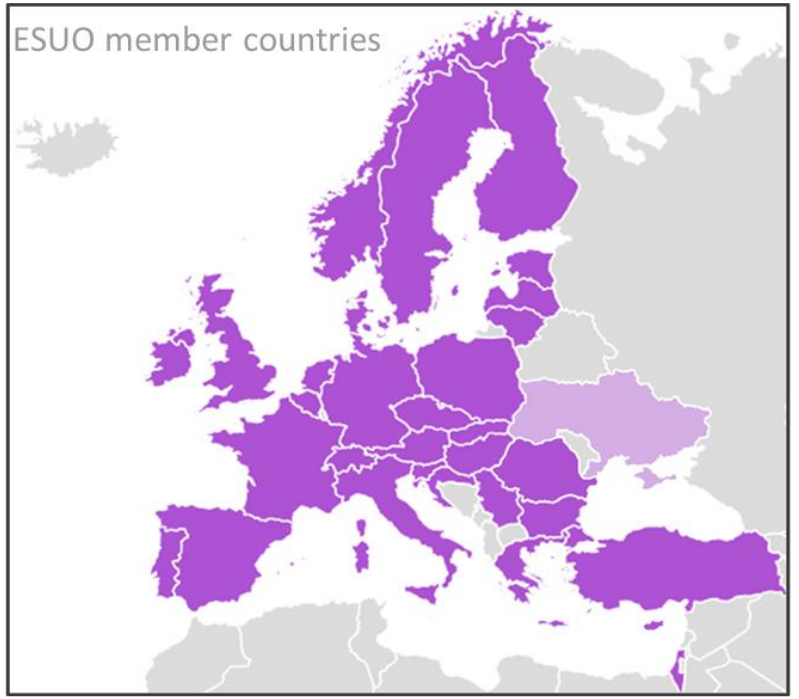
Access based on granted proposal for beamtime



User community representation – European Synchrotron and Free Electron Laser User Organisation, ESUO

- ESUO was established in 2010 to **represent all European photon science users**[*].
- Today, ESUO represents **> 25.000 users** of the European synchrotron (**SR**) and Free-Electron Laser (**FEL**) facilities.
- Users from **32 European member states and associated countries** are represented by ESUO national delegates.
- ESUO supports establishment of **National User Organisations** (**NUOs**).
- **Multiple delegates to ESUO** from nations with large user communities and multiple facilities and Facility User Organisations (FUOs).
- ESUO is a fully registered **non-profit international organization (AISBL) under Belgian law** since September 2021.
- ESUO is a **strategic partner of LEAPS** (www.leaps-initiative.eu).

