



Dear Colleagues:

We would like to present to you with the second LCLS Users' Newsletter. The newsletter will be published periodically to bring you updates from LCLS. Since Issue 1, many new exciting things have happened at LCLS, amongst others:

- In March 2009, Zoe van Hoover joined the LCLS as the Experimental Facilities Division Safety Officer.
- On April 10, 2009, first lasing of LCLS in saturation at 0.15 nm wavelength was observed.
- In April 2009 a very successful workshop on studies of matter in extreme conditions was held at LCLS.
- The 2nd LCLS call for proposals closed on May 15, 2009; 62 proposals for experiments for the AMO and the SXR beamlines were received.
- In early June, we announced that Joachim Stohr was appointed as the LCLS Director as of July 1, 2009.
- Christoph Bostedt, from Technical University of Berlin, Germany, joined LCLS as Instrument Scientist in mid June. Christoph will be working with John Bozek at the AMO instrument.
- In June 2009 the first group of scientists and technical staff moved to offices closer to the Near Experiment Hall (NEH).
- The LCLS Proposal Review Panel met in late July 2009.
- Commissioning of the AMO beamline and instrument with beam will start in August, and first user experiments are planned for Fall 2009.
- The long awaited LCLS Users' Administration website was launched last month (<http://www-ssrl.slac.stanford.edu/lcls/users/>).

With best regards,
Jochen Schneider

Update from the LCLS Users' Organization Executive Committee (LCLS UOEC)

The committee met on May 6, 2009 (minutes are available at <http://www-ssrl.slac.stanford.edu/lcls/users/lclsuo.html>). A meeting was held on July 8, 2009. The next meeting will be held in mid August.

We are seeking nominations for the LCLS UOEC, and we encourage users to volunteer or nominate colleagues in the areas of AMO, SXR, XPP, and XCS. Submit nominations by September 29th. The election will be held in early October, and results will be announced at the October 21st LCLS UOEC meeting, http://www-conf.slac.stanford.edu/ssrl-lcls/2009/LCLS_UOECelection.asp.

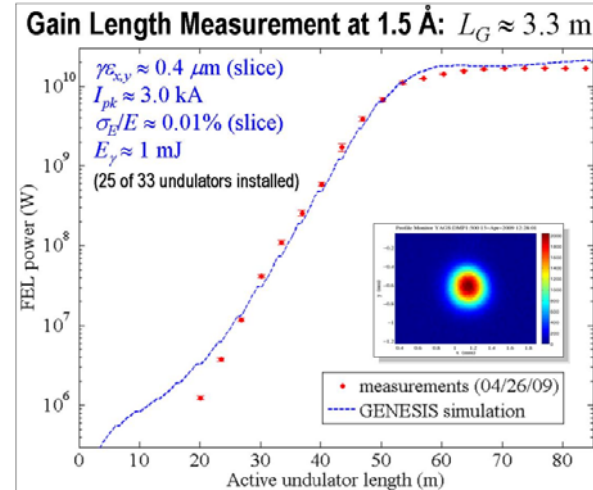
Commissioning News

The LCLS achieved SASE FEL saturation at a fundamental wavelength of 1.5 Angstroms on April 14, 2009. First 1.5-Angstrom lasing was accomplished on April 10th, immediately upon transporting the electron beam through the undulator, and SASE saturation was observed only 4 days later. This was accomplished with only 25 of 33 undulator magnets installed.

The figure shows the measured FEL power (red points) at 1.5 Angstroms made by kicking the beam after each undulator sequentially. The measured gain length is 3.3 m and a Genesis simulation (blue curve) is overlaid, with electron beam parameters listed (peak current is measured after full compression and slice emittance is measured in the injector). The measured X-ray pulse energy has since been as high as 2.5 mJ, which already exceeds the design level. The x-ray beam spot image is taken from a YAG screen located 50 meters downstream of the end of the undulator.

More information is available in a 2009 Particle Accelerator Conference publication at:

<http://www-srsl.slac.stanford.edu/lcls/commissioning/documents/th3pbi01.pdf>



June 30, 2009. FEL X-rays were transported onto the direct imager located in the Front-End Enclosure (FEE) for the first time. The high accuracy of the FEE system alignment was confirmed with no major difficulties in beam transport.

July 15, 2009. X-rays were taken through the K-monochromator and observed on the direct imager, precisely confirming the FEL wavelength of 1.5 Angstroms at 13.64 GeV.

LCLS Featured News and Articles

LCLS experienced many changes during the last three months, one of the most important was the launch of the new LCLS users' [website](#) which we hope will serve as an informative resource to the user community.

