Research Associate – High Average Power Laser Amplifier Development
Lasers in LCLS Science Department, Laser Science & Technology Division
Linac Coherent Light Source (LCLS)
SLAC National Accelerator Laboratory

SLAC National Accelerator Laboratory is a multipurpose laboratory for astrophysics, photon science, accelerator and particle physics research, operated by Stanford University for the US Department of Energy. The Linac Coherent Light Source (LCLS) is the world's first hard X-ray free electron laser (FEL) and operates as a user facility for a global community of scientists, providing ultrashort, ultra-bright pulses of X-rays to six experimental instruments focused on specific areas of science. The next generation free electron laser at SLAC, LCLS-II, will be operated at much higher repetition rate compared to LCLS-I using superconducting LINAC technology. Initial operation at LCLS-II is planned at 100 kHz, with possible upgrade to 1 MHz. While a commercial solution is available for the LCLS-II gun laser, high energy pump/probe laser amplifiers operating at these repetition rates are not currently commercially available. We plan to use OPCPA (Optical Parametric Chirped-Pulse Amplifier) techniques to develop a mJ-level R&D laser amplifier system. This amplifier will be the basis for pump/probe laser amplifier systems at LCLS-II.

The Research Associate is expected to work on the development of this high average power laser amplifier system. The development comprises performing tests on OPCPA pumped with the fundamental (1030 nm) and with the second harmonic (515 nm) of a high average power Yb:YAG amplifier system. The amplifier will have to operate with extreme reliability during FEL user runs. Development of automation and control system for remote control of the amplifier is essential. Operation of this amplifier at LCLS-II will be the next step after successful conclusion of the development project. Conducting independent scientific research on laser development or also other fields of science using the LCLS FEL is strongly encouraged.

The position is a two-year, fixed-term position for a recent graduate. The position will report to the Department Head for the Lasers in LCLS Science Department within the Laser Science and Technology Division.

Specific Responsibilities (including but not limited to)
- Assembly and testing of a high power OPCPA pump amplifier system based on fiber and Yb:YAG amplifiers.
- Development and testing OPCPA pumped at 515 nm (VIS/NIR OPCPA) and at 1030 nm (NIR OPCPA).
- Development of pulse broadening and compression techniques for high power beams.
- Modeling of high power OPCPA with FEA tools and OPCPA codes.
- Work with laser safety and controls groups to develop a robust control and protection system for the amplifier system.
- Participate in the planning of the laboratory and X-ray hutch assembly for LCLS-II.
- Develop robust diagnostics for the laser system.
- Develop high power harmonic sources to be used at LCLS-II for experiments.
- Conduct and publish original scientific research.

Qualifications
- Ph.D. in physical sciences, engineering, or related field.
- Experience designing, building, and maintaining ultrafast chirped pulse amplifier (CPA) systems and their associated pump sources, wavelength extension devices, and diagnostics.
- Experience integrating ultrafast laser systems into complex scientific experiments.
- Demonstrated record of publications throughout career and notable achievements in research.
- Demonstrated organizational skills and ability to multi-task and complete assignments.
- Ability to work independently and to collaborate in a research and development team.
- Excellent communication and writing skills to prepare technical and scientific documentation, proposals and presentations in support of conferences, meetings and reviews.

Desired Skills
- Experience developing high power laser systems
- Experience with fiber laser amplifiers
- Experience with OPCPA systems
- Experience with harmonic generation in crystals and gases
- Experience with DOE funded national lab research
- Experience with user facility operations and research

How to apply
Interested candidate should submit the following to Franz Tavella
tavella@slac.stanford.edu and to Alan Fry alanfry@slac.stanford.edu

- Curriculum Vitae
- Selected bibliography that highlights personal contributions
- Brief statement of research interest