# Kailai Wang

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## Education

**Cornell University** Sept. 2020—Expected May 2024

**Majors/Minors:** Physics (Major); Computer Science (Major); Mathematics (Minor)

**GPA:** 3.68/4.00

**Awards:** Dean's List (Fall 2020), (Spring 2021), (Fall 2022), Einhorn Discovery Grant Recipient (Fall 2022), Undergraduate Research Funding Recipient (Fall 2022)

## Publications

- (In Preparation) "Estimators for the analysis of multi-line intensity mapping"
  - Expected submission in June, 2023 in the Astrophysical Journal
- "`LIMpy`: A Semi-analytic Approach to Simulating Multi-line Intensity Maps at Millimetre Wavelengths"
  - Submitted to APJ; https://arxiv.org/abs/2304.06748

## Research Experiences

**Observational Cosmology Research: Line Intensity Mapping** Sept. 2021—Current

*Advisor: Professor Nicholas Battaglia* *Institution: Cornell University*

- Performed Fisher forecast and signal-to-noise calculations for [CII] and [OIII] intensity mappings of the upcoming CCAT-Prime experiment using several estimators: a projected angular power spectrum as a function of redshift, an isotropic 3D power spectrum, and the anisotropic 3D power spectrum with parallel and perpendicular components separated. The power spectra are calculated from halo catalogs generated from N-body simulations, and the noise realization corresponding to white noise is created under the Gaussian approximation. We are currently working on non-isotropic power spectra using realistic noise simulations that will help us prepare for the data analysis pipeline for the CCAT-prime experiment.
- Planned to present at the American Astronomical Society 241th Meeting

**Transient Astronomy Research: Afterglows** Sept. 2022—Current

*Advisor: Professor Anna Ho* *Institution: Cornell University*

- Performed photometry and data analysis using afterglow data from the Palomar 60-inch telescope (P60).

**Gravitational Wave Research: Eccentricity Models** June 2022—August 2022

*Advisors: Prof. Bruce Allen* *Institution: Max Planck Institute for Gravitational Physics*

- Developed an algorithm to generate gravitational waves from models that best match with the numerical relativity data
- Calculate mismatches between eccentric waveform models (TEOBResumS and SEOBNRE) with numerical relativity catalogs (SXS and RIT) to test the accuracy of the eccentric waveform models
- Presented at the Max Planck Institute

**Observational Cosmology Research: Cosmic Microwave Background** Feb. 2021—May 2021

*Advisor: Professor Michael Niemack* *Institution: Cornell University*

- Worked on data analysis and map simulations of the Cosmic Microwave Background
- Performed cosmological analysis on data from the Atacama Cosmology Telescope
- Wrote a report and presented on the topic of the Sunyaev-Zel'dovich effect and its applications to the galaxy clusters detection

## Campus Engagement

**Cornell Undergraduate Teaching Assistant (UTA)** Sept. 2022—Current

- Taught PHYS 2210 (Exploring Experimental Physics) for the Fall 2022 semester, assisted students with their laboratory work
- Taught PHYS 2208 (Fundamentals of Physics II) for the Spring 2023 semester, lead discussion sessions

**Cornell Undergrad Research Board Peer Mentorship Program Mentor** Sept. 2021—Dec. 2021

- Lead and advised 4-8 undergraduate student on how to get involved in research in their field of study
- Lead discussions and participated research networking events

**Cornell Learning Strategy Center Physics Peer Tutor** Jan. 2022—May 2022

- Held weekly paid Physics tutoring sessions for 4 hours per week
- Attended weekly tutoring workshops to improve as a tutor

## Skills

- Programming: Python (numpy, astropy, MCMC), Java, MATLAB, OCaml, LaTeX, working with clusters (supercomputers)
- Bayesian Statistics
- Languages: English (Fluent), Mandarin Chinese (Fluent), Spanish (Beginner)