Cormac McGuinness, ESUO President



[*]*U. Pietsch and M. J. Cooper, J. Synchrotron Rad. (2010) 17, 428-429.*

ESUO vision, missions and Executive Board

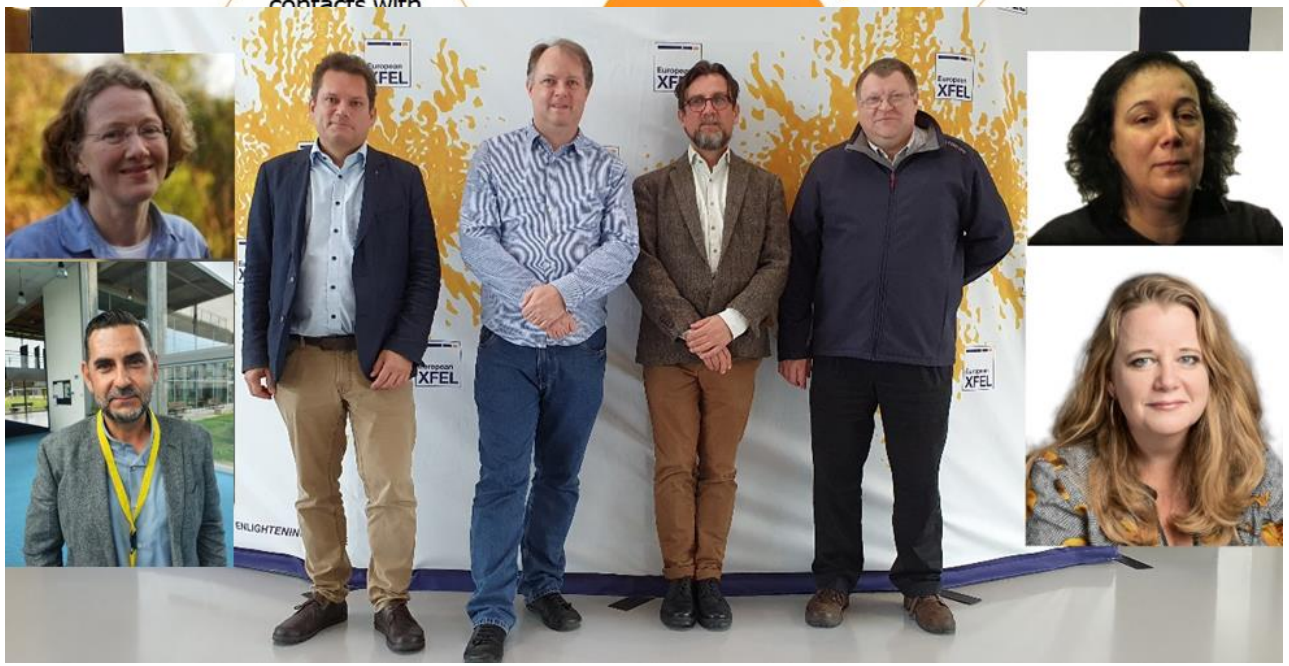
ESUO vision

to support a thriving (European) synchrotron and FEL user community with **equal opportunities of access** and participation for all scientists based solely on the **scientific merit** of their ideas

Executive Board of ESUO

- **ESUO President:**
  Cormac McGuinness (IE)
- **ESUO Executive Board:**

Carla Bittencourt (BE); Wojciech Gawelda (ES); Tom Hase (UK); Rainer Lechner (AT); Derek Logan (SE), Bridget Murphy (GE); Moniek Tromp (NL)



Call for proposals, deadlines

Call for proposals

- **Specific calls for beamtime proposals** (once / twice a year) are open at synchrotron facilities.
- Users are welcome to **answer theses calls by submitting their beamtime requests before the call deadlines.**
- Access based on **granted proposal for beamtime request.**

I. Call for proposals - Deadlines

Information about **deadlines of call for proposals** are available via:

Facility websites, including e.g. the synchrotrons of ***SESAME*** (Jordan):

THE CATALOGUE OF EUROPEAN LIGHTSOURCES
WAY FOR LIGHT

lightsources.org

ESUO
EUROPEAN SYNCHROTRON AND FEL USER ORGANISATION

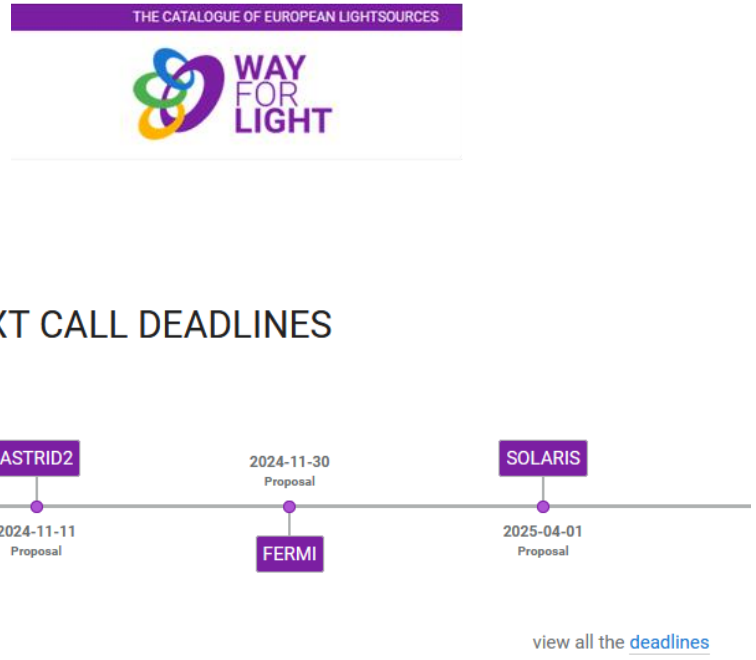
Important to consider these deadlines for the **planning / timeline of your foreseen measurement campaign(s).**

II. Call for proposals - Deadlines

Information about **deadlines of call for proposals** are available via:

Other websites:

e.g.



