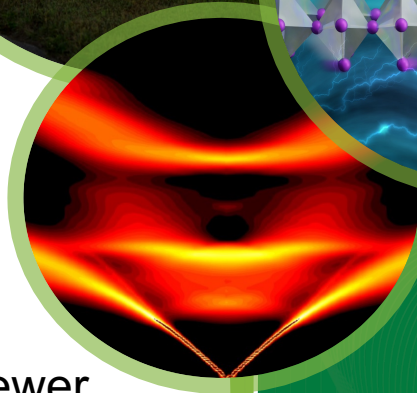
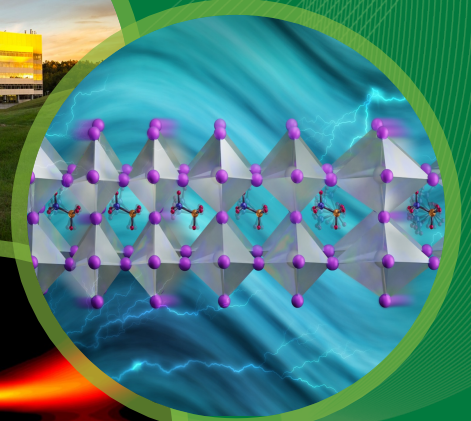


Proposal Writing

Michael Manley

Materials Science & Technology, ORNL

Facility User – Proposal writer – Proposal reviewer



X-ray and Neutron Sources (most DOE-Basic Energy Sciences)

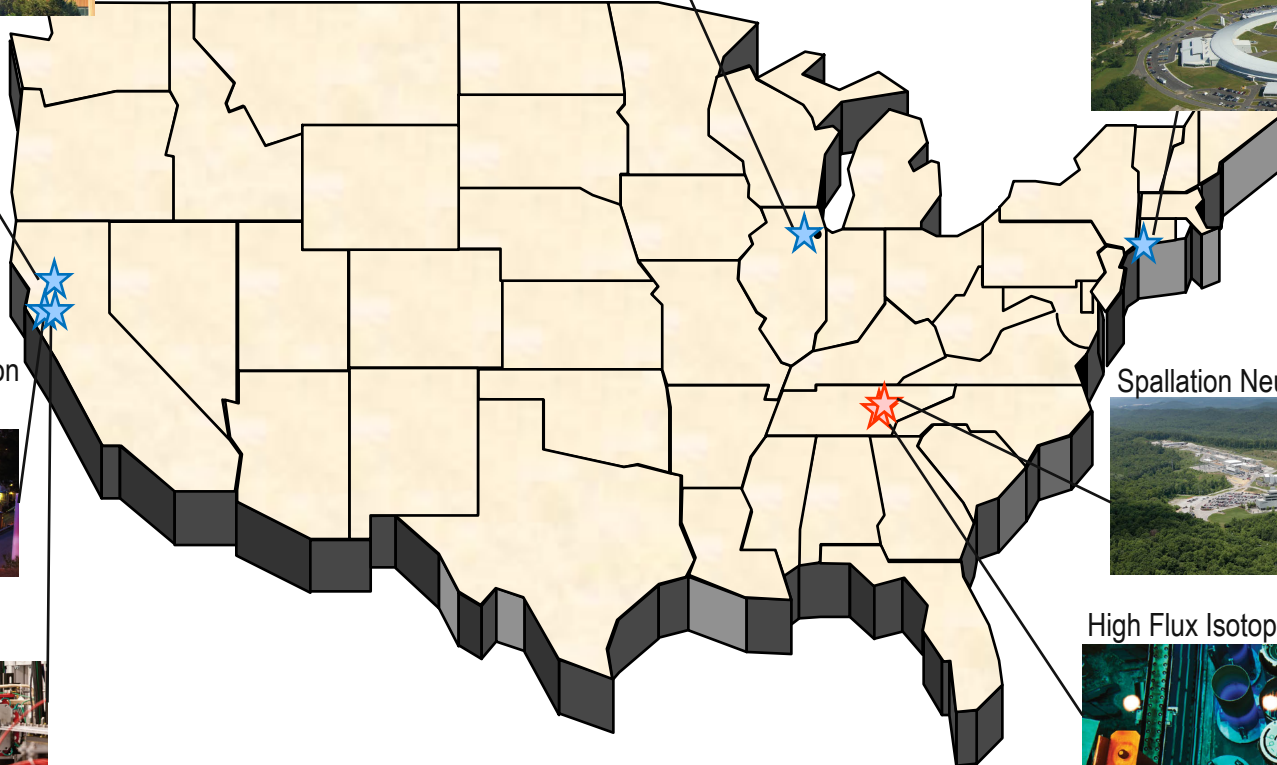
Advanced Light Source (ALS)



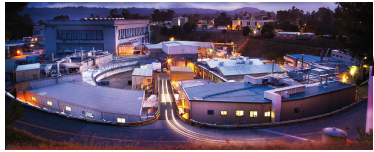
Advanced Photon Source (APS)



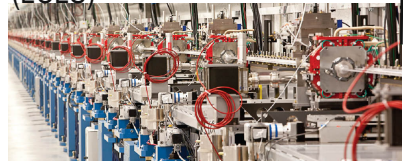
National Synchrotron Light Source II (NSLS-II)



Stanford Synchrotron Radiation Light Source (SSRL)



Linac Coherent Light Source (LCLS)



Spallation Neutron Source (SNS)

