



LCLS Project Management Document #	1.1-053	Directorate	Rev.	0
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LCLS Experiment Beam Time Access Policy

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10/30/08
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11/3/08
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Change History Log

Rev Number	Revision Date	Sections Affected	Description of Change
000	Oct 2008	All	Initial Version



LCLS Access Policy

Introduction and goals

Operation of the Linac Coherent Light Source will begin in summer 2009, when experimental instruments in the Near Experiment Hall should be ready to receive first light. The goals of the LCLS in the early operations phase will be:

- i)* achieving FEL performance baseline goals as soon as possible
- ii)* commissioning the first instruments
- iii)* producing high-impact early science
- iv)* achieving a rapid and orderly transition to a general user program.

As a National User Facility it is the goal of the LCLS program to attract a large number of diverse users and to enable a broad set of important experiments that take advantage of the unique capabilities of the LCLS.

During the LCLS design process, the Scientific Advisory Committee (SAC) identified 6 scientific areas for early exploration using the LCLS capabilities. Collaborations of potential LCLS users have organized around these scientific thrust areas, and these collaborations have played a key role in helping LCLS to design instrumentation which will enable research in these areas. It is expected that these collaborations will be prepared to submit proposals for experiments at LCLS as soon as beam time is available. In recognition of the support from these collaborations, their proposals will receive beam time during the commissioning and very early operations phase (see below). As each instrument approaches a steady-state operations phase, it will be managed as a general user facility, with access based upon scientific quality of proposals as judged by peer review.

Steady-state operation of LCLS, with all instruments having passed through the start-up phase, is expected by about the year 2014. From then on, apart from time set aside for in-house research¹, instrument maintenance and for a Director's Reserve², all photon science beam time will be considered general user time, distributed by LCLS management on the basis of the outcome of the LCLS proposal evaluation process.

The goal for steady-state operation is to provide 5000 hours per year of beam for photon science experiments and 2000 hours for accelerator and FEL studies. The allocation of the total machine

¹ The in-house research time will allow the lead instrument scientists to have the possibility to initiate at least one experiment per year as Principle Investigator, choosing the subject and collaborators. Proposals will be submitted within the standard LCLS proposal evaluation scheme.

² The Director's Reserve will allow the LCLS Director to allocate beam time on very short notice for particularly important experiments, and also will enable the Director to react to unforeseen problems with LCLS operation. The Director's Reserve will not exceed 5% of photon science experiment time.



operation time to accelerator and FEL studies and photon science experiments will be discussed with the LCLS SAC, and determined by LCLS management.

LCLS operation in the years 2009 to 2014 will depend on the performance of the FEL and the availability of the different experimental stations. Nevertheless, a very preliminary estimate of LCLS operation has been made in order to facilitate planning (see Table 1).

	2009	2010	2011	2012	2013	2014
Maintenance	4,260	2,160	2,160	2,160	1,960	1,960
Machine studies electrons	2,750	1,300	1,300	1,300	900	900
Machine studies photons	1,250	1,300	1,300	1,300	900	900
Photon science experiments	500	4,000	4,000	4,000	5,000	5,000

Table 1: Tentative operation plan for LCLS [hours per fiscal year]

The initial LCLS facility has space for six experimental stations, and scientific missions for these stations have been approved by the SAC. The instrument for AMO science and the three LUSI instruments for pump-probe studies (XPP), coherent imaging (CXI), and X-ray correlation spectroscopy (XCS) have secured full funding commitments from DOE-BES. However, due to the current funding profile their realization will be staggered and steady-state operation of all instruments will not be achieved until the year 2013. The other two experimental stations approved by the SAC (stations for High Energy Density Science (HED) and Soft X-ray Research (SXR)), are seeking funding at this time, and steady-state operation at these instruments is not expected until 2014.

Benchmarks for beam time allocation

Blocks of time will be scheduled in advance for *maintenance*, *FEL development*, *instrument commissioning/development* and *experimental operations*. A one-year look-ahead will be published prior to the start of operations. The one-year look-ahead schedule will be updated every six months. Every effort will be made to avoid changes in schedule, especially for experimental operations, with less than six months' notice. However, the facility may revise and adjust the schedules for maintenance, accelerator development and instrument commissioning with less advance notice, to provide best performance for experimental operations.

Experimental operation time will be allocated in standard shifts for a given instrument. The num-



ber of hours per shift will be determined prior to start of LCLS operations, and reviewed periodically. Table 1 above shows the expected number of hours LCLS will deliver beam for photon science experiments in the years 2009 to 2014. The time necessary for beamline and instrument development is counted as part of the time allocated to “machine studies photons”.

For AMO, the first of the four BES-funded instruments, a maximum of two years after first beam will be defined as the **instrument start-up phase**. For XPP, CXI and XCS instrument start-up phase is one year. Table 2 shows the expected profile for commissioning and early operation of these four instruments. During the instrument start-up phase a specific role will be given to the Instrument Teams formed in 2004 and approved by the SAC.

	Start of commissioning and early operation	Start of steady state operation
AMO	07-09	07-11
XPP	06-10	06-11
CXI	01-11	01-12
XCS	06-11	06-12

Table 2: Tentative operation scheme of DOE funded LCLS instruments

During the instrument start-up phase, the Instrument Teams will receive beam time for access to their instruments, as detailed below.

In **LCLS steady-state operation** 75% of the time available for photon science experiments will be general user time and will be assigned following the LCLS proposal selection procedure, based upon the scientific quality of the proposals as judged by peer review. The remaining 25% of the photon science beam time may be allocated for the Director’s Reserve, for in-house research, and instrument maintenance.

