Yi Guo

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EDUCATION

University of California, San Diego	La Jolla, CA
Ph.D. Physics Physics Excellence Award	Sep 2018 – Expected Jun 2023
University of California, Santa Barbara	Isla Vista, CA
B.S. Physics, Mathematics Academic Honors, Worster Fellowship	Sep 2014 – Jun 2018

SKILLS

Languages and Tools	Python, R, Mathematica, C/C++, Fortran, LaTeX, Pytorch, TensorFlow, Git, Docker
Web Development	JavaScript, HTML, CSS, React, React Native, Firebase, Gradio
Data Science and ML	Data Visualization, Parallel/Distributed Computing, Monte Carlo, Regression Neural Network, Natual Language Processing

EXPERIENCE

University of California San Diego — La Jolla, CA

Teaching Assistant — Oct 2018 – Present

- Computational Physics I / II: N-Body Simulation; Quantum Mechanics Simulation.
- Reviewed as "Excellent" TA by the instructor.

Research Assistent — Dec 2019 – Present

- Developed numerical methods to forecast the sensitivies of the primordial non-gaussianity for future LSS surveys. Innovated to include the kSZ effect and adopt multi-tracer technique, resulting in [Todo] a significant reduction of uncertainty.
- Quantitatively analyzed the constraints on the coupling strength between axions and standard model fermions using tree level quantum field theory and modern cosmology. Adopted Numba to speed up parallel Python by 100X. Work published on *JCAP*.
- Calculated the CMB anisotropy phase shift in a neutrino-dominated universe, confirming the series expansion approximation from the photon-dominated scenario is only off by 5%.

University of California Santa Barbara — Isla Vista, CA

Undergraduate Researcher — Sep 2015 – Jun 2017

- Presented research on gas behavior in galaxy mergers at UCSB undergraduate symposium and Worster symposium with an audience of 200 faculty and students.
- Developed a software package in Python and Fortran that improved the spectrum fitting workflow by 10X. Created C codes and Shell scripts to auto-locate galaxies and measure photometries.

SOFTWARE DEVELOPMENT PROJECTS

Machine Learning Application – AI Voice Assistant — Feb 2023 – Mar 2023

- Developed a voice assistant using Whisper for speech recognition, fine-tuned GPT-J as a language model, and VITS for text-to-speech. Prototyped a demo with Gradio.

Web Application – Personal Task Management System — Apr 2022 – May 2022

- Built a Progressive Web App on Firebase for personal task tracking using React and Material UI. Implemented NoSQL database and OAuth2 login.

PUBLICATIONS

D. Green, **Y. Guo**, J. Han and B. Wallisch, (Forthcoming), "Light Fields during Inflation from Future Galaxy Surveys,"

D. Green, **Y. Guo** and B. Wallisch, "Cosmological implications of axion-matter couplings," In: *JCAP* 02.02, p. 019 (2022) DOI: 10.1088/1475-7516/2022/02/019 arXiv: 2109.12088 [astro-ph.CO].