Science Campaigns - Overview

expansion of PRP access channel (~10%)

- Target high-impact science areas exploiting LCLS capabilities
- Support comprehensive research efforts requiring multiple LCLS beamtimes (e.g. including synthesis, experiment, theory etc.)
- Open, competitive access based on peer-review
- Scientific scope and impact well above standard PRP proposal, and:
  - Clear justification for campaign, and need for LCLS capabilities (partnership)
- Review: PRP-plus
  - PRP augmented by high-level external area experts, SAC input/oversight on portfolio
- Opportune time – increased competition and capacity (local, worldwide)

Opportunity for LCLS to target a few high-reward “grand challenge” science areas
LCLS Science Campaigns – How? & When?

- **LCLS Request for Proposals (RFP)**
  - Target specific (promising) science areas
  - In consultation and coordination with BES programs as appropriate
  - Pre-proposal and discussion with LCLS required before invitation for full proposal

- More extensive proposal – “PRP-plus” (following specific template)

- Review by PRP augmented by additional area experts as needed with:
  - Broader science perspective (e.g. National Academy level)
  - Scientific expertise relevant to specific proposal

- **LCLS SAC** input and oversight on Science Campaign portfolio
  - Feedback on science areas to be targeted, and balance with general user access

- Final decision by LCLS Director

- Feedback to LCLS (and PRP) following each beamtime

*Investigators on a Science Campaign will not be allowed to submit PRP proposals on the same subject
Denied campaign proposals will automatically be considered for normal PRP beamtime*
Criteria: LCLS Science Campaigns

- Expand on existing PRP proposal criteria
- **Science scope & impact** of the proposed research should be well above a typical PRP proposal
  - Comprehensive, high-impact program
  - Scientific and technical expertise of the team (likelihood of success)
- Compelling need for LCLS capabilities, instrumentation, expertise
- Scientific justification for “campaign”
  - *Will the proposed sequence of experiments result in a qualitative advance on an important science area?*
  - *Could this be accomplished through the PRP mechanism?*
- Value of proposed collaboration with LCLS facility and staff (LCLS strategic interest)
  - e.g. Connection to BES or DOE-SC scientific mission
  - e.g. Opening an important new area of science
  - e.g. Developing and demonstrating important new capability (instrumentation/method)
  - other arguments for the “value of proposed collaboration” also may be considered
See Updated LCLS Policies for Details

- [https://lcls.slac.stanford.edu/proposals](https://lcls.slac.stanford.edu/proposals)
- [https://lcls.slac.stanford.edu/policies](https://lcls.slac.stanford.edu/policies)

**Proposal Preparation Guidelines**

Submit your proposal early to avoid a last-minute crisis time. The *proposal deadline* is strictly enforced.

The following modes of access are available to users:

- Regular User Proposals
- **Scientific Campaign Proposals**
- Protein Crystal Screening (PCS) Proposals

**LCLS Policies**

- Integration of User-Supplied Equipment at LCLS
- Instrument Enhancements at LCLS
- Reporting Requirements and Acknowledgement Statement
- Guidelines for Press Releases and Public Communications
- **Proposal Review Process**
- Beam Time Allocation and User Notification
- Duplication of Effort
- Significant Deviation from Proposed Research in a Research Proposal
- Instrumentation Development
Science Campaign RFP (2020)

**Structural Dynamics of Complex Matter**

*Exploiting mJ pulses at 25 keV*

**Motivation:**
- Maximize science impact of unique LCLS capability with new HXU
- Solicit the highest impact science requiring: mJ pulses >18 keV and multiple beamtimes

**Science Opportunities for LCLS-II @ 25 keV:**
- Transient/metastable material phases
  - Large q-range & multiple Bragg peaks
- Structural dynamics of complex matter (e.g. molecular complexes)
  - Time-resolved Pair Distribution Function analysis at atomic scale
- Stochastic dynamics and fluctuations in matter at the atomic scale
  - Coherent scattering, XPCS, with reduced radiation damage
    (>5x reduction compared to 10 keV for Z>40)
- Penetration through dense media (high Z), access *operando* conditions, and unique sample environments
  - 90% trans. through 2 mm diamond, ~5x compared to 10 keV
  - Dynamic pressure, transient fields, temperature

➢ **Target science areas (and new capability) for Run 18/19 PRP calls**
Many Promising Areas for Future Science Campaigns

*LCLS will continue to seek input:*

- LCLS users (e.g. at Users’ Meeting)
- LCLS SAC
- Broader science community
  (e.g. through workshops, emerging initiatives etc.)
- other...