

BEN SAPPEY

bensappey@gmail.com
bsappey@ucsd.edu

 [ben-sappey-astro](#)
 [0000-0003-1399-3593](#)

EDUCATION

University of California, San Diego

- Ph.D. Physics, Candidate Aug. 2020 – Present
- GPA: 3.79

Occidental College, Los Angeles, CA

- B.A. Physics with an emphasis in Chemistry; Minor: Chemistry May 2019
- GPA: 3.61

RESEARCH INTERESTS

- Exoplanet Detection, Characterization of Atmospheres
- Exoplanet formation pathways
- Optical Laser Combs, Fabry-Perot Cavity analysis, Instrumentation

RESEARCH AND WORK EXPERIENCE

HISPEC Science/Instrumentation Team, Graduate Student

2022 – Present

- Helped lead team to determine wavelength calibrations sources for high-resolution NIR spectrograph
- Conducted experiments in lab and at telescopes to validate design decisions
- Ran simulations of absorption gas cell to calibrate spectrograph absolutely

KPIC Science/Instrumentation Team, Graduate Student

2021 – Present

- Characterized calibration sequence of KPIC instrument
- Member of 15+ observation/engineering runs using KPIC on-sky
- Documented data reduction sequence
- Assisted development of data reduction pipeline adding capability to analyze multiple datasets simultaneously

Stable Laser Systems, Physicist

Aug. 2019 – July 2020

- Investigated the stability of Nd:YAG lasers locked to a Fabry-Perot cavity using the Pound-Dreaver-Hall method in reference to a second laser locked to the saturated absorption of iodine at 532 nm. Laser frequency drift was measured to sub-kilohertz levels
- Performed research with an “astro-etalon” meant to analyze starlight
- Reference: Mark Notcutt: mark@stablelasers.com

Jet Propulsion Laboratory, Summer Research Program

June-Aug. 2018

- Aided in research of Centaurs (comet-type bodies with unstable orbits between 5-30 AU) for JPL/SWRI led NASA Discovery Program Proposal under Lead Art Chmielewski
- Investigated CubeSat-based augmentation of a proposal designed to study Centaurs
- Reference: Artur B. Chmielewski, artur.b.chmielewski@jpl.nasa.gov

Jet Propulsion Laboratory, JVS RP

Feb.-May 2018

- Objective: Implement feasible atmospheric/meteorological measurement techniques on Mars and other planets by developing a program to retrieve atmospheric characteristics from observational data including methane and carbon dioxide concentrations.
- Reference: Dr. Pin Chen, pin.che@jpl.nasa.gov

Occidental Summer Research, Fletcher-Jones Scholar

May-August 2017

- Studied Kinetics of LiDH(OH) catalyst using rotated disk electrochemistry to confirm a previously unknown reaction mechanism for catalysis of water

- Successfully synthesized organic, limiting electron transport chain from electrode to Cytochrome P450 protein, involved in biological catalysis of water
- Reference: Dr. Michael G. Hill, mgh@oxy.edu

HONORS AND AWARDS

Graduated Cum Laude, with Distinction	May 2019
Sigma Pi Sigma Nat'l Physics Honors Society Inductee	March 2018
Nominated for Junior Achievement Award, Occidental College	March 2018
Fletcher Jones Scholar, Chemistry Department	May 2017
Dean's List (6x Recipient)	2015- 2018

