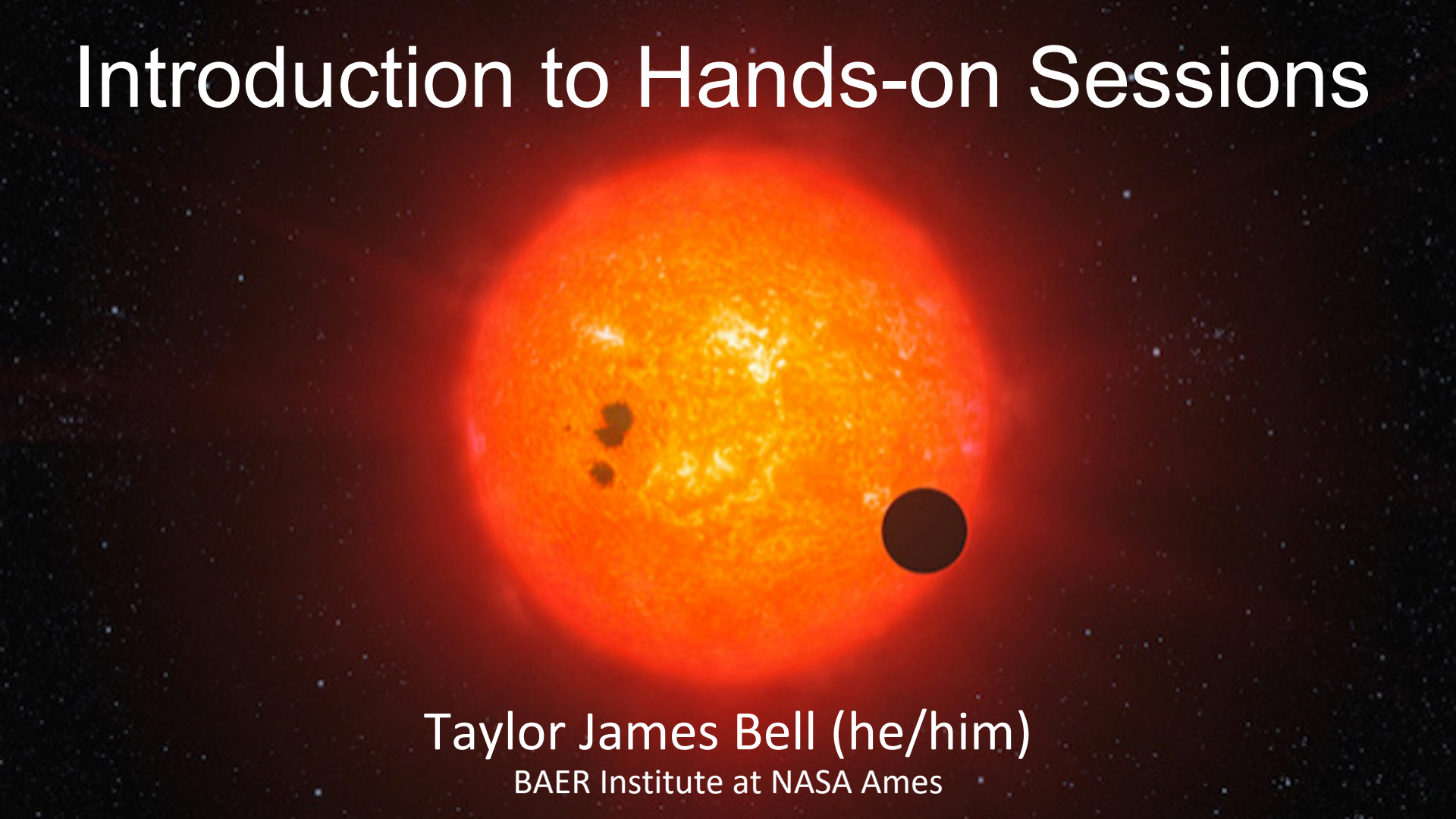
Introduction to Hands-on Sessions



Taylor James Bell (he/him)
BAER Institute at NASA Ames

MONDAY - Hands-on Session I: Reducing JWST Data: from raw data to light curves

TUESDAY - Hands-on Session II: Fitting JWST Data: from light curves to planet spectra