Proposal for beamtime request – Preparation phase

Apply for beamtime – Brief introduction and basic content of the proposal for beamtime

- **Electronic form** – use *the last updated* existing ***Project Description template*** provided by the facility

- to be written **in English**
- with the **following content**:

Basic content:

- Proposal summary
- Scientific background
- Experimental plan
- Requested beamline(s) and beamtime with justification
- Results expected and impact
- References

I. Proposal for beamtime request – Preparation phase

1) Define the scientific case of your experiment

2) Think about experimental approach(es) on how to solve it: Which synchrotron? Which beamline? Which methods? Which experiments? Which samples? Which sample environment? …

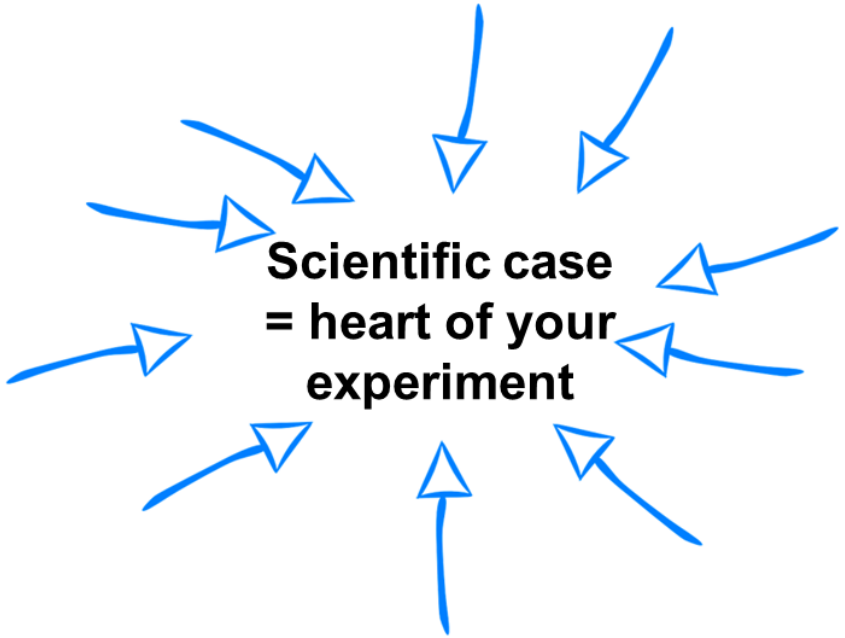
3) Define your experimental plan: details on the planned experiments, i.e. amount of beamtime needed, team members, expected results, analysis, interpretation, …

4) Contact the facility beamline scientists to discuss the technical feasibility of your experiment and to get additional advices prior to the submission.

5) Start the writing of your proposal for beamtime request

II. Proposal for beamtime request – Preparation phase

1) Define the scientific case of your experiment:



"One of the main reasons for not obtaining the support of the panel is the lack of a clear statement on how the proposed work will result in significant advances." - Sue Kilcoyne, University of Salford.

The scientific case should describe:

The aim(s) of the proposed experiment

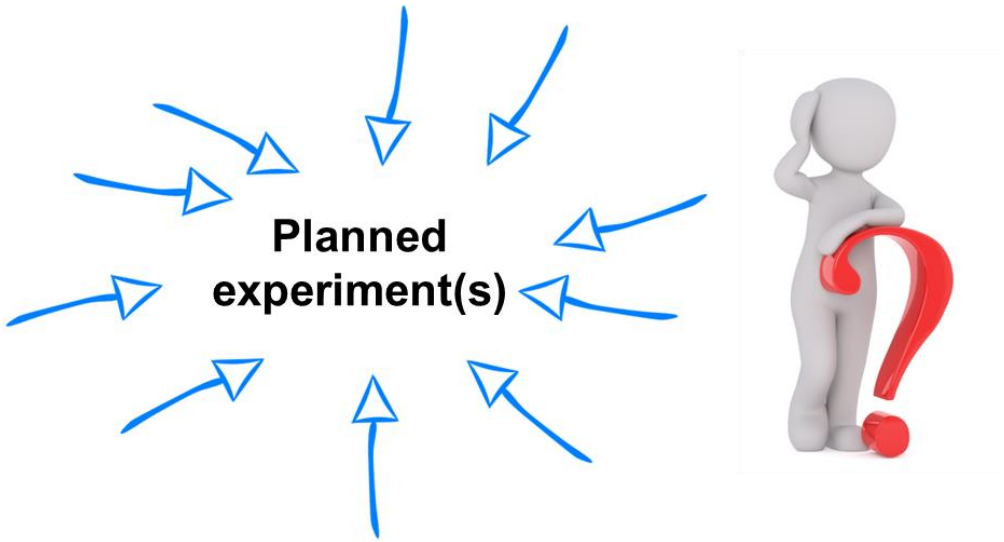
- Explain what the open question(s) is (are) and what is needed to answer it (them).

