KERI HOADLEY

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RESEARCH INTERESTS

1) Molecular content and evolution of protoplanetary disks around T Tauri/Herbig-Haro stars via internal (stellar) and external (star-forming environment) irradiation.
2) Development and implementation of astronomical instrumentation for ground- and space-based facilities, including component-level testing for next-generation technologies.
3) Exoplanetary science: Atmospheric diagnostics and abundances with transmission spectroscopy; statistical characterization of exoplanets with radial velocity (RV) observations.

PROFESSIONAL PREPARATION

Ph.D. Astrophysics, University of Colorado, Boulder **2017**
Adviser: Dr. Kevin France
"Experimental and Observational Studies of Molecular Hydrogen in Interstellar and Circumstellar Environments"

M.S. Astrophysics, University of Colorado, Boulder **2014**
Adviser: Dr. Kevin France

B.S. Astronomy & Astrophysics, Florida Institute of Technology **2011**
B.S. Mathematical Sciences, Florida Institute of Technology **2011**
magna cum laude, Advisers: Dr. Hakeem Oluseyi & Dr. Semen Koksal

SKILLS AND STRENGTHS

Skills	Data Reduction and Analysis, Modeling and Optimization, Instrumentation Hardware, Instrument Calibration and Reduction Pipeline Implementations, Project Management, Component Modeling and Characterization
Design Software	Zemax OpticStudio
Platforms	Python, IDL, LaTeX

PUBLICATIONS AND PRESENTATIONS

Select Publications
Currently Published

- **Hoadley, Keri;** France, Kevin; Kruczek, Nicholas; et al. *The re-flight of the Colorado high-resolution Echelle stellar spectrograph (CHESS): improvements, calibrations, and post-flight results.* Proc. SPIE, 9901-138. (July 2016).
- France, Kevin; Fleming, Brian; and **Hoadley, Keri.** *CHISL: The Combined High-resolution and Imaging Spectrograph for the LUVOIR Surveyor.* JATIS, Volume 2, Issue 4. (October 2016).
- France, Kevin; **Hoadley, Keri;** et al. *The SLICE, CHESS, and SISTINE Ultraviolet Spectrographs: Rocket-Borne Instrumentation Supporting Future Astrophysics Missions.* JAI, Volume 5, Issue 1. (March 2016).
- **Hoadley, Keri;** France, Kevin; Alexander, Richard D.; McJunkin, Matthew; and Schneider, Christian. *The Evolution of Inner Disk Gas in Transition Disks.* ApJ, Volume 812, Issue 1. (October 2015).
- Fleming, Brian; Quijada, Manuel; France, Kevin; **Hoadley, Keri;** Del Hoyo, Javier; and Kreczeek, Nicholas. *New UV instrumentation enabled by enhanced broadband reflectivity lithium fluoride coatings.* Proc. SPIE, 96010R. (August 2015).
- **Hoadley, Keri;** France, Kevin; Nell, Nicholas; et al. *The assembly, calibration, and preliminary results from the Colorado high-resolution Echelle stellar spectrograph (CHESS).* Proc. SPIE, 9144-06. (July 2014).

· Oluseyi, Hakeem; Becker, Andrew; Culliton, Christopher; Furqan, Muhammad; **Hoadley, Keri;** et al. *Simulated LSST Survey of RR Lyrae Stars throughout the Local Group.* AJ, Volume 144, Issue 1. (July 2012).

In Preparation

· **Hoadley, Keri;** France, Kevin; et al. *The Colorado High-resolution Echelle Stellar Spectrograph: Pathfinder Instrument for the LUVOIR Surveyor.* Applied Optics, 2016.

· **Hoadley, Keri;** France, Kevin. *Molecular Hydrogen Absorption in Protoplanetary Disks* ApJ, 2016.

· **Hoadley, Keri;** France, Kevin; Redfield, Seth. *The Sightline to ϵ Persei: Results from the second flight of the Colorado High-resolution Echelle Stellar Spectrograph.* ApJ, 2017.

Successful Proposals

Co-I, Hubble Space Telescope (HST) Cycle 24, 20 Primary Orbits 2016

"Measuring residual H_2 gas from small to large gaps in protoplanetary disks: different pathways to planets?"