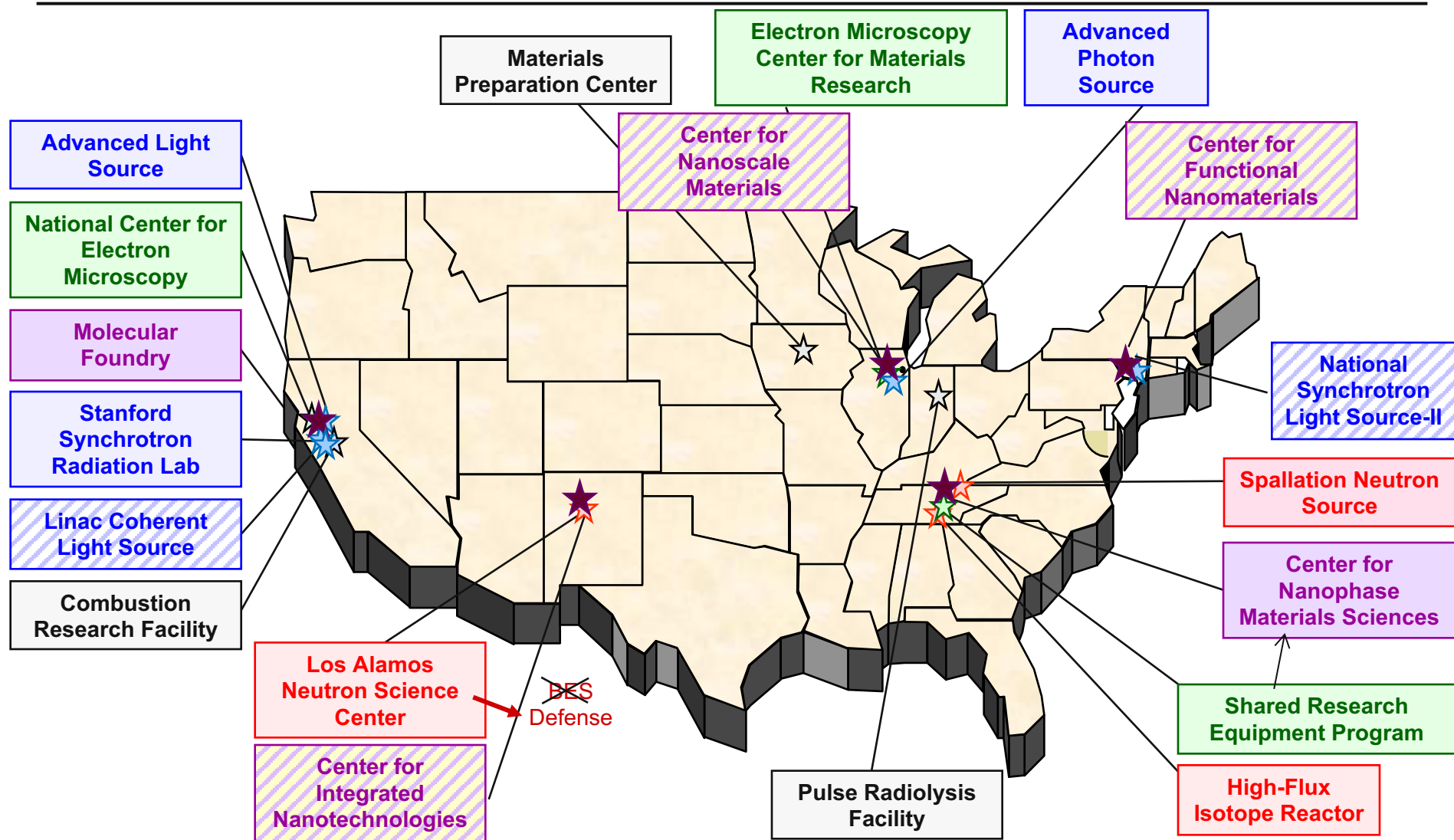


High Flux Isotope Reactor (HFIR)



Also 5 DOE Nanoscience Centers (BNL, SNL/LANL, ORNL, ANL, LBNL)
DOE Electron Microscopy Centers (ANL, LBNL, ORNL)

DOE-BES Scientific User Facilities



Also

~46 EFRCs – Energy Frontier Research Centers, 2 HUBs
Advanced Scientific Computing Centers (e.g. NERSC)
NSF facilities (e.g. National High Magnetic Field Lab, CHESS, Nanotech)

DOE-BES By The Numbers

BES
RESEARCH
SPANS

MORE THAN
150

ACADEMIC, NONPROFIT,
AND INDUSTRIAL INSTITUTIONS

15

DOE NATIONAL
LABORATORIES

47

STATES AND
WASHINGTON, D.C.

25

CORE
RESEARCH AREAS

46

ENERGY
FRONTIER
RESEARCH
CENTERS

2

ENERGY
INNOVATION
HUBS

SUPPORTED
RESEARCHERS

~6,100

Ph.D.
SCIENTISTS

~2,100

STUDENTS
SUPPORTED

BES | BY THE
NUMBERS

FY 2019

BES supports fundamental research to understand, predict, and ultimately control matter and energy at the electronic, atomic, and molecular levels.