The scientific background and the expected beneficial impacts for the science and the society

- Refer to the literature, previous results to the topic
- Mention the level of sample characterization
- Explain the expected significant scientific breakthroughs and their impact on the society.

III. Proposal for beamtime request – Preparation phase

2) Think about the experimental approach, i.e. the experiments to be conducted.

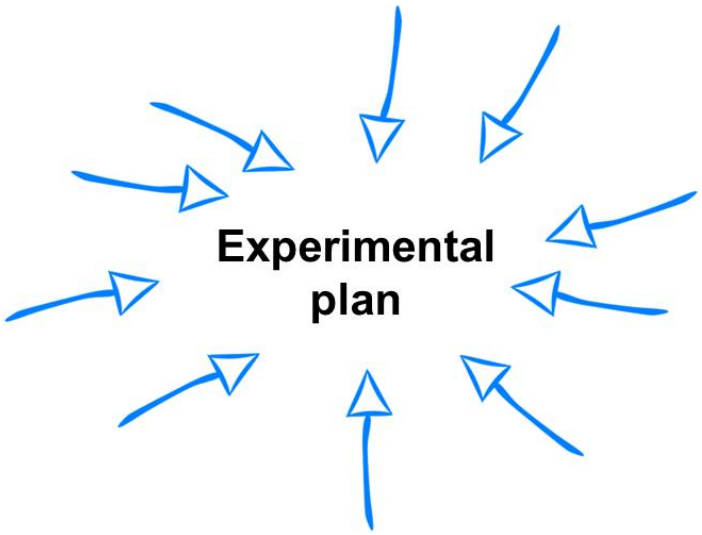


Description of the proposed experiments:

- What are the **most appropriate synchrotron(s), beamline(s), instrument(s)?**
- What is the **investigated material** – sample composition, form, size, availability?
- What is the **sample preparation technique**?
- What are the **sample conditions** (temperature, pressure, magnetic field, …)?
- How **feasible** and **attractive** the experiment is?

IV. Proposal for beamtime request – Preparation phase

3) Define your experimental plan:

