

# EMILY THIERSTEIN

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## RESEARCH INTERESTS

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Physics of ultrafast light-induced molecular dynamics.

## EDUCATION

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### **Stanford University**

Applied Physics; PhD program  
Stanford, CA

*2022 - present*

### **California Institute of Technology**

Physics; Bachelor of Science; Degree Conferral 2022  
Pasadena, CA

*2017 - 2022*

*GPA: 3.7*

### **Stanford University's Online High School**

Stanford, CA

*Class of 2017*

## RESEARCH APPOINTMENTS

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### **Graduate Student**

Ultrafast molecular spectroscopy with XFELs  
Bucksbaum group, Attosecond Science Group  
Stanford University

*2022 - present*

### **Research Intern**

Attosecond Science Group  
SLAC National Accelerator Laboratory

*Feb. 2022 - Dec. 2023*

### **Experimental Senior Thesis**

Simulation and Implementation of a Square Cross-Section Electromagnet for Precision Measurements  
Hutzler Lab  
California Institute of Technology

*2020 - 2022*

### **Samuel P. and Frances Krown Summer Undergraduate Research Fellow**

Simulation of High Energy Auger-Meitner Electron Trajectories in a Dedicated Magnetic Bottle Electron Spectrometer.

Bucksbaum Group

Stanford University, SLAC National Accelerator Laboratory

*June - September 2021*

### **The Aerospace Corporation Summer Undergraduate Research Fellow**

Construction and wavelength tuning of a near ultra-violet laser for application in precision measurement

Hutzler Lab

California Institute of Technology

*March - September 2019*

### **Summer Undergraduate Research Fellow**

Design and Implementation of a Supersonic Molecular Beam Source

Hutzler Lab

California Institute of Technology

*June - September 2018*

## TALKS GIVEN

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- **Coincident electron-ion spectroscopy for fragmentation channel-resolved X-ray photoelectron spectroscopy** June 2024  
Division of Atomic Molecular and Optical Physics (DAMOP) annual meeting  
American Physical Society
- **Simulation of Auger-Meitner Electron Trajectories in a Magnetic Bottle** October 2021  
Summer Undergraduate Research Fellowship Seminar Day 2021  
California Institute of Technology, Stanford Linear Accelerator Center
- **Creation and Wavelength Tuning of a Near Ultra-Violet Laser for Application in Precision Measurement** October 2019  
Summer Undergraduate Research Fellowship Seminar Day 2019  
The Aerospace Corporation
- **Design and Implementation of a Supersonic Molecular Beam Source** October 2018  
Summer Undergraduate Research Fellowship Seminar Day 2018  
California Institute of Technology

## CONFERENCES ATTENDED

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- **APS Division of Atomic, Molecular, and Optical Physics annual Meeting** June 2024  
Fort Worth, TX
- **Ultrafast X-ray Summer School** June 2022  
SLAC National Accelerator Laboratory
- **Ultrafast Dynamic Imaging of Matter Conference** September 2021  
University of Potsdam
- **Ultrafast X-ray Summer School** June 2021  
Center for Free-Electron Laser Science

## RELEVANT COURSEWORK

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### Stanford University

- Photons and Waves 1 term
- Statistical Mechanics 1 term
- Physics of Energy 1 term
- Introduction to FELs 1 term
- Quantum Mechanics II 1 term
- X-ray Scattering Laboratory 1 term

### California Institute of Technology

- Calculus of one and several variables 2 terms
- Linear algebra 1 term
- Differential equations 1 term
- Probability and statistics 1 term
- Complex analysis 2 terms
- Computational physics laboratory 3 terms
- Physics of waves 1 term
- Advanced classical mechanics 2 terms
- Quantum mechanics 1 term
- Advanced quantum mechanics 2 terms
- Advanced statistical mechanics 2 terms
- Group theory for physics applications 1 term
- Order of magnitude physics 1 term
- Beginning, intermediate, and advanced physics laboratory courses 5 terms

- Electronic circuits laboratory

1 term

## PROGRAMMING SKILLS

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### Spectral-domain Ghost Imaging

#### SIMION

Numeric and analytic simulation and analysis of trajectories of ions and electrons through electric and magnetic fields, gravitational interaction of massive bodies, and complex magnetic fields in Python, SIMION, and Julia

#### Programming Languages

Python, Matlab, Julia, Mathematica, Lua, LabVIEW

## OTHER ASSOCIATIONS

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### American Physical Society

Member

2019 - Present

### Caltech Physics Club

Co-Founder

November 2019

Leadership Team

January 2019 - June 2021

### Propulsion And Rocketry Systems Engineering at Caltech

Aeronautics Team

October 2017 - June 2018

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- [1] Oliver Alexander et al. “Attosecond impulsive stimulated X-ray Raman scattering in liquid water”. In: *Science Advances* 10.39 (Sept. 2024). Publisher: American Association for the Advancement of Science, eadp0841. DOI: 10.1126/sciadv.adp0841.
  - [2] Kurtis Borne et al. “Design and performance of a magnetic bottle electron spectrometer for high-energy photoelectron spectroscopy”. In: *Review of Scientific Instruments* 95.12 (Dec. 2024), p. 125110. ISSN: 0034-6748. DOI: 10.1063/5.0223334.
  - [3] Paris Franz et al. “Terawatt-scale attosecond X-ray pulses from a cascaded superradiant free-electron laser”. en. In: *Nature Photonics* 18.7 (July 2024). Publisher: Nature Publishing Group, pp. 698–703. ISSN: 1749-4893. DOI: 10.1038/s41566-024-01427-w.
  - [4] Zhaoheng Guo et al. “Experimental demonstration of attosecond pump–probe spectroscopy with an X-ray free-electron laser”. en. In: *Nature Photonics* 18.7 (July 2024). Publisher: Nature Publishing Group, pp. 691–697. ISSN: 1749-4893. DOI: 10.1038/s41566-024-01419-w.
  - [5] Jun Wang et al. “Probing Electronic Coherence between Core-Level Vacancies at Different Atomic Sites”. In: *Physical Review X* 15.1 (Jan. 2025). Publisher: American Physical Society, p. 011008. DOI: 10.1103/PhysRevX.15.011008.