\$784
MILLION
RESEARCH
BUDGET

~21% AVERAGE
NEW GRANT
SUCCESS RATE

NEARLY
1,400
CORE RESEARCH PROJECTS

MORE THAN
16,000
USERS AT 12
BES FACILITIES

\$955
MILLION
SCIENTIFIC USER FACILITY
OPERATING BUDGET

OPERATIONS
FOR SCIENTIFIC
USER FACILITIES

44%

FACILITY
UPGRADES,
CONSTRUCTION

20%



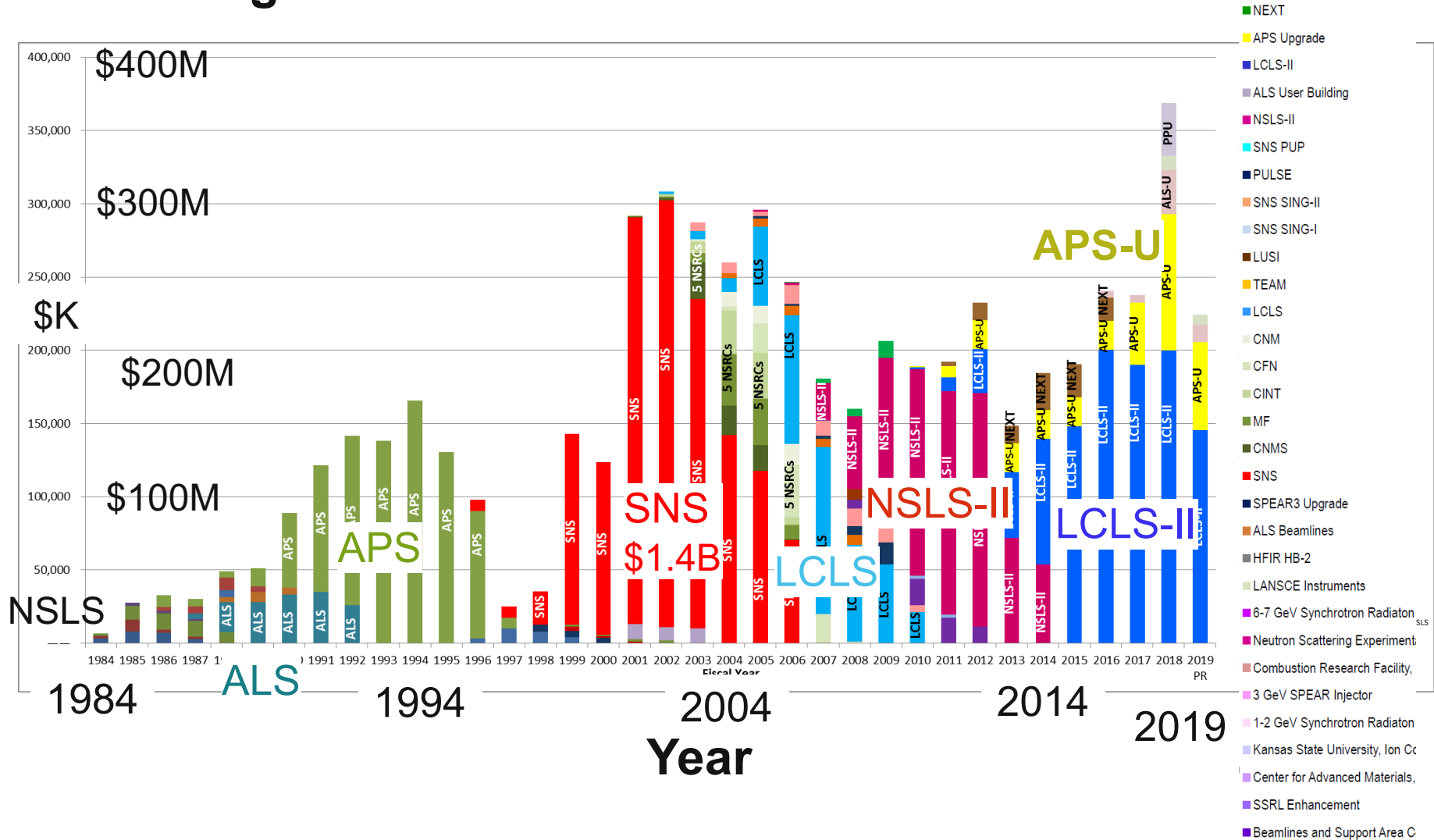
36% RESEARCH

47%
UNIVERSITIES
53%
DOE LABS

\$427 MILLION
FACILITY UPGRADES,
CONSTRUCTION
BUDGET

DOE-BES Facilities Construction ~35 Years

Funding

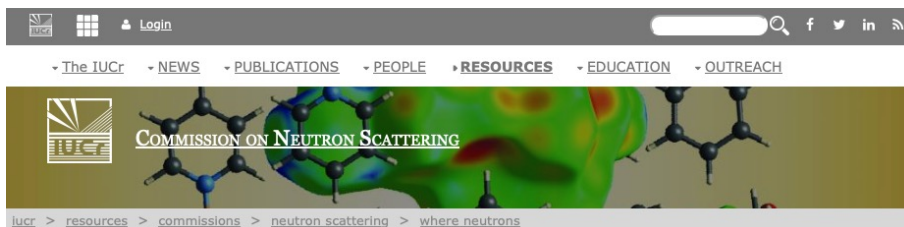


X-ray and Neutron Sources Available Worldwide

Scattering Science Goes Global – access varies

Neutron Sources at www.neutronsources.org

Light Sources at www.lightsources.org



NEUTRON SCATTERING FACILITIES

ASIA AND AUSTRALIA

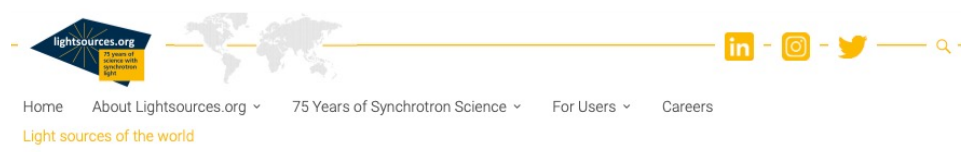
- [J-Parc](#) (Japan)
- [KENS](#) (Tsukuba, Japan)
- [JAERI](#) (Japan)
- [KUR-RI](#) (Kyoto, Japan)
- [ISSP](#) (Tokyo, Japan)
- [KAERI](#) (Hanaro, Korea)
- [OPAL at ANSTO](#) (at Lucas Heights, Australia)

EUROPE

- [ILL](#) (Grenoble, France)
- [ISIS](#) (Oxford, UK)
- [GKSS](#) (Geestach, Germany)
- [BENSC \(HZB\)](#) (Berlin, Germany)
- [FRM II at Garching](#) (T.U.Munich, Germany)
- [TUDELFT](#) (Delft, The Netherlands)
- [SINQ](#) (at PSI Zürich, Switzerland)
- [BNC](#) (Budapest, Hungary)
- [FLNP](#) (Dubna, Russia)
- [PNPI](#) (Gatchina, Russia)
- [JEEP-II \(Kjeller\)](#) (Norway)

North and South America







- [SNS and HFIR at Oak Ridge](#) (USA)
- [LANSCE](#) (Los Alamos, USA)
- [NIST](#) (USA)
- [McMaster University](#) (Canada)
- [Chalk River](#) (Canada)



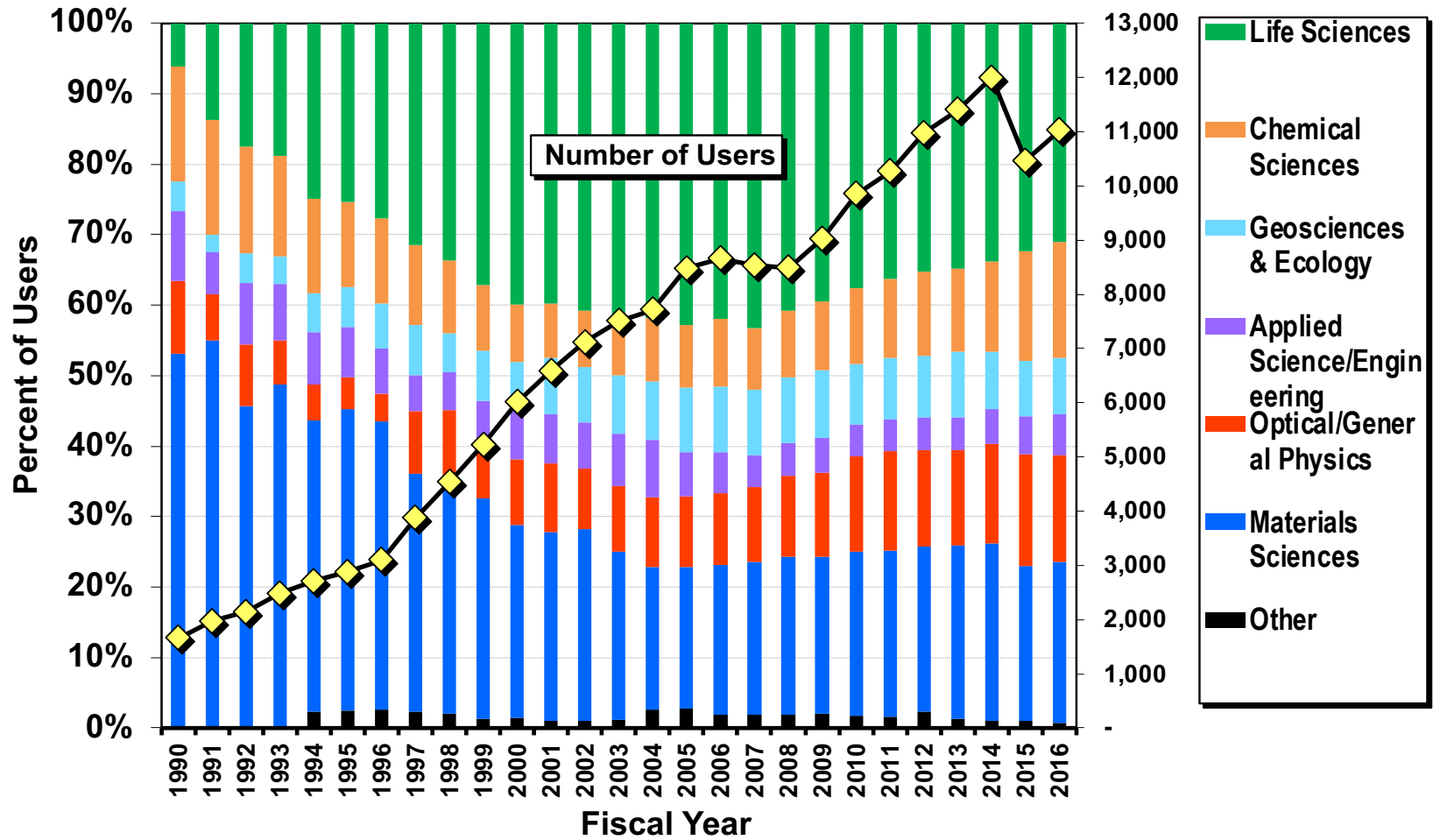
Synchrotron facilities

 African Light Source Project (Honorary Member)	 ALBA	 ALS ADVANCED LIGHT SOURCE	 Argonne NATIONAL LABORATORY APS at Argonne National Laboratory	 Australian Synchrotron
 HZB BESSY II Light Source BESSY II at HZB	 Canadian Light Source Centre canadien de rayonnement synchrotron	 CHESS CORNELL HIGH ENERGY SYNCHROTRON SOURCE	 diamond	 Elettra Sincrotrone Trieste
 ESRF European Synchrotron Radiation Facility	 LNLS	 MAXIV	 Brookhaven National Laboratory National Synchrotron Light Source II	 NSRRC
 PAL POHANG ACCELERATOR LABORATORY Pohang Light Source-II	 DESY PETRA III at DESY	 Photon Factory High Energy Accelerator Research Organization KEK	 HZDR HELMHOLTZ ZENTRUM DRESDEN ROSENDOERF ROSL, Beamline at ESRF (HZDR)	 SESAME (Honorary Member)
 SOLARIS NATIONAL SYNCHROTRON RADIATION CENTRE	 SLAC NATIONAL ACCELERATOR LABORATORY SSRL at SLAC	 PAUL SCHERRER INSTITUT PSI Swiss Light Source at PSI		

