

Philip Jacobson

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EDUCATION	Cornell University , Ithaca, NY <i>Bachelor of Arts</i> , Physics GPA: 3.99/4.00 <i>Magna Cum Laude</i>	May 2019
	University of California, Berkeley , Berkeley, CA <i>Masters of Science</i> , Electrical Engineering and Computer Science	Expected May 2021
	University of California, Berkeley , Berkeley, CA <i>PhD</i> , Electrical Engineering and Computer Science	Expected May 2024
HONORS AND AWARDS	Phi Beta Kappa	Spring 2019
	Cornell Howard Milstein Scholarship	Spring 2019
	Cornell Howard Milstein Book Award	Spring 2019
	Dean's List	Fall 2015 - Fall 2018
	Eagle Scout	Fall 2014
RESEARCH EXPERIENCE	Graduate Student Researcher	EECS Department
	August 2019 - Present	University of California, Berkeley
	Working in Prof. Ming Wu's optoelectronics group in UC Berkeley's department of Electrical Engineering and Computer Science.	
	<i>Photonic Reservoir Computing</i>	
	Modeling, simulating, and building a reservoir computing (RC) based neural network implemented on high-speed photonic hardware.	
	Research Assistant	Department of Physics
	January 2018 - Present	Cornell University
	Did research in Cornell's Laboratory of Atomic and Solid-State Physics and in collaboration with the Cornell High-Energy Synchrotron Source (CHESS) under Prof. Carl Franck and Dr. Stanislav Stoupin:	
	<i>Intra-atomic Bremsstrahlung (IAB)</i>	
	Performed experimental analysis to characterize the spectrum of X-rays (IAB) radiated from an inner-shell photoelectron. Helped in the design of experiments performed at CHESS to examine X-ray scattering off of atomically-thin Cu films. Wrote software to analyze billions of detector hits in search of the IAB signal and to characterize background and extraneous scattering using coincidence detection methods. Achieved results in several times closer agreement to theory than previous experiments.	
	<i>Diamond Thermal Expansion</i>	
	Created a semi-empirical model based on the Einstein model of phonon dispersion for the thermal expansion of diamond. Improved upon previous models through use of the best-available low temperature data, creating a model with high fidelity in a broad temperature range from 0-3000 K. Created model through use of linear least-square's fitting in Python.	
	<i>Charge Transfer Dynamics (CTD)</i>	
	Expanding upon coincidence technology developed in search for IAB to study charge transfer excitations in metal-oxides using Nonresonant Inelastic X-ray Scattering (NIXS). Experiment was performed at Argonne National Lab's Advanced Photon Source (APS), aided in the analysis of several gigabytes of X-ray data, using the previous developed "fluorescence tag" method.	

Research Assistant

February 2016 - December 2017

Worked on several projects in Cornell's experimental cosmology group under Professor Mike Niemack:

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Fourier Transform Spectroscopy for Silicon Optics

Worked in collaboration with a graduate student to design and build a Fourier Transform Spectrometer (FTS) for measuring anti-reflection coatings on Si lenses for the next generation of Cosmic Microwave Background (CMB) telescopes. Designed and modeled various optical and mechanical components of the FTS, wrote control software for the system, and performed initial testing on various Si wafers.

Optimization of Telescope Optics Tube Layouts

Designed and optimized optical lens configurations for the next generation of CMB telescopes. Ran optimization routines to design lens layouts with corrections for spherical aberrations and an ideal beam shape for coupling to detector arrays. Wrote software to determine effect of asymmetry from Lyot stop placement, modeled using principles of Gaussian Beam optics.

PUBLICATIONS **P. Jacobson**, S. Stoupin, "Thermal Expansion Coefficient of Diamond in a Wide Temperature Range", *Diamond and Related Materials*, August 2019.

P. Jacobson, A. Rasovic, A. Campello, J. Kuan, C. Goddard, S. Stoupin, J.Y. Ko, Y. Chen, J. Oh, G. Gardner, C. Franck "Continued Exploration of Intra-atomic Bremsstrahlung", in prep.

**RESEARCH
TALKS**

P. Jacobson, A. Rasovic, S. Jia, Y. Li, C. Franck, "Testing for the Continuous Spectrum of X-Rays Predicted to Accompany the Photoejection of an Atomic Inner Shell Electron" American Physical Society March Meeting, March 2019.

J. Kuan, A. Campello, G. Gardner, J. Oh, **P. Jacobson**, C. Goddard, Y. Chen, C. Franck, "Intra-atomic Bremsstrahlung (IAB) Search at CHESS" NSF Site Visit, March 2018.

P. Jacobson, P. Corlies, B. Koopman, E. Vavagiakis, N. Cothard, P. Gallardo, M. Niemack, "Measuring Silicon Optics with Fourier Transform Spectroscopy", Cornell Undergraduate Astronomy Research Forum, May 2017.

**TEACHING
EXPERIENCE****Undergraduate Teaching Assistant**

August 2016 - May 2018

Taught for Phys 1112: Mechanics and Heat and Phys 2214: Oscillations, Waves, and Quantum Physics. Held office hours and homework help sessions, and assisted in teaching during recitation sections.

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**LEADERSHIP
AND
OUTREACH****Active Citizen**

January 2017 - Present

Encouraging science and community participation for residents of the Hans Bethe House Dormitory. Hosted talks with Cornell professors for students to learn about ongoing research in various fields of physics.

Hans Bethe House
Cornell University

Supervisor

August 2015 - Present

Serving as a supervisor for Robert Purcell Marketplace Eatery, Cornell's largest dining hall. Lead student workers during dinner shifts and facilitate trainings, clean-up, and

Cornell Dining
Cornell University

set-up. Awarded worker of the semester for outstanding service.

Eagle Scout

February 2014 - November 2014

Led a community service project building picnic tables and benches for a local church. Supervised over 20 people throughout the design and construction phases of the project in an effort totaling over 100 man hours.

COMPUTER SKILLS

Languages: Python, Java, MATLAB, HTML, CSS, L^AT_EX

Software: SolidWorks, Zemax OpticStudio, Wolfram Mathematica

Operating Systems: Unix, Linux, Windows

AFFILIATIONS

Society of Physics Students

Cornell Undergraduate Research Board

American Physical Society