Presentations

Invited Talks

· Space Telescope Science Institute, Star and Planet Formation Seminar Series June 2016

Contributed Talks

· 229^{th} American Astronomical Society Meeting (Dissertation Talk); Grapevine, Texas January 2017

· NASA UV-Visible Astrophysics Research and Analysis (APRA) PI Program Review September 2016

· 4^{th} Session of the Sant Cugat Forum on Astrophysics: Workshop on Young Solar Systems; Sant Cugat, Barcelona, Spain April 2016

· SPIE Astronomical Telescopes + Instrumentation; Montreal, Quebec, Canada June 2014

Select Contributed Poster Presentations

· SPIE Astronomical Telescopes + Instrumentation; Edinburgh, Scotland, United Kingdom June 2016

· Gordon Research Conference: Origins of Solar Systems; Mt. Holyoke, Massachusetts July 2015

PROJECTS

The Colorado High-resolution Echelle Stellar Spectrograph (CHESS) 2012 - 2016

Ph.D Thesis Project

· Design, characterize, build, and calibrate an objective echelle spectrograph for far-ultraviolet (FUV) observations of interstellar medium materials, focusing on abundances of molecules towards star-forming regions.

· Lead a small team of students and engineers to build the spectrogaph and electronics sections of the payload.

· Characterize research and development (R&D) gratings (echelle and cross-disperser) for use in CHESS.

· Work with manufacturers to improve R&D results for flight-ready optics in the FUV.

· Handle day-to-day tasks and scheduling for all major and minor instrument development necessities.

· Design, simulate, and test optical alignment procedures of the instrument.

· Oversee development of a reduction pipeline GUI, used to convert raw echellogram to a science-quality product.

· Develop custom routines to model cathode lamp spectrum for wavelength calibration of the instrument.

· Develop custom routines to model the point spread function (PSF) over the instrument bandpass.

· Lead the team through field operations and testing at Wallops Flight Facility and White Sands Missile Range for two launches (NASA/CU 36.285 UG and NASA/CU 36.297 UG).

· Reduce, analyze, and publish results from sounding rocket flights (Hoadley et al. 2014, 2016; Hoadley in prep).

Sceince-Oriented Projects 2012 - 2017

· Create a 2D physical model of a variety of warm H_2 atmospheres in protoplanetary disks with radiative transfer output, to compare the model-produced emission profiles to observed profiles in the far-UV. (Hoadley et al. 2015)

· Use first-principles physics to model the absorption profiles of H_2 observed within the stellar Lyα wings of proto-planetary disk targets. (Hoadley et al. in prep)

TEACHING & MENTORING

Students Mentored:

Nicole Arulanantham, University of Colorado graduate student. *Modeling the distribution of H_2 and CO in the RY Lupi disk; Masters Thesis.* 2016 - present.
Nicolas Kruczek, University of Colorado graduate student. *The re-flight of the Colorado High-resolution Echelle Stellar Spectrograph (CHESS) - Flights 3 & 4; Ph.D Thesis.* 2015 - present.
Nicolas Erickson, University of Colorado graduate student. *The Dual-channel Extreme Ultraviolet Continuum Experiment (DEUCE): A Rocket-Bourne Experiment for Ionization Output from Massive Stars; Ph.D. Thesis.* 2015 - present.
Jack Swanson, University of Colorado undergraduate student (Mechanical Engineering). 2014 - 2016.
Jacob Wilson, University of Colorado undergraduate student (Astrophysics). 2014 - 2016.
Rachel Bushinsky, University of Colorado undergraduate student (Astrophysics). 2012 - 2013.
Eliot Kersgaard, University of Colorado undergraduate student (Astrophysics). 2012 - 2014.

Teaching Assistant for ASTR 1010: Introductory Astronomy for Non-Science Majors, Spring 2012
University of Colorado, Boulder, CO

OUTREACH AND PUBLIC RELATIONS

Co-adviser for Summer Rocket Camp August 2016
LASP/CU-Boulder

· Sponsored summer camp for low-income middle school students in predominately minority communities.
· Teach students about general rocket characteristics and experiment designs.
· Oversee and advise students on basics of electrical and mechanical hardware.

Soumners-Basch Observatory Open House Nights and Astronomy Day August 2011 - present
CU-Boulder

· Set-up, test, and run two telescopes (12", 16") for public viewing.
· Lead discussions on observations, including solar system objects, multi-stellar systems, star-forming regions, star clusters, planetary nebulae, and galaxies.
· Lead experiments throughout town for the general public to experience, including heliostat viewing and prism experiment for solar spectrum.

News Articles of CHESS-1 & CHESS-2 Launches May 2014, February 2016
Released: NASA News, AAS Press, Colorado Space News, Missile Ranger (WSMR Newspaper)

· Press releases for launches of CHESS-1 and CHESS-2.

PROFESSIONAL REFERENCES

Dr. Kevin France, Assistant Professor, CU-Boulder — kevin.france@colorado.edu, (303) 492-1429
Dr. James Green, Professor, CU-Boulder — james.green@colorado.edu, (303) 492-7712
Dr. Brian Fleming, Research Scientist, LASP/CU-Boulder — brian.fleming@colorado.edu, (303) 735-7496
Dr. Andrea Banzatti, Postdoctoral Fellow, STScI — banzatti@stsci.edu, (410)-338-2452