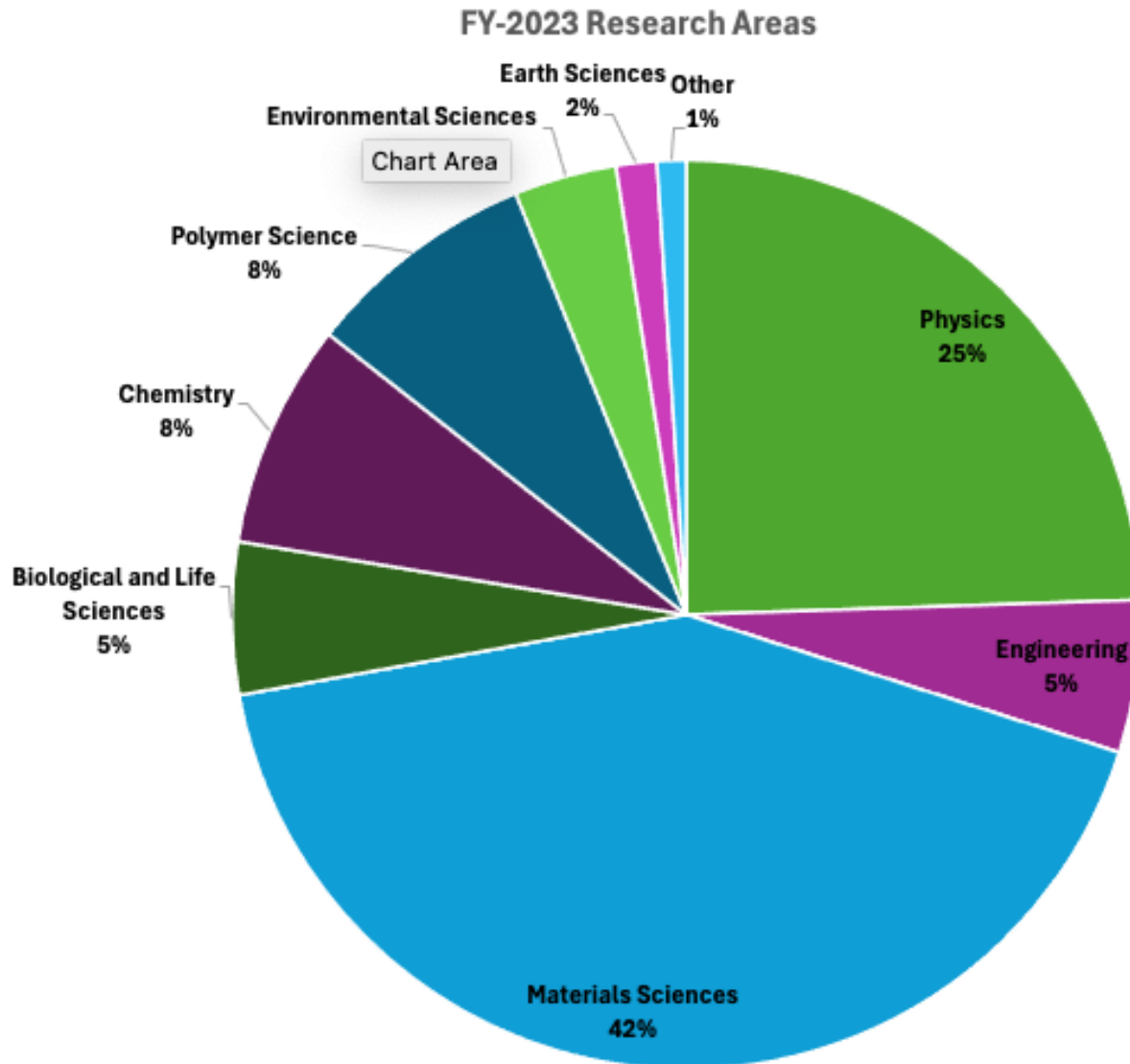
FEL facilities

 European XFEL	 HZDR HELMHOLTZ ZENTRUM DRESDEN ROSENDOERF FELBE / FELBE at HZDR	 Elettra Sincrotrone Trieste FELBE at ELETTRA	 DESY FLASH at DESY	 SLAC NATIONAL ACCELERATOR LABORATORY LCLS at SLAC
 PAL POHANG ACCELERATOR LABORATORY PAL-XFEL	 PAUL SCHERRER INSTITUT PSI Swiss FEL at PSI			

