Keyi Ding

3400 N Charles Street, Baltimore, MD 21218 (667)-910-4739
https://keyiding.github.io/ kding5@jhu.edu

Education

Johns Hopkins University, Baltimore, Maryland Spring 2024

Bachelor of Science in Physics, Computer Science

Minors in Applied Mathematics and Statistics, Mathematics

Cumulative GPA: 3.91/4

Activities: AstroJays Rocketry Club, Society of Physics Students

Publications

1. **Ding, K.**, Schlaufman, K. C., et al., "Accurate, Precise, and Self-consistent Photospheric and Fundamental Stellar Parameters for Solar-type Stars Without the Need for Spectroscopy", *in prep*
2. Schmidt, S. P., Schlaufman, K. C., **Ding, K.**, et al. 2023, "Verification of Gaia DR3 Single-lined Spectroscopic Binary Solutions With Three Transiting Low-mass Secondaries", *Astronomical Journal, 166, 225* astro-ph/2310.07936

Professional Appointments

Undergraduate Research Assistant 2022 - Present

Department of Physics & Astronomy, Johns Hopkins University / Subaru Telescope Prime Focus Spectrograph (PFS) Galactic Archaeology Working Group Baltimore, MD.

Advised by Prof. Rosemary Wyse, Carrie Filion

- Establish a photometry-based machine learning pipeline to distinguish likely member giant stars in target galaxies from foreground Milky Way dwarf stars, for the target selection in the PFS survey of M31 and several dwarf galaxies.
- Model the HSC narrow-band NB515 filter's sensitivity to stellar parameters and chemical abundances with synthetic photometry of spectra in the MaNGA Stellar Library (MaStar).
- Simulate stellar populations in both foreground and target galaxies using theoretical Galactic models and observational data, and construct training sets with MaStar synthetic photometry that represent the stellar populations.
- Train a neural network model to predict membership probabilities and test it with existing dwarf galaxies catalogs.

Undergraduate Research Assistant 2021 - Present

Department of Physics & Astronomy, Johns Hopkins University Baltimore, MD.

Advised by Prof. Kevin Schlaufman, Dr. David Nataf, Dr. Henrique Reggiani

- Test the capability of a novel stellar parameter inference method by fitting MIST isochrones to multi-wavelength photometry, parallax, and 3-D dust maps on a large scale (10k+ stars).
- Verify the precision and accuracy of the photospheric and fundamental stellar parameter inference with solar-type stars in 7 open clusters and the Kepler field in comparison to spectroscopy and asteroseismology (publication 1).
- Employ the stellar parameter inference method to study candidate exoplanet host stars and identify transiting brown dwarfs (publication 2).
- Implement Python scripts to conduct the inference, collect data with ADQL queries, analyze posteriors, and develop parallel computing tools to improve computation efficiency on advanced computing clusters.

Instrument Support Intern 2022 - 2023

Space Telescope Science Institute Baltimore, MD.

Advised by Dr. Louis-Gregory Strolger, Dr. Joleen Carlberg, Dr. Amy Jones, Sean Lockwood

- Write tutorial Jupyter Notebooks for the HST Space Telescope Imaging Spectrograph (STIS) data user community, covering topics including STIS calibration pipeline, spectra extraction, target acquisition, synthetic photometry, and the exposure time calculator (ETC).
- Implement Python scripts to address HST Help Desk questions.
- Standardize the coding format of tutorial notebooks and edit documentation for publication.

Honors and Awards

Provost's Undergraduate Research Award (with a $6000 research grant) 2023
Issued by Hopkins Office of Undergraduate Research for independent research (36 out of 400+ applicants)

IDIES Summer Student Research Fellowship (with a $6000 research grant) 2022
Issued by JHU Institute for Data Intensive Engineering and Science (IDIES) for student-led research in big data or computationally-intensive science (2 Recipients/year)

HopHacks, Second Place 2022
Johns Hopkins based hackathon (Second place out of 30+ teams)

Dean's List 2020 - 2023
GPA above 3.5/4 for 6/6 semesters

Conferences and Talks

Development of Machine Learning Techniques to Distinguish Giant Stars from Dwarf Stars Using Only Photometry January 2024 (upcoming)
243rd AAS Meeting, American Astronomical Society (AAS), New Orleans, LA

Development of Machine Learning Techniques to Distinguish Giant Stars from Dwarf Stars and Application to the Andromeda Galaxy and the Milky Way October 2023
DREAMS Symposium, Johns Hopkins University, Baltimore, MD

Accurate and Precise Photospheric Stellar Parameters from Rubin ugriz Photometry August 2023
Rubin Project and Community Workshop (PCW), LSST Cooperation, Tucson, AZ

Updates on the STIS Jupyter Notebooks Repository April 2023
The Telescope and Instruments Performance Summary (TIPS), Space Telescope Science Institute, Baltimore, MD

STIS Jupyter Notebooks January 2023
241st AAS Meeting, American Astronomical Society (AAS), Seattle, WA

Laying the Foundation for Large Scale Stellar Parameter Inference in the Field of Exoplanets October 2022
IDIES Annual Symposium, JHU Institute for Data Intensive Engineering and Science (IDIES), Baltimore, MD

Determining Stellar Parameters of Stars in Open Clusters with Isochrones Inference August 2022
CARE Undergraduate Research Talks, JHU Center for Astrophysics Research Experience, Baltimore, MD

Teaching Experience

AS.171.107 General Physics for Physical Science Majors (Active Learning) I Fall 2023
Learning Assistant, with Prof. Rosemary Wyse
(Active learning version of Physics 101 on introductory mechanics for physical science majors)

AS.171.108 General Physics for Physical Science Majors (Active Learning) II Spring 2023
Learning Assistant, with Prof. Petar Maksimovic
(Active learning version of Physics 102 on introductory electricity and magnetism for physical science majors)

AS.171.101 General Physics: Physical Science Major I Fall 2022
Learning Assistant, with Prof. Nadia Zakamska
(introductory mechanics for physical science majors)

Technical Skills

- **Programming Languages and Software Tools:** Python, Java, SQL/ADQL, R, MATLAB, C/C++, JavaScript, HTML, Git, LaTeX, MarkDown, Bash, SLURM, Mathematica
- **Quantitative Research:** Machine Learning, Mathematical Modeling, Bayesian Statistics, Relational Databases, Multi-core Parallelism, Distributed Computing (Spark, Dask)
- **Communication:** Chinese (Native), English (TOEFL 114/120)