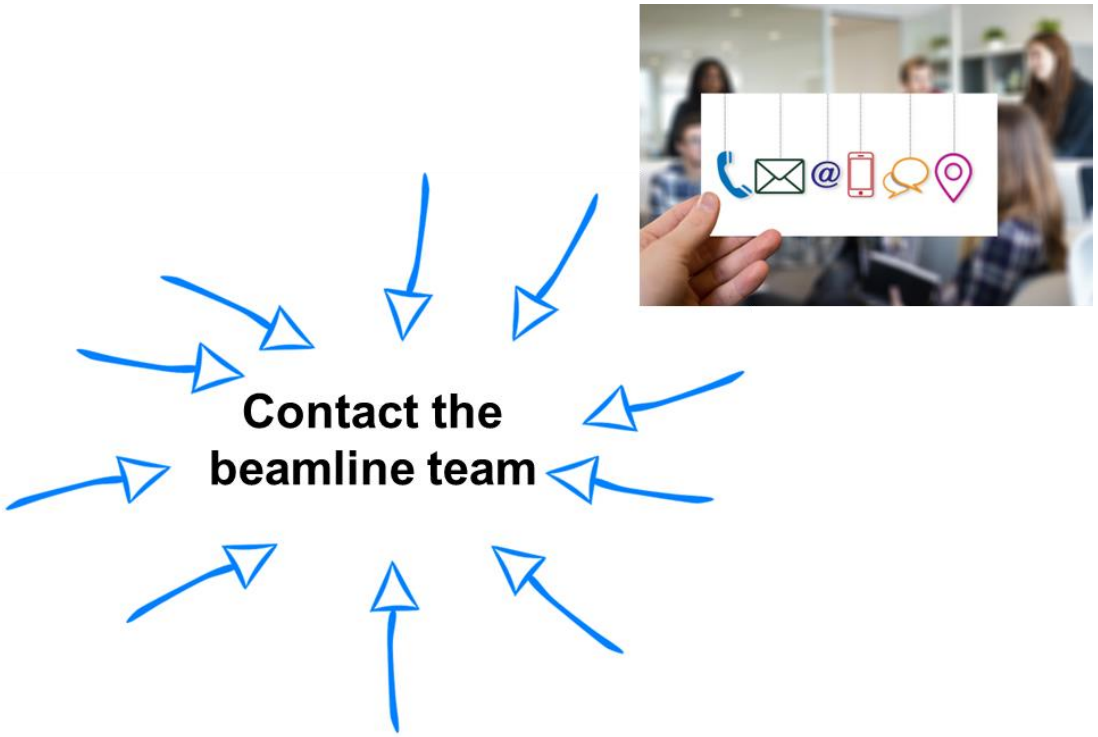


Description of your experimental plan:

- **What will be measured?** (get into specifics)
- **How long** will it take to make measurement?
- **Who** is going to take part to the measurement campaign?
- How will the **acquired data be analyzed**?
- Can you **demonstrate you are capable of doing it**?
- What is the **timeline**?

V. Proposal for beamtime request – Preparation phase

4) Contact the facility beamline scientists:



Contact with the facility beamline team:

- to discuss the **technical feasibility** of your experiment
- to ascertain the **amount of needed beamtime**
- to verify the availability of the **sample environment equipment**
- to discuss the **sample preparation** method(s)

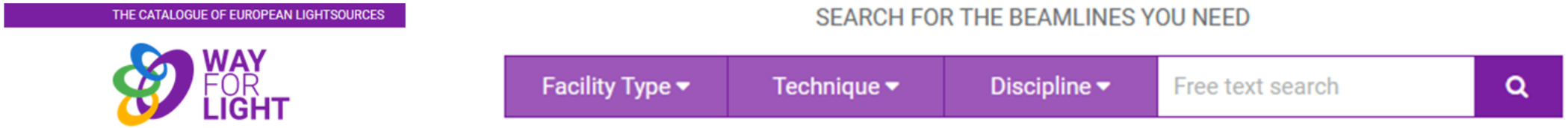
VI. Proposal for beamtime request – Preparation phase

Examples of useful websites to get valuable information on synchrotrons, beamlines as well as contact information for preparing your proposal for beamtime request:

- **All facility websites**

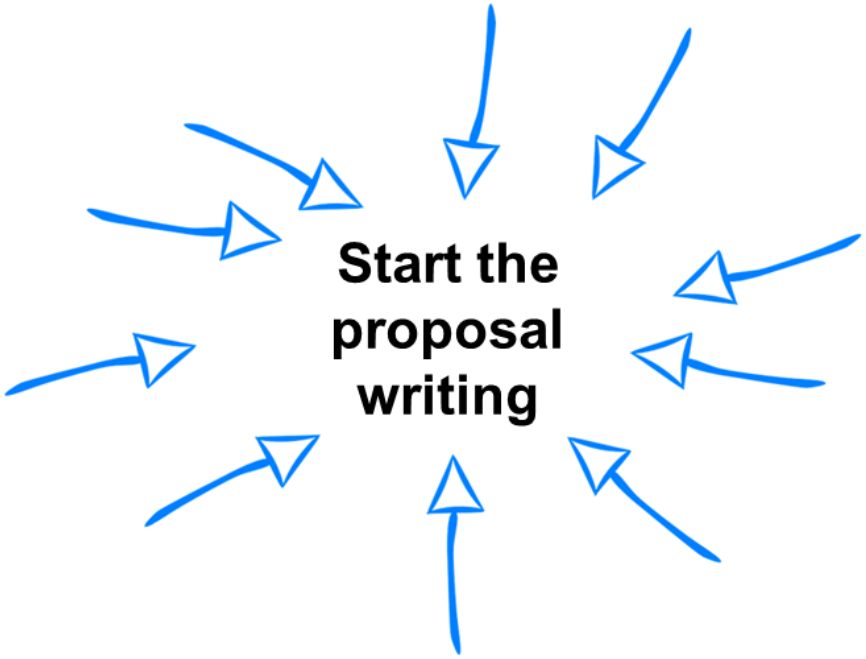
- **Lightsouces.org** (https://lightsources.org/lightsources-of-the-world/)

