Jiamu Huang

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Education

University of California, Santa Cruz
B.S. in Physics(Astrophysics), Current GPA: 3.96/4.00 2018–Current

Research Projects

AGN chemical evolution, photoionization modeling Spring 2021–Current

Advisor: Gregory Shields, Douglas N.C. Lin

- Study the chemical evolution in the broad and narrow line region(BLR and NLR) of active galactic nuclei(AGN), and connect the chemical evolution with self-regulated star formation and evolution in the AGN accretion disk near the central supermassive black holes.
- Use CLOUDY modelling to explore the relation between the AGN emission lines and chemical abundance(as well as physical properties) in the BLR and NLR clouds.

Reverberation mapping of AGN accretion disk Spring 2021–Current

Advisor: Keith Horne, Douglas N.C. Lin

- Model the AGN accretion disk to match the observed data from 2014 observing campaign of NGC 5548.
- We find the observed reverberation inter-band time delay is shorter than expected when fitting the spectral energy distribution(SED) of NGC 5548 with the classic Shakura-Sunyaev thin disk model. This implies that the temperature at larger radii(~ 5 light days) should be higher than thin disk model. Therefore, we proposed an accretion model with wavy(rippled) structures to reconcile both SED and delay time.
- To explain the variability of NGC 5548 continuum spectrum, we first fit the low-state continuum with only viscous heating, and then we turn on the "lamppost" luminosity to fit both observed SED and delay time. As a result, a wavy accretion disk profile can explain the results from observation.

Spectroscopy, Sepc2d/Pypeit pipeline comparisons Spring 2020–Current

Advisor: Kevin McKinnon, Puragra(Raja) GuhaThakurta

- Use Pypeit, a recent developed spectral reduction package based on Python, to reduce and analyze the spectra from Keck II/DEIMOS spectra of Milky Way halo stars from the HALO7D survey.
- Make robust comparisons of two spectral reduction pipelines: Pypeit and Spec2d.
- Our tests show that PypeIt performs as well as, or better than spec2d for our DEIMOS data; wavelength solutions agree within $\sim$1 pixel, better skyline subtraction, more continuous spectra, less vignetting, and higher extracted SNR.

Publications

1. **Jiamu Huang**, Douglas N. C. Lin and Gregory Shields, "Self-regulated Stellar Evolution And Rejuvenation Embedded in Discs", in prep.
2. D. A. Starkey, Keith Horne, **Jiamu Huang** and Douglas N. C. Lin, "A Rippled Accretion Disc Model to Explain AGN Continuum Lags", in prep.

Research Positions

- **Mentor** of Science Internship Program(SIP) at University of California, Santa Cruz — Summer 2019
  Project: Spectral Classification of Weak CN and Carbon Stars in M31 and M33
  - Identifying weak CN stars, a special population of stars that show a weak CN spectral absorption feature at ∼7900Å, using HST spectra.
  - Studying the kinematics for selected weak CN stars, and compare with the background stars in M31 and M33.

References

- **Douglas N.C. Lin** — University of California, Santa Cruz
  lin@ucolick.org
- **Prof. Puragra(Raja) GuhaThakurta** — University of California, Santa Cruz
  raja@ucolick.org
- **Gregory Shields** — Director, Laguna Falls Institute for Astrophysics
  shields@lfastro.org
- **Prof. Keith Horne** — University of St. Andrews
  kdh1@st-andrews.ac.uk
- **Prof. Ruth Murray-Clay** — University of California, Santa Cruz
  rmc@ucsc.edu

PRESENTATIONS

- *Pipeline comparison between Spec2d and Pypeit using Deimos HALO7d data*,
  the 240th meeting of the AAS — June 2022

Teaching Experiences

- **Learning Assistant** at University of California, Santa Cruz — Fall 2021
  Course: Physics 5A, Introduction to Physics I

Outreach

- *Astrophotography and Astronomy*, at Beijing No.8 High School — November 2020
- *Colors, Spectra of Different Astrophysical Objects*, at Beijing No.4 High School — April 2021

Scholarships and Awards

- UCSC Undergraduate Dean's Scholarship — 2018–2021
- UCSC Dean's Honors List — 2018–2021

Technical Strengths

- **Programming Languages:** Python, FORTRAN, MATLAB
- **Packages/pipelines:** Astropy, Scipy, REBOUND, PyQSOFit, Spec2d, Pypeit
- **Software:** CLOUDY, Maxim DL, Pixinsight, Wolfram Mathematica