The LCLS SAC will evaluate the appropriate balance of scientific fields and use of the instruments including the planned HED and SXR beamlines to be funded primarily by external sources. For planning purposes in steady state operation it is assumed that each of the 6 experimental stations will get about the same amount of beam time; modifications to this plan may be made by LCLS management with advice from the Proposal Review Panel (PRP) and the SAC.

Proposal evaluation process and beam time allocation

After consultation with the SAC, the LCLS management will invite scientists from outside SLAC and designate two non-voting representatives of LCLS management to serve on the LCLS Proposal Review Panel (PRP). The PRP will review all proposals for experiments at LCLS and rank each on a five-point scale from 1 down to 5, and explain the ranking in a written statement to the applicants. The PRP will meet twice a year. Calls for proposals will be publicized about six



months before the PRP meeting date with a deadline for submission three months before the PRP meeting.

During the LCLS start-up period LCLS management will organize proposal preparation workshops for the scientific thrust areas and instruments addressed by the call for proposals. They will take place months before the deadline for submission of proposals. At these workshops the status of the LCLS facility will be presented with emphasis on expected beam properties and performance of the instruments, as well as on the needs for instrument commissioning.

LCLS management will make available templates for the submission of proposals putting emphasis on

- the scientific case
- reports of results from earlier relevant experiments
- technical feasibility of the experiment
- description of the technical capability of the proposing group:
 - recent publications in the corresponding field of research
 - availability of group members for preparation of the experiment and during the measurement campaign
 - know-how for data analysis
- potential hazards.

There will be ample time for discussion, which should stimulate the formation of collaborations among participants with similar scientific goals. The hope is that these workshops will support the preparation of the best proposals for early science at LCLS.

After submission of the proposals LCLS management will seek additional input from the instrument scientists regarding experiment feasibility and from the LCLS safety officer regarding potential hazards associated with the experiment. The whole dossier is then forwarded to the PRP .

Beam time assignment will be done by LCLS management on the basis of the PRP ranking of the proposals.

SAC-approved Instrument Teams

The definition of the initial science program for LCLS was developed through an open process. Letters of intent to pursue scientific studies and design instruments were solicited from the breadth of the scientific community. These proposals for full instruments, technologies and science were evaluated by the LCLS SAC. Based on these letters, the SAC recommended that LCLS instruments be designed to enable scientific research in five thrust areas:

1. Atomic, molecular and optical science (AMO)
2. Coherent scattering of nano-scale fluctuations (XCS)
3. Diffraction studies of stimulated dynamics (XPP)
4. Coherent imaging of non-periodic objects (CXI)
5. High energy density science (HED)



It later became clear that 6 instruments would be required to cover the full range of this science over the wavelength range of LCLS, and so “Investigation of materials with soft X-rays (SXR)” was identified as a sixth thrust area by SAC.

In recognition of their early support of LCLS and valuable contributions to the design process, the instrument teams will be given up to 50% of the beam time during the instrument start-up phase, in general not more than 1000 hours. For the consortia providing the funds for building the HED and SXR instruments specific MoUs will be agreed upon. In any case, in order to facilitate the best science at LCLS, all access will be through the LCLS proposal review process and priority will always be given to the highest-rated proposals. Only in cases of equal ranking, proposals from the Instrument Teams will be given priority.

Additional instrumentation at LCLS

New instrumentation for LCLS may from time to time be developed by outside groups using primarily non-LCLS funding. For instrumentation that offers a *significant addition of general utility to LCLS*, the LCLS management may enter into an agreement with an outside group, specifying the way in which this instrumentation will be deployed at LCLS so as to benefit the general user community, and the time period for which this instrumentation will be available at LCLS. Groups contributing funds, equipment and/or personnel to the construction of new instrumentation can expect to receive a fraction of beam time on the new instrument during a specified time period. (Note that providing new instrumentation is different from providing resources to conduct a specific experiment, where the equipment will not be available to the general LCLS user community.) Approval for realization of new instrumentation at LCLS which is largely funded by external groups will follow a three step procedure:

1. The external collaboration intending to build new instrumentation must get the support of LCLS management, before negotiations with funding agencies are started. The LCLS commitment will generally be given for a specific period of time, and will be reviewed on a six-month basis. The discussions between LCLS and the collaboration should include:
 - Evaluation of the scientific potential by the LCLS SAC
 - Submission of a Technical Design Report (TDR) to LCLS management
 - Evaluation of the TDR by the SAC and additional experts in consultation with LCLS. The review will include feasibility of the program, staffing availability, general user access to instrumentation, permanence of the instrumentation or facility, data acquisition interface issues, etc.
 - Analysis of impact on beam time

After approval by the SAC, the results will be summarized in a Letter of Intent signed by the collaboration’s spokesperson and the home institutions involved as well as LCLS management.

2. Negotiation between the collaboration and the funding agencies, involving representatives of LCLS/SLAC management.



3. After securing funding the collaboration, together with LCLS instrument scientists and management, will work out the final layout of the instrumentation and the timeline for construction, commissioning and early operation. In addition, the LCLS involvement in construction oversight will be defined. In case of a change in design from that described in the TDR, which significantly affects the scientific potential of the instrument, the SAC will be informed. The negotiations will conclude with the signing of a Memorandum of Understanding by the spokesperson of the collaboration, the collaborating institutions, and the LCLS/SLAC management.