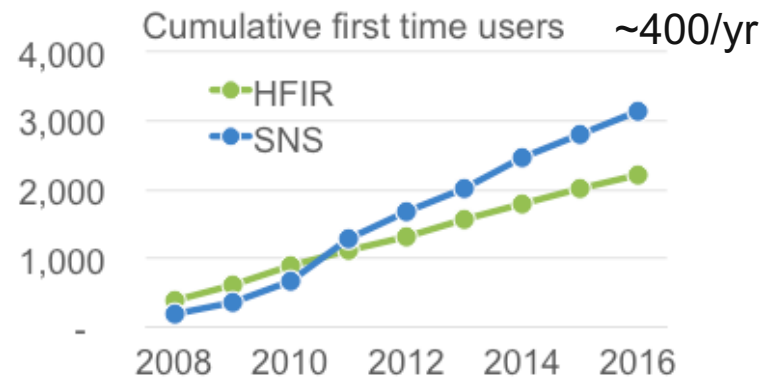
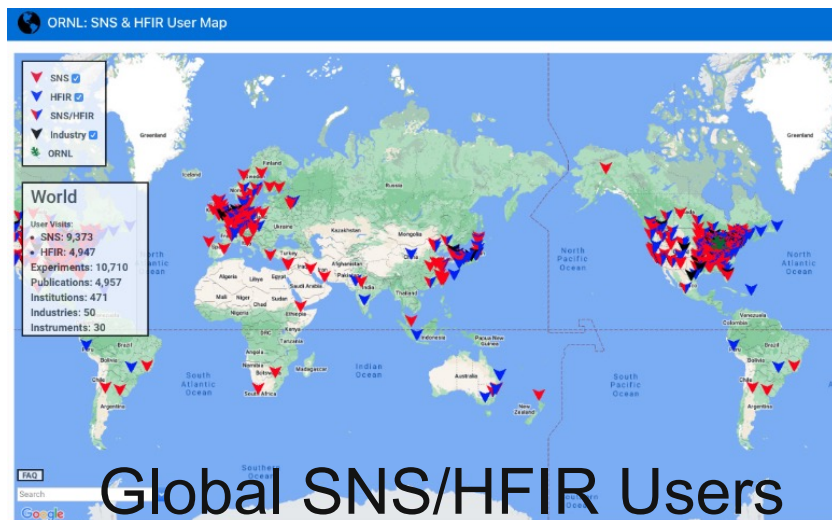
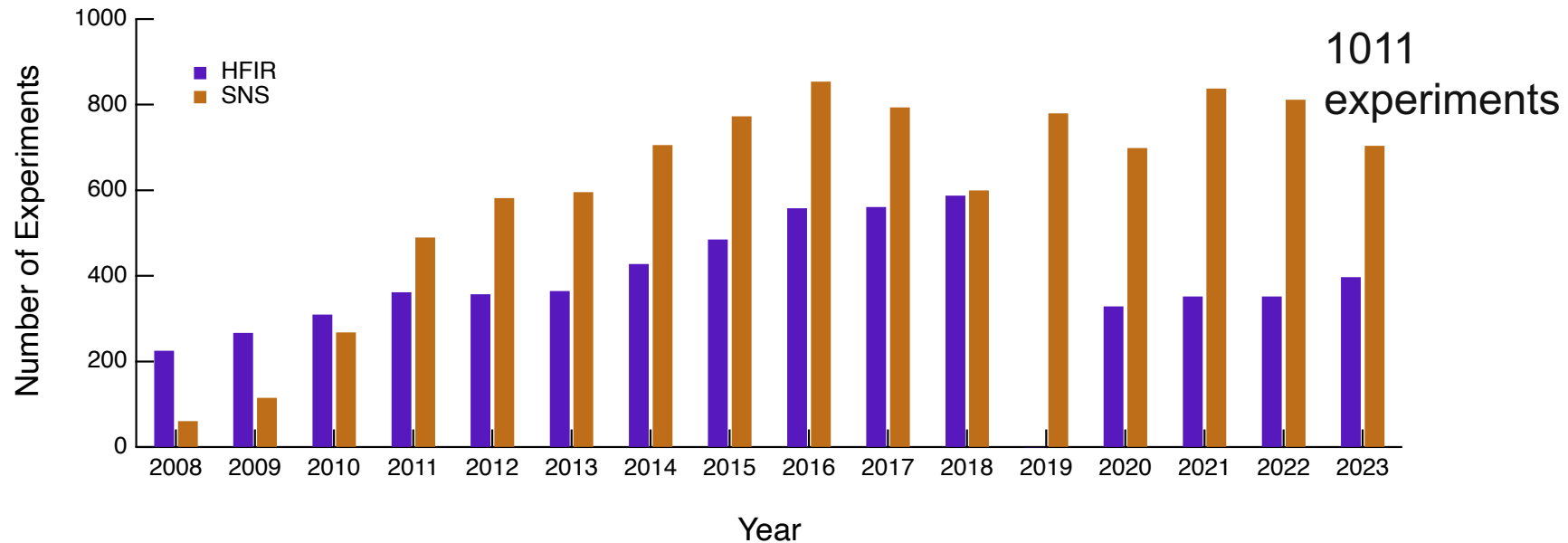
X-ray Source User Communities



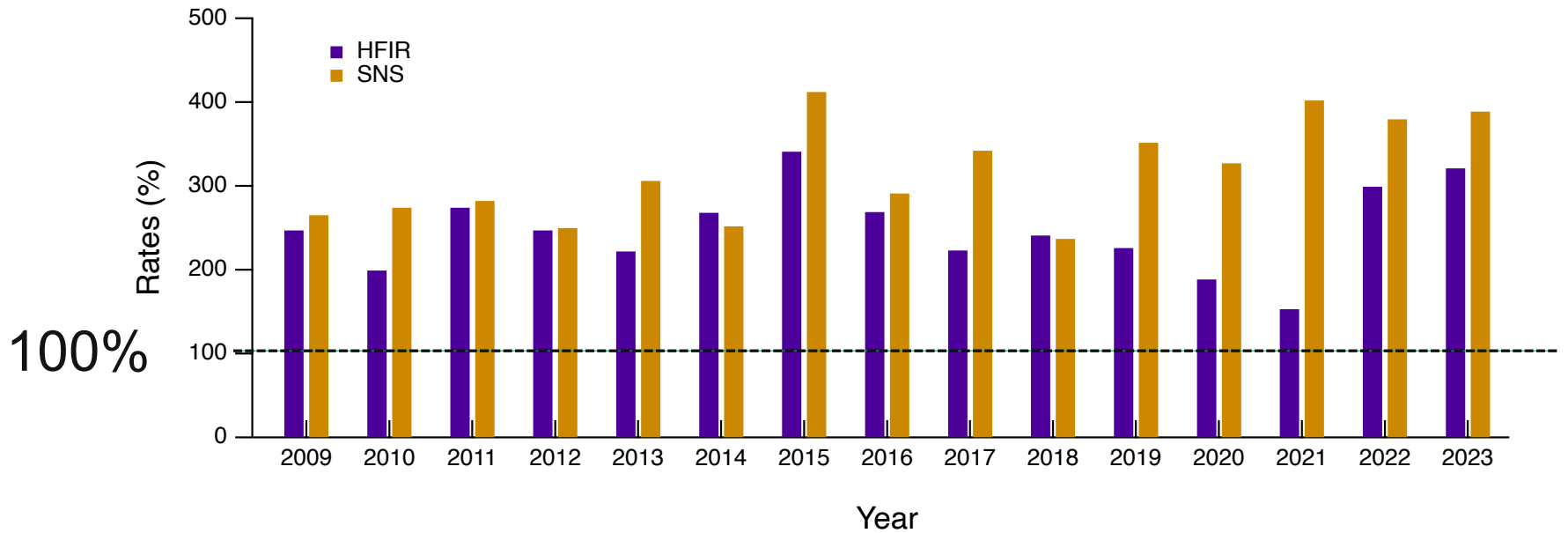
Neutron User Communities



SNS and HFIR impact continues to grow



Overall subscription rates at HFIR/SNS remain high



~30%
receive
beamtime

Basics of the facility proposal systems



All DOE (NIST & NSF) neutron and x-ray sources offer access to beam time through a proposal system.



- When and how often proposals are submitted varies by facility.
- APS and NSLS-II three times (“cycles”) per year.
- SNS/HFIR and ALS two times per year.
- All proposals are peer-reviewed and rated, and beam time is allocated using the scores. Once time has been allocated, beamline staff schedule the proposals.

Amount of general user time available

APS/NSLS/SSRL/ALS

- ✓ All beamlines offer general user beam time.
- ✓ Most DOE/NSF funded beamlines provide 80-100% of their time to general users.

SNS/HFIR

- ✓ Amount varies by instrument.
- ✓ ~75% of time will be for general users.



For most, you can search facility websites by technique or by beamline. Quality of proposal websites varies.

Users Get Started with Assistance of the Instrument Scientists

Study instrument web pages

Contact an Instrument Scientist to discuss your research

- What is the research problem?
- Which instrument(s) are appropriate? (scores?)
- How mature is the research project (risk, size)?
- What is the material – sample composition, form, size, availability?
- What are the experimental conditions (temperature, pressure, magnetic field, etc)?
- What will be measured?
- Probability of success? Impact? Significance?
- How will results be presented and to whom?
- What is the timeline?