- **Wayforlight – The catalogue of European lightsources** (https://www.wayforlight.eu/beamlines)



VII. Proposal for beamtime request – Preparation phase

5) Start the writing of your proposal for beamtime request:



- Use the proposal structure of the dedicated **proposal template** provided by the facility
- Write your proposal **in English**
- Aim for a **clearly written proposal**

Proposal writing

Proposal writing – Some advices – “Don’t”

In your proposal:

Don’t forget to use a good title, repeat title at top of proposal description
It helps to have a good title, and to have the title at the top of the description…

Don’t simply type or paste the text in the User Office text box for the proposal – instead upload a properly formatted well laid out PDF

Don’t have a continuous block of text – instead use paragraphs appropriately.
Why? It looks horrible ! Poor formatting will influence the score indirectly.

Don’t contradict yourself.

Don’t refer to a figure that you have forgotten to include !!

Don’t refer to a figure that is within one of your references.
If it needs to be mentioned, then include it in the proposal.

Don’t allow figures to be pixelated such that they are unreadable.

Don’t leave out a figure caption – make sure that it is informative.

Don’t include a figure that only an expert theorist could interpret.
Make sure that the most appropriate figures are included with complete captions.
You may need to make caption text within the graphic (some User Office systems).

Don’t exceed the stated page limit – it will mostly get cutoff.

Don’t widen the margins – a frame is usually put over the allowed area on the page.

Don’t reduce the font size just to get that last sentence within page limit.

I. Proposal writing – Some advices – “Do”

In your proposal:

Aims of the experiments and scientific background

- Explain clearly – at beginning - what is the open question, and how this is being addressed in this experiment.
- Give appropriate background, demonstrate knowledge of the area (citations) and for the non-expert reviewer detail what is known, unknown, problematic and unsolved, and what is the context for your experiment?

Experimental plan

- Explain how the experiment will be performed, and how specific samples or specific measurements can combine to address the open question.
- Identify clearly the objectives or outputs of the experiment. Explain what will be learned if even partially successful.
- Explain how specific instrumentation or beamline enables these measurements.
- Explain precisely the samples that you will be studying and be sure to give evidence that the samples are ready and available and are of high quality.
- Describe any and all relevant preliminary laboratory work that you have done. Use of beamline should be after all of the relevant characterization work.

II. Proposal writing – Some advices – “Do”

In your proposal:

Experimental plan

- Describe the experimental plan. Get into specifics of the measurements that may not be obvious. Discuss which particular measurements are the most challenging or may take the most time.
- Detail precisely the requirement for the beamtime that you have requested and explain how this breaks down.

Expected results

- This is a very necessary and important section of the proposal.
- Do not use general phrases but detail what the important results you will obtain from the proposed experiment.
- Be clear and put well-defined attainable results, be realistic but also describe the larger goal.
- You may need to detail parallel theoretical outcomes or data analysis methods.

Slide adapted from C. McGuinness slide (HERCULES – Proposal writing - 14th April 2016).

III. Proposal writing – Some advices – “Do”

In your proposal:

References

- Be sure to give the most relevant citations when describing the current state of the field but be sure to cite your own work as well in this context.
- Detail within the proposal, or by use of references, your own experience. The reviewers need to know you can do the job…

Figures

- Include appropriate, well captioned, and well thought out figures that help provide context for the expert and the non-expert reviewer.
- Preliminary data should be shown, whether from laboratory measurements, earlier studies or (if available) from any preliminary test measurements.

Summary / abstract

- Important part of the proposal. One paragraph, like the abstract of a scientific paper. Remember: what is the point of the proposal ? This, at the very least, should be the one thing that is articulated most clearly.
- Do so in the abstract, but also in the first paragraphs / ½-page of proposal.

Slide adapted from C. McGuinness slide (HERCULES – Proposal writing - 14th April 2016).