On April 21, 2009, SLAC announced that [the world's brightest X-ray source](#) had sprung d to life. "This milestone establishes proof-of-concept for this incredible machine, the first of its kind," said SLAC Director Persis Drell. "The LCLS team overcame unprecedented technical challenges to make this happen, and their work will enable frontier research in a host of fields. For some disciplines, this tool will be as important to the future as the microscope has been to the past." Even in these initial stages of operation, the LCLS X-ray beam is brighter than any other human-made source of short-pulse, hard X-rays. Initial tests produced laser light with a wavelength of 1.5 Angstroms, or 0.15 nanometers—the shortest-wavelength, highest-energy X-rays ever created by any laser. To generate that light, the team had to align the electron beam with extreme precision. The beam cannot deviate from a straight line by more than about 5 micrometers per 5 meters—an astounding feat of engineering." Read more <http://home.slac.stanford.edu/pressreleases/2009/2090421.htm>

April 24, 2009. John Galayda, Director of LCLS Construction provided insights on the construction project <http://today.slac.stanford.edu/feature/2009/dir-20090424.asp>

May 26, 2009. Where the LCLS Ends: The CXI Instrument. The [Coherent X-ray Imaging instrument](#), the fourth scientific instrument to be installed at the LCLS, will view single objects smaller than a micron or one millionth of a meter—*tiny*. But even better than that, it may be the first X-ray instrument ever to do so for individual biological molecules when it comes online in 2011. Read more <http://today.slac.stanford.edu/feature/2009/lcls-instruments-cxi.asp>.

June 12, 2009. SLAC Director Persis Drell, wrote an article featuring [LCLS Users](#), entitled "From the Director: The LCLS Users are Coming," read more; <http://today.slac.stanford.edu/feature/2009/dir-20090612.asp>

June 26, 2009. Steven Chu, Secretary of Energy Visited SLAC. Speaking to a crowd of more than 700, Secretary of Energy Steven Chu urged researchers to confront what he called "the energy challenge." Read More at <http://today.slac.stanford.edu/feature/2009/chu-20090626.asp>

Meet LCLS Scientists and Staff

Christoph Bostedt, AMO Instrument Scientist. Christoph Bostedt joined the LCLS AMO scientific group in mid June. Christoph's primary responsibility will be to support the AMO experiments and the CAMP collaboration as it prepares to conduct experiments in November and December 2009. Prior to coming to LCLS, Christoph was a Senior Scientist at the Technical University Berlin, where he worked on non-linear effects in clusters induced by intense soft x-ray pulses.

Zoe Van Hoover, XFD Safety Officer. Zoe Van Hoover, joined the LCLS as the Experimental Facilities Division Safety Officer (XFDSO) in March 2009. Prior to starting work as the XFDSO, she worked in the SLAC accelerator control room, as an Engineering Operator in Charge. In her work in the accelerator control room, Zoe participated in the commissioning phase operation of the LCLS injector and undulator hall. Zoe has a bachelors' degree in physics from Reed College.

Deadline, Events and Updates

- **July 29-31, 2009.** Science Drivers for Hard X-ray Upgrades to LCLS Workshop. See details and registration <http://www-conf.slac.stanford.edu/hardxray/>
- **October 1, 2009.** Deadline for 3rd LCLS Call for Proposals for Soft X-Rays at the AMO, SXR, and XPP stations. Proposal submission site will be available as of August 1, 2009. (<http://www-ssrl.slac.stanford.edu/lcls/users/proposals.html>)
- **October 18-21, 2009.** The joint LCLS/SSRL User Meeting. Plan to attend to hear updates about each of the LCLS instruments as well as learn about experiments and experiences from the first users scheduled at the AMO station. See details and registration <http://www-conf.slac.stanford.edu/ssrl-lcls/2008/2009.asp>
- **October 21, 2009.** Concurrent workshops include SXR and XPP Experiment Preparation. <http://www-conf.slac.stanford.edu/ssrl-lcls/2009/workshops.asp>

Safety Corner by [Zoe Van Hoover](#)

I would like to welcome you to this new section of our newsletter. In each edition, I will include information about safety processes at LCLS. User and worker safety is of the utmost importance to SLAC staff and management. In this first message, and in preparation for the arrival of the first LCLS users this fall, I would like to remind you that each spokesperson for an experiment that has been allocated beam time has been contacted and asked to fill out a Safety Questionnaire. Identifying hazards is the first step in the Integrated Safety and Environmental Management System (ISEMS) process which SLAC uses to ensure user and worker safety. Based on your responses to this questionnaire, I will work with the AMO instrument scientists to identify and implement appropriate hazard controls for your planned experimental work.

Each user who will be coming to the LCLS site this fall will be contacted with information regarding the safety training courses which will be required for you to do work here. Every user will be required to take three courses which may be completed on line, prior to your arrival on site. In addition to these computer based courses, there will be on site safety orientation and training provided when you arrive at LCLS. A few users may be contacted regarding additional training requirements for specialized hazardous work that they plan to perform during their LCLS visit.