Instrument Scientists Assist First-time and Returning Users

Provide technical advice, guidance, and assistance

Instrument options

Sample and experiment preparation

Number of experiment days

Logistics (scheduling, transporting and storing samples)

Proposal preparation tips and assistance

Experiment team members

Data analysis

Publication considerations

Consider beamline staff as collaborators, include as co-authors if appropriate.



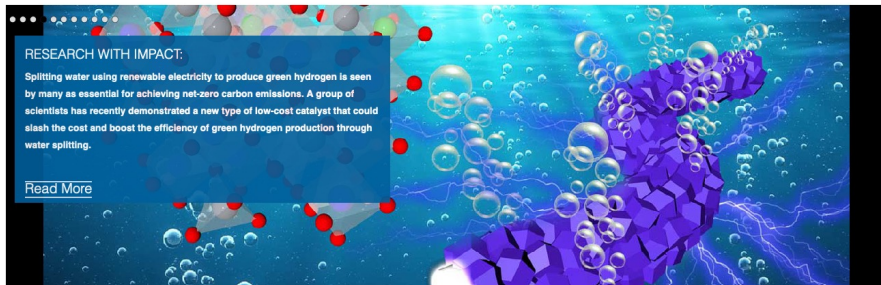
Submitting a proposal

Facilities have link on home page



The Advanced Photon Source
a U.S. Department of Energy Office of Science User Facility

APS



THE ADVANCED PHOTON SOURCE UPGRADE IS IN PROGRESS

The Advanced Photon Source is undergoing a comprehensive upgrade to replace its original electron storage ring with a new, state-of-the-art accelerator. This will increase the brightness of APS X-ray beams by up to 500 times, and new beamlines will be constructed to take advantage of these improved capabilities. The facility will be closed for operations during this time.

Visit the APS Upgrade webpage for information about the project's progress and future science at the facility. We look forward to completing the project and welcoming our users back to the APS this year.



About Us User Facilities Science & Discovery News Our People Careers

Neutron Sciences Directorate

SNS VIRTUAL TOUR HFIR VIRTUAL TOUR REQUEST BEAM TIME

Home About Future Science For Users For Industry Publications Instruments News/Events Staff

Home » Spallation Neutron Source

SNS, HFIR



Spallation Neutron Source

OPERATING STATUS



National Synchrotron Light Source II

NSLS-II



Home About Accelerator Beamlines Research For Users For Industry News & Events Staff Directory Jobs Intranet



User Guide
User Access, Proposal, Training & Shipping

Operating Status
Beam current, operating mode, systems, etc.

Accelerator Schedule
Operations, studies, shutdowns

Next deadline for proposals and beam time requests: **September 30, 2024** at 11:59 p.m. (ET). | [Submission Details](#)

BERKELEY LAB

ADVANCED LIGHT SOURCE

BEAM STATUS ALShub LOGIN SEARCH

SCIENCE USERS BEAMLINES ABOUT NEWS & EVENTS ALS-U

The Advanced Light Source is a U.S. Department of Energy scientific user facility at Lawrence Berkeley National Laboratory. Our mission is to advance science for the benefit of society by providing our world-class synchrotron light source capabilities and expertise to a broad scientific community.

ALS

ANNOUNCEMENT **ALS User Meeting, August 12-14**

Don't miss the 2024 ALS User Meeting, featuring invited speakers, hands-on workshops, tutorials, and two ALS-Molecular Foundry joint workshops. Registration for in-person attendance at the 2024 User Meeting is now closed. Registration for virtual attendance is open through August 9.

Light sources use a "Universal Proposal System"

My Dashboard Proposal Calls Knowledge Base Contacts User Profile Feedback Tours MM Michael

Submit a Proposal

The map shows the following light sources and their locations:

- LCLS (SLAC):** Linac Coherent Light Source, located in California.
- LaserNetUS:** Located in California.
- MeV-UED (SLAC):** Megaelectronvolt Ultrafast Electron Diffraction, located in California.
- APS (Argonne):** Advanced Photon Source, located in Illinois.
- NSLS-II (Brookhaven):** National Synchrotron Light Source II, located in New York.
- LBMS (Brookhaven):** Laboratory for BioMolecular Structure, located in New York.

Argonne
NATIONAL LABORATORY

Website
<https://www.aps.anl.gov/>

Location
9700 S. Cass Ave.
Lemont, IL 60439

Phone
630-252-9090

Advanced Photon Source

Feature Beamlines Contact Info Beamlines

Title	Types	Proposal Cycles	Deadline	Proposal Call Status
2024-3 CAT Member Proposals	CAT Member	APS: 2024-3	12/19/2024 00:59:59	SUBMIT A PROPOSAL
2024-3 Resource Staff Proposals (Includes CAT and APS Staff)	Resource Staff	APS: 2024-3	12/19/2024 00:59:59	SUBMIT A PROPOSAL
2024-3 Macromolecular Crystallography Proposals	General User - Macromolecular Crystallography	APS: 2024-3	12/19/2024 00:59:59	SUBMIT A PROPOSAL

Different types of proposals allow facility flexibility – cont.

SNS HFIR

General User (majority of proposals – one cycle)

Programmatic (allows >1 cycle, e.g. your thesis)

Mail-in powder POWGEN, NOMAD, and VISION – **New in 2024, ARCS, HYSPEC (powders)...**

Proof of principle (feasibility – 1 day)

Sample alignment (add to other proposal) HFIR CG-1B Laue

Rapid Access - high impact, can be submitted anytime

NIST NCNR

MAIL-IN SAMPLES FOR POWDER DIFFRACTION

Accepts proposals for experiments on the BT1 powder diffractometer on "mail-in" samples. That is, samples may be mailed to NCNR staff, who will execute the data collection.

QUICK ACCESS PROPOSALS

If a user feels that beam time is required very soon to carry out important measurements that cannot be delayed, a proposal may be submitted requesting expedited access. The proposal will be reviewed by the BTAC, and held to a substantially higher standard than regular proposals.

Macromolecular Crystallography is often a separate, self-contained community

- A separate proposal system at APS.
- Highly automated for mail-in measurements.
- Beamtime relatively available.

Questions asked

General Info (Title, Experimenters, Funding source, etc.)

Abstract - What is the *scientific importance* of the proposed research?

Why do you need the facility to do this research?

- (Neutron vs. X-rays) or (Neutrons + X-rays)?
- Spallation source vs. reactor source
- Hard X-rays vs. Soft X-rays

Why do you need the beam line (and/or instrument)?

- Particular technique or sample environment

What previous experience / results do you have (pubs important)?

Describe the proposed experiment(s), including samples and procedures. Show that you're prepared.

Justification of the amount of time requested. Don't be greedy or unrealistic about time needed. Ask beamline staff.

Proposal: General information

Title should be specific and to the point, not vague.

- Good: “XAS study of Fe valence in CaFe_2As_2 under pressure ”
- Bad: “Understanding superconductivity in superconductors”

Is it thesis related? Is there a deadline?

- Will push your proposal up if scores are close

Fill in the abstract - This is where reviewer develops first impression.

Science impact in abstract is most important criteria for score.

Do upload a figure/publication from previous work.