SELECTED PUBLICATIONS

- Ben Sappey**, Quinn Konopacky, Clarissa Do Ó, et al. "HD 206893 B at High Spectral Resolution with the Keck Planet Imager and Characterizer (KPIC)", *in prep.*
- Ben Sappey**, Quinn Konopacky, Jerome Maire, et al. "Calibration unit design for Keck/High-Resolution Infrared Spectrograph for Exoplanet Characterization (HISPEC)," Proc. SPIE 13096, Ground-based and Airborne Instrumentation for Astronomy X, 130966K (18 July 2024); <https://doi.org/10.1117/12.3020409>
- Jerry W. Xuan, Jason Wang, Luke Finnerty, ..., **Ben Sappey**, et al. Validation of Elemental and Isotopic Abundances in Late-M Spectral Types with the Benchmark HIP 55507 AB System. , 962(1):10, February 2024. doi: 10.3847/1538-4357/ad1243.
- Luke Finnerty, Jerry W. Xuan, Yinzi Xin, ..., **Ben Sappey**, et al. Atmospheric Metallicity and C/O of HD 189733 b from High-resolution Spectroscopy. , 167(1):43, January 2024. doi: 10.3847/1538-3881/ad1180.
- Daniel Echeverri, Jerry Xuan, Nemanja Jovanovic, ..., **Ben Sappey**, et al. Vortex fiber nulling for exoplanet observations: implementation and first light. Journal of Astronomical Telescopes, Instruments, and Systems, 9:035002, July 2023. doi: 10.1117/1.JATIS.9.3.035002.
- Yinzi Xin, Jerry W. Xuan, Dimitri Mawet, ..., **Ben Sappey** et al. On-sky speckle nulling through a single-mode fiber with the Keck Planet Imager and Characterizer. Journal of Astronomical Telescopes, Instruments, and Systems, 9:035001, July 2023. doi:10.1117/1.JATIS.9.3.035001.
- Luke Finnerty, Tobias Schofield, **Ben Sappey**, et al. Keck Planet Imager and Characterizer Emission Spectroscopy of WASP-33b. , 166(1):31, July 2023. doi: 10.3847/1538-3881/acda91.
- Jean-Baptiste Ruffio, Katelyn Horstman, Dimitri Mawet, ..., **Ben Sappey**, et al. Detecting Exomoons from Radial Velocity Measurements of Self-luminous Planets: Application to Observations of HR 7672 B and Future Prospects. , 165(3):113, March 2023. doi: 10.3847/1538-3881/acb34a.
- Ji Wang, Jason J. Wang, Jean-Baptiste Ruffio, ..., **Ben Sappey**, et al. Retrieving C and O Abundance of HR 8799 c by Combining High- and Low-resolution Data. , 165(1):4, January 2023. doi: 10.3847/1538-3881/ac9f19.
- Jerry W. Xuan, Jason Wang, Jean-Baptiste Ruffio, ..., **Ben Sappey**, et al. A Clear View of a Cloudy Brown Dwarf Companion from High-resolution Spectroscopy. , 937(2):54, October 2022. doi: 10.3847/1538-4357/ac8673.
- Ji Wang, Jared R. Kolecki, Jean-Baptiste Ruffio, ..., **Ben Sappey**, et al. Retrieving the C and O Abundances of HR 7672 AB: A Solar-type Primary Star with a Benchmark Brown Dwarf. , 163(4):189, April 2022. doi: 10.3847/1538-3881/ac56e2.
- Jason J. Wang, Jean-Baptiste Ruffio, Evan Morris, ... **Ben Sappey**, et al. Detection and Bulk Properties of the HR 8799 Planets with High-resolution Spectroscopy. , 162(4): 148, October 2021. doi: 10.3847/1538-3881/ac1349.
- Andrew D. Sappey, Pat Masterson, and **Ben A. Sappey**. Passive optical heterodyne spectroscopy measurement of the doppler shift of Fe(I) lines induced by the rotational velocity of the sun. J.

Opt. Soc. Am. B, 37(12):3829–3840, Dec 2020. doi: 10.1364/JOSAB.404190. URL <https://opg.optica.org/josab/abstract.cfm?URI=josab-37-12-3829>.

PRESENTATIONS

- “Could that even Happen? Astronomy in Pop Culture: what Hollywood gets right ... and not so right” - Astronomy on Tap, San Diego, CA, 1 October 2024
- “High-resolution Infrared Spectroscopy at Keck: Probing exoplanet atmospheres in Exquisite Detail with KPIC and HISPEC” – Keck Science Meeting, Pasadena, CA, 13 September 2024
- “Calibration Unit Design for High Resolution Infrared Spectrograph for Exoplanet Characterization (HISPEC)” – AO4ELT 7, Avignon, FR, 26-30 June 2023
- “High Resolution Spectroscopy of Directly Imaged Exoplanets” – Advancement Presentation, La Jolla, California, 25 April 2023
- “HD 206893b with Keck Planet Imager and Characterizer” – Keck Science Meeting 2022, Pasadena, California, 15 September 2022
- “HD 206893b with Keck Planet Imager and Characterizer” – In the Spirit of Lyot 2022, Leiden, Netherlands, 27 June -1 July 2022
- “Properties and Bulk Composition of HD 206893b with Keck Planet Imager and Characterizer” – AASTCS 9: Exoplanets IV, Las Vegas, Nevada, 1-6 May 2022

GROUP MEMBERSHIPS

KPIC Climate Committee Member	November 2022 - Present
KPIC Phase I/II Science Team	February 2021 - Present
HISPEC Instrument/Science Team	June 2022 - Present
UCSD Physics Graduate Council	July 2022 – August 2024
UCSD Astronomy Graduate Council	August 2023 - Present
Cosmic Tours Planetarium	2022 - Present
NYRIA Local Organizing Committee	January 2024 - October 2024