LCLS UEC Meeting February 24th, 2023

Present: M. Mitrano, N. Hartley, L. Conradson, Y. Cao, M. Dunne, P. Jones, N. Power-Riggs, M. Doyle, D. Rolles, G. Doumy, C. Knotts, J. Williams, S. Teitelbaum A. Marinelli

Absent: E. Biasin, E. McBride, U. Bergmann, T. Gorkhover, D. Oberthür, C. Rajendran, M. Schmidt, M. Trigo, B. Mooers

Director's Updates:

Restarting Run 21:

- LCLS run 21 will restart following the December safety incident. The current delays are that we are still waiting for approval from the DOE for control of hazardous energy (CoHE) and Lock Out Tag Out approval.
- The current plan is for beam to be operational by early April, and resume user experiments by mid-April. LCLS II restart will be prioritized. The current plan is to remove the scheduled April downtime, and instead use the current time period to take care of updates that would have occurred during this break.
- The new run 21 schedule is being prepared now. Experiment spokespeople have been contacted about blackout dates, and a final schedule should be published by mid-to-late March.
- Run 21 will run from April through July, pause for a 5-week summer downtime, and restart in September. Some experiments will be bumped to run 22 but will be prioritized within the run.
- For the fiscal year 22-23, LCLS will be in use for less than the planned number of hours, due to the ~3 month period of enforced downtime.
- Accident Investigation Board from the DOE has completed its investigation, but the findings have yet to be sent to SLAC leadership.
    - **Question**: Will the report and findings be shared with users?
    - **Answer**: It can be, but is expected to primarily address issues internal to SLAC, such as steps involved in isolating electrical equipment, rather than issues pertaining to users.
    - Greatest impact on user experience is expected to be the addition of pre-job briefings before beamtimes, which are designed to ensure that all team members are fully aware of the hazards and everyone is ready to proceed.

Plan for Run 22:

- The timing for Run 22 will depend on the restart time of LCLS over the coming weeks, but will certainly be in FY2024. Based on the recommendations of the UEC at the last meeting, the deadline for proposals has been moved to the end of March (3/28), rather than the previous February deadline.
- There will be a town hall on March 7th to discuss further details about the upcoming run. Members of the UEC are encouraged to attend.
- Soft X-ray experiments (TMO, ChemRIXS) will be operating using LCLS-II beam

Project Updates:

- The first cryo modules for LCLS-II-HE have been received, with excellent performance being demonstrated at the partner labs (J-Lab, Fermilab).

- MEC Upgrade is also underway, SLAC has received funding to explore moving long-pulse laser from visible (green) to UV wavelengths, and from kilojoule to multi-kilojoule energy.
- LCLS II has completed installation, and is at the commissioning stage, currently on hold awaiting CoHE reactivation. In the past year, we have successfully cooled the superconducting Linac to 2 K, and observed no loss for the cryo-module performance following the complex installation. Currently we observe 3.5 GeV at 1 kHz performance at the high Q_0 linac, and will ramp to compressed beam performance and lasing over the coming weeks. There has been an overall nine-month delay since the initial predicted first light, including the latest shutdown. Nonetheless, it is expected that the accelerator restarts in mid-March, ramping up until April, at which point the beam moves to the undulators, expecting beam that meets performance thresholds by June.
  Following this, it is expected that we will soon achieve 100 kHz repetition rates and will be able to continue to increase the average power, consistent with the priority needs of the user science program. Currently the limitation is average power. Decisions about how to prioritize rep. rate vs. power vs different performance modes will depend on the experiment.

  Question: Have there been studies performed regarding stability of optical elements?
  Answer: Currently the heat load of mirrors is sufficient to perform without cooling at 2-20 W levels, but we are adding a cooling system to all mirrors to allow future ramping to >100W.
  Q: When will x-rays get to the end stations?
  A: Goal is to have beam at front end enclosures by May. Subsequently, the beam will be sent to TMO and then to ChemRIXS.
  Q: Do you foresee adapting repetition rate of the laser on a run-by-run basis, depending on specific experimental parameters?
  A: Yes, once a rep. rate has been commissioned, changing for a specific experiment will not be difficult.
  Q: Are we in communication with EU XFEL to learn from their best practices?
  A: Yes, there has been much back and forth between their teams handling accelerators, beam transport, lasers, and many other aspects of the facility. In September there is a scheduled meeting across all FELs to discuss challenges.

SLAC Director's Search:

The UEC chair reported that a subset of the UEC had met with Kelly Gaffney to relay comments discussed in previous meeting, specifically a desire for a Director who is engaged with users and pushes for an inclusive environment. Mike Dunne also highlighted the fact that the job description for the lab director was officially published.

Preparation for Users' Meeting

The UEC Vice chair shared the plans for the User's meeting, which will be held in the last week of September. The current plan is to hold the meeting in person, barring any unforeseen public health developments. We discussed the possibility of providing virtual option to attendees, but plan to have all speakers on site, and hold the poster session in person as well.

There is great interest in holding workshops and tutorials that encourage new users, either as interactive data processing workshops, or highlighting the early science results from new instruments. We also discussed possibly holding joint sessions with other facilities, for instance

taking advantage of experiments to study coherence taking place at the Advanced Photon Source or Brookhaven National Lab.

There was a discussion of the possibility of offering reduced rates to increase access to the meeting. There was agreement that students should be offered a reduced registration fee, but unclear if it would be possible or desirable to offer reduced rates for less well-resourced institutions. A possible compromise would be to offer option to attend the users' meeting virtually for a smaller registration fee.

New Modes of Operation:

Continuing the discussion from a prior UEC meeting the UEC chair raised the question of whether to revisit the current mode of user operation at LCLS (12-hour shifts, for day and night). Paul suggested discussing this with Sébastien Boutet and Chris Kupitz, particularly to ask if there are existing metrics to understand how well current allocation/standard configuration serves instruments and users. If we did move to a 24-hour model, as done at other XFEL instruments, it would need to be determined whether it would be possible to allow users to run with minimal staff support.

There was also discussion regarding the question of access, particularly for new users. Beamtimes currently are often scheduled for 5 shifts per run, with consideration for balancing the number of groups able to participate, the likelihood of being able to obtain successful results, and flexibility of users' schedules. The value of contingency shifts, and data set collection, where groups can submit short (1-2 shift) proposals, or users with existing beamtime can request an additional shift to complete a largely successful data collection, were discussed.

In many of these cases, funding and staff availability are the limiting factors. With LCLS I/II running concurrently, this will highlight this limitation, and LCLS and SLAC must determine how to best support staff while taking advantage of having two independent light sources.

Next Steps:

The UEC should meet with Sébastien Boutet and Proposal Review Panel Chairs to discuss the value and feasibility of any changes.