- Shows you made good use of beam time.
- Do not upload a 20 pages of supplemental information (figures often help, couple of plots with text OK)

Experimental Details

- Give background information on why it is important.
 - Reviewer is not necessarily an expert on your subject. Try to capture imagination of reviewer with basic idea.
 - Each committee gets many proposals each cycle. Proposal needs to be clear.

- Clearly state what you want to measure and how.
 - Give some details. Temperature range, wavelength, sample geometry...
 - Sample characterization (XRD, SEM, etc.) and preliminary data important.
 - Reviewer and beamline need to judge if experiment is feasible

- Why use x-rays or neutrons?
 - Neutron vs. x-rays OR neutron + x-rays?
 - TEM, Mössbauer, Raman, etc. (Have you done your homework?)

- Justify the amount of beam time requested (ask instrument scientist!)
 - Be reasonable.

Ratings for APS Proposals

Review Criteria for General User Proposals

Criteria for reviewing general user proposals and for macromolecular crystallography general user proposals are shown below.

Rating Criteria for General User Proposals and Macromolecular Crystallography Proposals

Impact of Research

- **Revolutionary:** Experiment results will significantly advance knowledge in a specific scientific/technology field. Very high probability of publication in a leading scientific journal and/or very high probability of technological/societal impact*. **(1)**
- **Significant:** The outcome of the proposed research will advance knowledge in a specific scientific/technology field. High probability of publication in a leading scientific journal and/or high probability of technological/societal impact*. **(2)**
- **Important:** Experiment results likely to produce incremental scientific/technological advances. Likely probability of publication in a non-leading scientific journal and/or some technological/societal impact*. **(3)**
- **Minimal:** The experiment results will not significantly impact a specific scientific/technology field. Publication may or may not result from this research and/or minimal technological/societal impact*. **(4)**
- **Insignificant:** Results not likely to make contributions to understanding of fundamental or applied fields. Publication not likely and/or no technological/societal impact*. **(5)**

Quality of Research Plan

- **Very High Quality:** Planned experiment demonstrates clear viability*, optimal understanding of facility resources and experimental team and their resources are above average. Data analysis strategy is very well thought out. **(1)**
- **High Quality:** Planned experiment is well thought out, viable*, and experimental team and their resources are adequate. Data analysis strategy is sound. **(2)**
- **Moderate:** Planned experiment is viable* but team would benefit from collaboration with facility staff. **(3)**
- **Below Average:** Research planning, resources, and/or data analysis strategy is lacking some important details. **(4)**
- **Poor:** Research plan is not well thought out. **(5)**

Justification of Need for Facility Resource

- **Essential:** The unique characteristics of the facility resources are shown to be essential for the success of the proposed work. **(1)**
- **Important:** The unique characteristics of the facility resources are important for the success of the proposed work **(2)**
- **Beneficial:** The proposed work will likely benefit from the use of the unique facility resources. **(3)**
- **Not required:** The proposed work does not take advantage of unique facility resources. **(4)**

APS proposals are rated on a scale from 1 to 5

Average score was ~1.6, but seems to slowly decrease

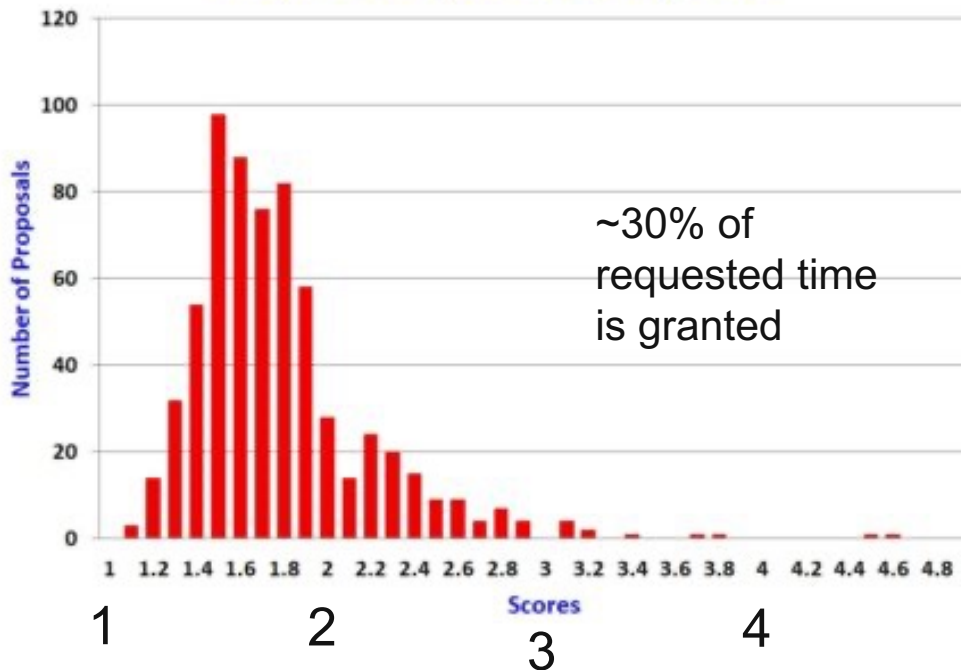
Cut off score for receiving beam time varies by beamline (1.3 - 2.2)

Proposal “**ageing**” (score improves by 0.2 each cycle it does not receive time, up to 0.4). This is needed for getting time at some oversubscribed beamlines, so long-term planning is needed. **But you have to remember to request beamtime again for every cycle.**

ALS provides cutoff scores – Helps you know what to expect

<https://als.lbl.gov/general-user-proposal-score-statistics/>

Distribution of Proposal Scores for General User
Proposals for cycle 2024-2 Aug - Dec



SNS/HFIR does not tell you a score or panel members.

You can try asking user office or beamline.

Beamline cutoff scores

Beamline	% Beam Time Allocated / Requested	Cutoff Score
1.4 (IR)	50	1.96
2.4 (SINS)	33	1.80
4.0.2 (Magnetic Spectroscopy/Scattering)	17	1.65
5.3.2.2 (Polymer STXM)	31	1.50
5.4 (IR)	49	1.97
6.1.2 (Soft X-Ray Microscopy)	21 easier	2.13
6.3.1.1 (Magnetic Spectroscopy)	31	1.83
6.3.2 (Calibration, Optics Testing, Spectroscopy)	40	1.87
7.0.1 (COSMIC)	20	1.44
7.0.2 (Surface & Materials Science (MAESTRO))	12	1.48
7.3.1 (ISAAC)	10	1.67
7.3.3 (SAXS)	15 harder	1.40
8.0.1 (SXF)	7	1.56
8.3.2 (Tomography)	24	1.50
9.0 (Chemical Dynamics, Coherent Imaging)	48	2.00
9.3.1 (Tender APXPS)	7 harder	1.28
9.3.2 (APXPS)	20	1.34
10.0.1 (HERS/AMO)	12	1.66
11.0.1 (PEEM3, Soft X-Ray Scattering)	23	1.40
11.0.2 (APXPS, STXM)	16	
12.2.1 (Small Molecule Crystallography)	42	1.70
12.2.2 (High Pressure)	27	1.49
12.3.2 (Microdiffraction)	61	1.52

Pick appropriate panel!

