Postdoctoral opportunities at the Stanford PULSE Institute

The Stanford PULSE Institute announces its first biannual call seeking highly motivated postdoctoral researchers who are interested in cutting edge-research of ultrafast phenomena using advanced techniques such as X-ray free electron lasers, ultrafast electron sources, laser-based methods such as high-order harmonic generation, and quantum chemical simulation methods.

Stanford PULSE Institute is located at SLAC National Accelerator Laboratory, and is a leading interdisciplinary research center. It focuses on the development of advanced techniques in ultrafast science, including the use of world's first X-ray free electron laser, the Linac Coherent Light Source (LCLS). We investigate the fundamental light-matter interaction processes including those leading to the energy conversion in materials and molecules.

Our successful candidates will work closely with PULSE faculty members, senior scientists, and researchers to develop and execute research projects that align with Stanford's and SLAC's mission and goals. We specifically seek applicants who are interested in the **research directions listed below**. As part of our commitment to creating a more diverse and inclusive environment, we are actively seeking applicants from underrepresented backgrounds, including women, people of color, individuals with disabilities, and members of the LGBTQ+ community, and those who have demonstrated a commitment to advancing equity and inclusion in their research and professional activities.

The successful candidates will receive competitive compensation. The minimum Stanford postdoc salary levels can be found here. Additional financial support for relocation is available upon request. Applicants can submit their application materials through this link. Applications will be reviewed starting August 1st and on a rolling basis until the positions are filled.

We seek candidates with the following qualifications:

- A PhD in a relevant field, such as physics, chemistry, materials science, or a related discipline.
- Demonstrated expertise in relevant research areas (see below).
- Strong interpersonal and communication skills.
- Commitment to advancing diversity, equity, and inclusion in research and professional activities.
- Commitment to working in a collaborative and interdisciplinary research environment.

Specific research directions we seek candidates for:

1. We anticipate multiple postdoctoral opportunities in the area of attosecond science and strong-field physics in condensed matter systems including 2D materials. Our projects include high-harmonic spectroscopy of quantum materials such as monolayer 2D crystals, their moiré patterns and other heterostructures. Candidates should have

expertise in ultrafast optics, attosecond pulse generation, or in related ultrafast spectroscopic techniques. PIs Shambhu Ghimire, David Reis, and Tony Heinz (PULSE UCS-UEDES)

2. We anticipate an opportunity in ultrafast laser and x-ray spectroscopy of catalytic molecular processes on nanoparticles. The candidate should have expertise in one or more of the following areas: Ultrafast laser spectroscopy, ultrafast nanophotonics, X-ray science, free electron laser science. (PULSE-UCS-UNA) PI: Matthias Kling.
3. We anticipate multiple opportunities in ultrafast laser and x-ray science at LCLS. The candidate should have expertise in one or more of the following areas: x-ray scattering, non-resonant and resonant inelastic x-ray scattering, x-ray optics and instrumentation, ultrafast x-ray science, Raman scattering, nonlinear optics, free electron laser science. PIs: Matthias Kling, James Cryan, Thomas Wolf
4. Experimental strong-field quantum electrodynamics (QED) at the Schwinger scale in the collision between the ultrarelativistic electron beam on the FACET-II facility with an intense laser beam. The fundamental processes studied are in the strong-field limit of nonlinear Compton scattering and electron-positron pair production in the tunneling regime. The candidate should have expertise in one or more of the following areas: High intensity laser physics, accelerator physics, high energy particle detection, advanced electron-beam and laser diagnostics and plasma physics. PIs: Sebastian Meuren, David Reis, Phil Bucksbaum (PULSE E-320 Collaboration)
5. We anticipate multiple opportunities for post-docs for studying nonequilibrium dynamics of quantum materials using ultrafast optical and x-ray pulses from free electron lasers. The candidate should have expertise in one or more of the following areas: x-ray scattering, non-resonant and resonant inelastic x-ray scattering, x-ray optics and instrumentation, ultrafast x-ray science, Raman scattering, nonlinear optics, free electron laser science ideally as applied to current problems in quantum materials. In addition, experience in time and/or energy-resolved synchrotron- and free-electron-laser- based x-ray scattering, or a strong background in laser and x-ray optics and strongly correlated electron materials would be advantageous. PIs David Reis and Mariano Trigo
6. Postdoctoral opportunities in solution-phase and heterogeneous photochemistry and ultrafast x-ray methodology are available in the Solution Phase Chemistry Group in PULSE. Our group focuses on understanding, with the goal of controlling, electronic excited state dynamics of transition metal coordination complexes and other materials relevant to solar energy conversion. Open projects will focus on the use of time-resolved x-ray spectroscopy methods to investigate excited state relaxation pathways and interfacial charge transfer of molecular and heterogeneous photocatalysts, respectively. Candidates should have expertise in x-ray spectroscopy methods (steady-state or time-resolved) or ultrafast optical methods, and excited state dynamics of molecules or materials. PIs: Amy Cordones-Hahn, Kelly Gaffney.