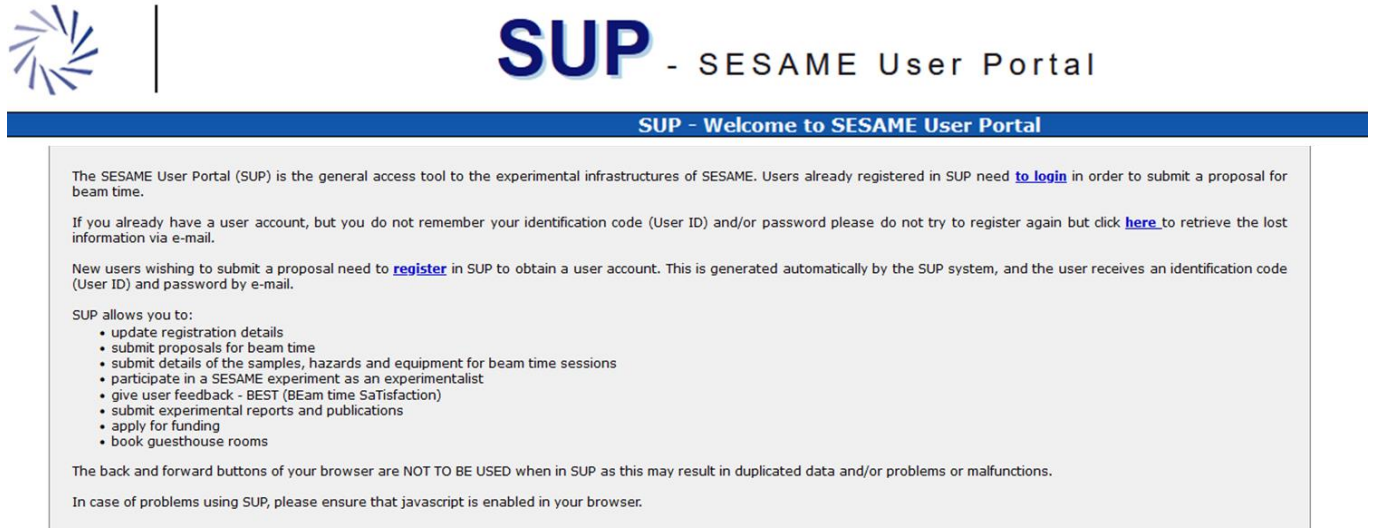
Proposal submission

I. Proposal for beamtime request – Submission

- **Create your user account via the relevant User Office website** well in advance of the proposal submission.

⚠ All co-investigators must also be registered in the User Portal in order to enable them to be included in the proposal.

Ex: Go to *SESAME User Portal*



Create a login / password
Provide the requested information

- **Submit your proposal via the relevant User Office website**

II. Proposal for beamtime request – Submission

- **Possible other option: Use Umbrella and create your Umbrella account**
  https://umbrellaid.org/how.html

= federated identity system for the users of the (European) large neutron and photon facilities.

- **Connect your umbrellaID account with your existing accounts at different facilities** (Single Sign On)

- Use the services of the partner facility and **submit your proposal.**

Proposal evaluation

I. Proposal for beamtime request – Review process

After submission and once the call is closed:

- All proposals reviewed by beamline scientists for technical feasibility

  You were talking to them right? Don't propose something impossible …

- Proposals then get assigned to the relevant proposal review committee and distributed to members for scoring.
  Proposals will typically be scored by three panel members, not all of whom will be experts in your field. You must convince the non-expert and the expert.

- Panel of reviewers meet and discuss all proposals, scores and comments.
  Reviewers time is limited however – you did make your point clearly ?

- Most beamlines are oversubscribed with not enough time for all.
  Note you may be competing against proposals from radically different areas.

The best rated proposals – regardless of subject matter – get the time.

All other proposals, once the time is exhausted, fall below the "cutoff" score.

Slide adapted from C. McGuinness slide (HERCULES – Proposal writing - 14th April 2016).

II. Proposal for beamtime request – Review process

After submission and once the call is closed:

An **evaluation process** of the submitted will be conducted in accordance with the IUPAC recommendations for the use of major physics users facilities:

- **Technical feasibility**
- **Scientific merit** (relevance, impact, innovation, potential of the scientific- and/or technological case, …) assessed by a proposal review committee.
- **Availability of the resources required**
- **Previous record of the proposer**

Additional input for you

- This presentation was partially based on supporting materials from (i) the **European synchrotron and FEL user organisation** (**ESUO**, www.esuo.eu) and (ii) the actual ESUO president, C. McGuinness.

Very best wishes of success for the writing of your next proposals for beamtime request(s)!

Acknowlegments

Thank you very much
to the organizers of the event
as well as to you for your
attention.