13 Current Panels

High Pressure
Instrumentation
Imaging/Microbeam
Macromolecular Crystallography
Scattering - Condensed Matter
Scattering - Applied Materials
Scattering – Chem / Biol / Environment
Small Angle Scattering (SAXS)
Spectroscopy
Structural Science
Inelastic X-ray scattering
Pump Probe
Dynamic Compression

**If multiple possibilities -
Look at members & Ask staff**

<https://www.aps.anl.gov/About/Committees/Proposal-Review-Panels>

Training Resources		
Chair: <ul style="list-style-type: none">• UPS Chair Training Video• Assigning Reviews• Consensus Meeting		
Reviewer: <ul style="list-style-type: none">• UPS PRP Training Video• Accessing and Completing Assigned Review		
High Pressure Dongzhou Zhang, Chair <ul style="list-style-type: none">• James Walsh• Jiyong Zhao• Antonio Moreira dos Santos• Shanti Desmyard• Maik Lang• Stella Chariton• Bin Chen• Wenli Bi• Bora Kalkan• Jennifer Girard• Ross Hubiak• Tim Strobel• Anne Pommier	Instrumentation Gary Navrotski, Chair <ul style="list-style-type: none">• Ayman Said• Yu-Sheng Chen	Imaging/Microbeam Garth Williams, Chair <ul style="list-style-type: none">• Bhoopesh Mishra• Hendrik Ohldag• Benjamin Twining• Balaji Raghothamachari• Mingyuan Ge• Trevor Willey• Tanja Ducic• Jigang Zhou•
Scattering – Condensed Matter Sara Haravifard, Chair <ul style="list-style-type: none">• Matthew Brahnik• Kemp Plumb• Joerg Strempler• Paul Miceli• James Patrick Clancy• Jennifer Sears• Pat Clancy• Jacob Ruff• Edwin Fohlung	Scattering – Applied Materials Darren Pagan, Chair <ul style="list-style-type: none">• Michelle Jamer• Tao Li• Richard Sandberg• Michael Sangid• Ahmet Uysal• Mark Daymond	
Spectroscopy – Enviro/Earth/Bio Xiaofeng Guo, Chair <ul style="list-style-type: none">• Ashaki Rouff• Yuji Arai• Arjen van Veenen	Spectroscopy – Chem/Catalysis Tyler Carroll, Chair <ul style="list-style-type: none">• Zhenxing Feng• Amari Ebrahim• Koffi Yao• Debora Motta Meira• Jier Huang• Lu Ma	Spectroscopy – CMP/Magnetism Riccardo Comin, Chair <ul style="list-style-type: none">• Giuseppina Conti• Gerald Seidler• Alex Frano• Christina Rost• Yongseong Choi• Yu He
Scattering – Chem/Bio/Enviro David Powers, Chair <ul style="list-style-type: none">• Ivan Kuzmenko• Neal Markad• Minal Bera• Yuting Luo• Xiaobing Zuo	Small-angle X-ray Scattering (SAXS) Joe Strzalka, Chair <ul style="list-style-type: none">• Esther Tsai• Samarvaya Srivastava• Zhe Qiang• Robert Moore• Chentui Zhu	Dynamic Compression Tim Gemmann, Chair <ul style="list-style-type: none">• Justin Brown• Alan Kastengen• Thomas Sewell• Alison Kubota
Structural Science Craig Brown, Chair <ul style="list-style-type: none">•• Peter Khalifah• James Kaduk• Angus Wilkinson•• Jamie Neilson• Daniel Shoemaker• Jennifer Swift• Scott Misure• Kiril Kovac• Brent Melot• David Billing• Jennifer Niedziela• Cora Lind-Kovacs• Raj Suryanarayanan• Alan Goldman• Irina Klemm-Trois	Inelastic X-ray Scattering Stuart Calder, Chair <ul style="list-style-type: none">• Raphael Hermann• Hasan Yavas• Yue Cao• Jonathan Pelliciani	Pump Probe Dugan Hayes, Chair <ul style="list-style-type: none">• Vankatraman Gopalan• Gilles Dourmy• Elisa Blasin• Katherine Davis

Several common pitfalls

- Proposer assumes committee is familiar with their research and jargon.
- Proposal does not address "Why should I care?"
- Proposer writes vague proposal asking for multiple weeks of time. Better to write a proposal with a well-defined objective and realistic time request.
- Proposer submits 2 (or more) similar proposals for related materials thinking that multiple proposals increases chances. Reviewers may not appreciate.

Common Reviewer comments:

- "Proposers could improve their score by including more experimental details, attaching previous results and expanding on the purpose and importance of the research."
- "Hasn't the proposed research been published previously?"
- "We do not feel that granting 20 shifts/cycle for 2 years is consistent with the history of publication of this work."
- "Proposer should perform initial characterization with lab sources or TEM."
- "Will the signal be strong enough compared to background?"

After submission

- Allow time for review and revisions
- Expect feedback several weeks from the call close
- Be ready to schedule experiment if approved
 - Identify participating team members
 - Respond to facility access approval information
 - Facilitate execution of user agreements
 - Complete required training. Confirm sample availability and description and laboratory needs
- Consider reviewer comments if not approved and plan to resubmit this proposal or a new proposal in the next call. Opportunities continue to grow.

Scientific and Funding Opportunities



As a student

- Attend neutron & x-ray schools, workshops & user meetings. Knowledge and connections have long-term impact. Collaborations are essential.
- Join SNS HFIR User Group (SHUG) and other facility user organizations
Advocacy group, learn about and influence new developments
- Explore DOE and NSF internships, fellowships, and research programs
SCGSR; ORISE/ORAU (HERE, GO!). Local contacts help (a lot).
<https://science.energy.gov/wdts/scgsr/how-to-apply/priority-sc-research-areas/>
- Invite scientists from national labs to your campus, e.g. for seminar

As a young professional

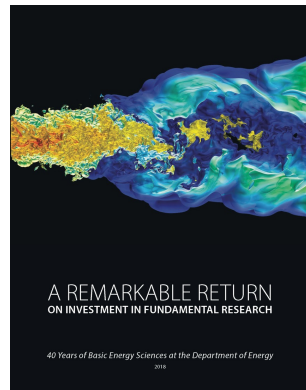
- Continue to use “free” user facilities
New faculty and industrial users can be favored in reviews
- Volunteer to be a reviewer on proposal panels
- Consider EPSCoR programs if located in a participating state
- Apply for Early Career award – great for tenure application

Proposal Resource: “Basic Research Needs Workshop on...”

~50 reports in past ~20 yrs; Participants from academia, industry, and DOE labs



2002-2018



- BES at 40: Remarkable Return on Investment in Fundamental Research
- Basic Research at the Frontiers of XFEL Ultrafast Science (2017)
- Quantum Computing in Chemical and Materials Sciences (2017)
- BRN on Energy and Water (2017)
- BRN for Future Nuclear Energy (2017)
- BRN on Next Generation Electrical Energy Storage (2017)
- BRN on Catalysis Science (2017)
- BRN Synthesis Science for Energy Relevant Technology (2016)
- BRN on Future Electron Sources (2016)
- BES Computing - Exascale Requirements Review (2015)
- BRN Quantum Materials for Energy Relevant Technology (2015)
- BRN for Environmental Management (2015)
- Challenges at the Frontiers of Matter and Energy (2015)
- Controlling Subsurface Fractures and Fluid Flow (2015)

<http://science.energy.gov/bes/community-resources/reports/>

Focused on current & future, not a scientific review – good source of science motivation



QUESTIONS?

NXS Lecture - Mike Manley:
"Proposal Writing"