WEDNESDAY - Hands-on Session III: Forward Modeling with PICASO

WEDNESDAY - Hands-on Session IV: Retrievals using petitRADTRANS

THURSDAY - Group Projects

FRIDAY - Group Project Presentations

Hands-on Session I:
Reducing JWST Data: from raw data to light curves

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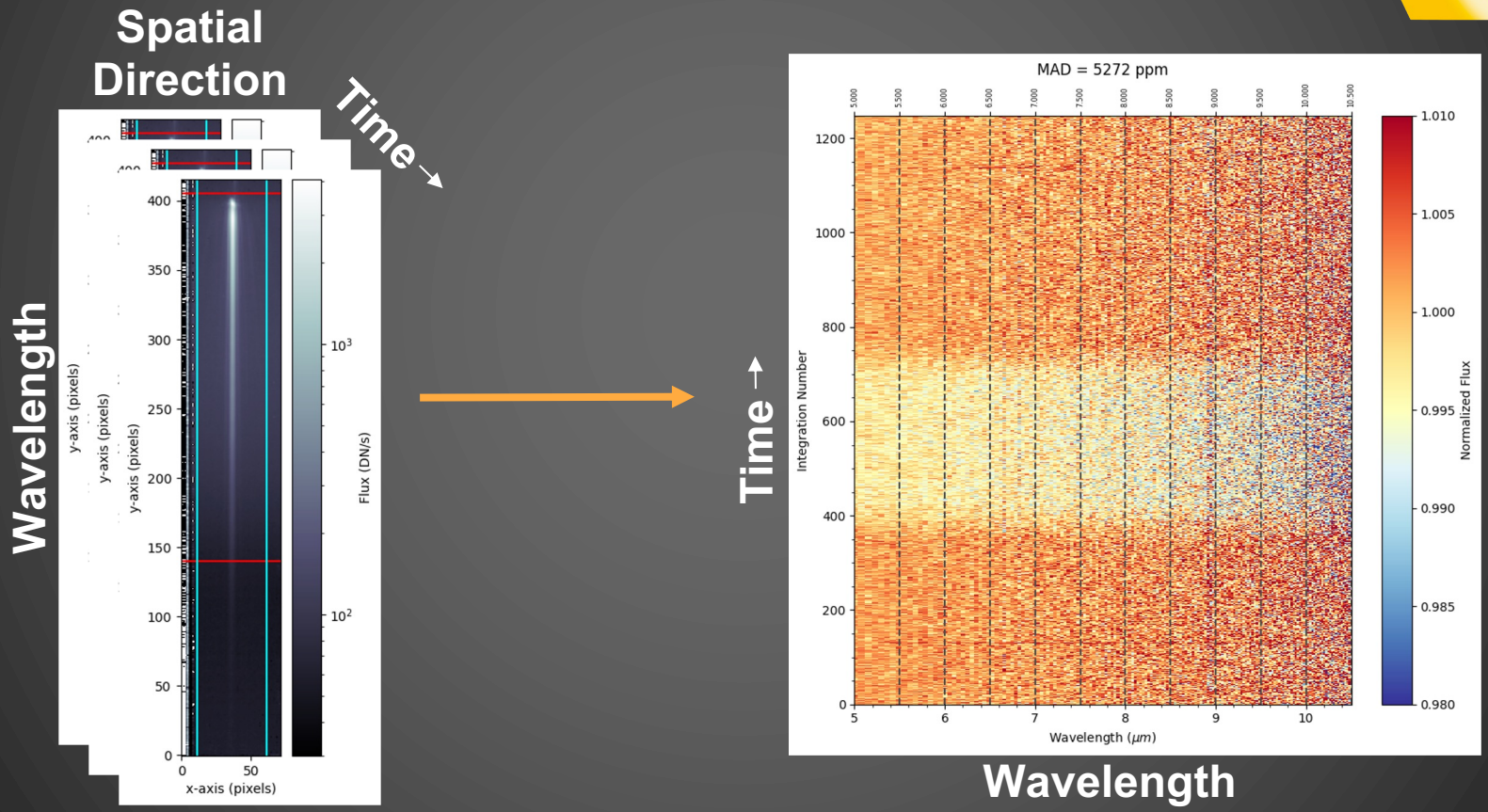
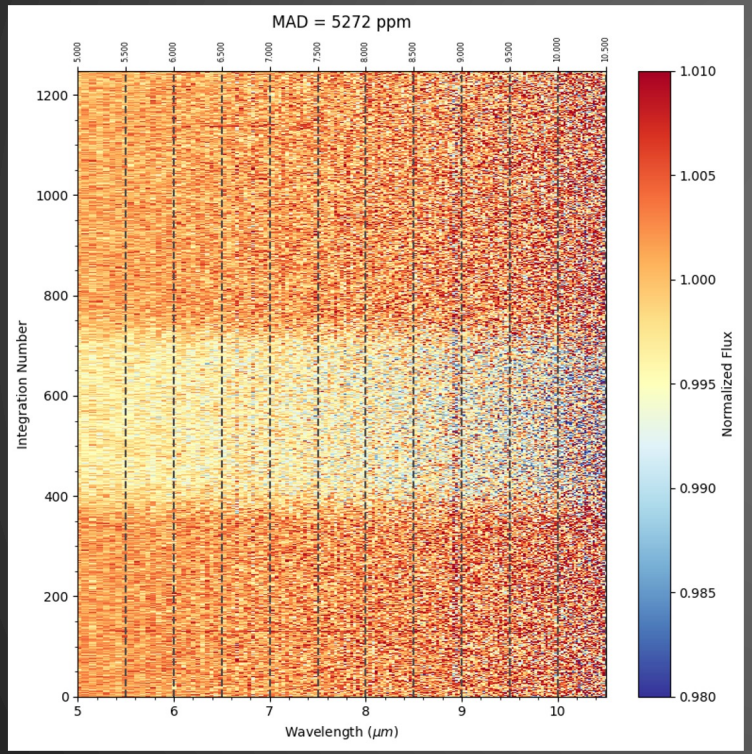
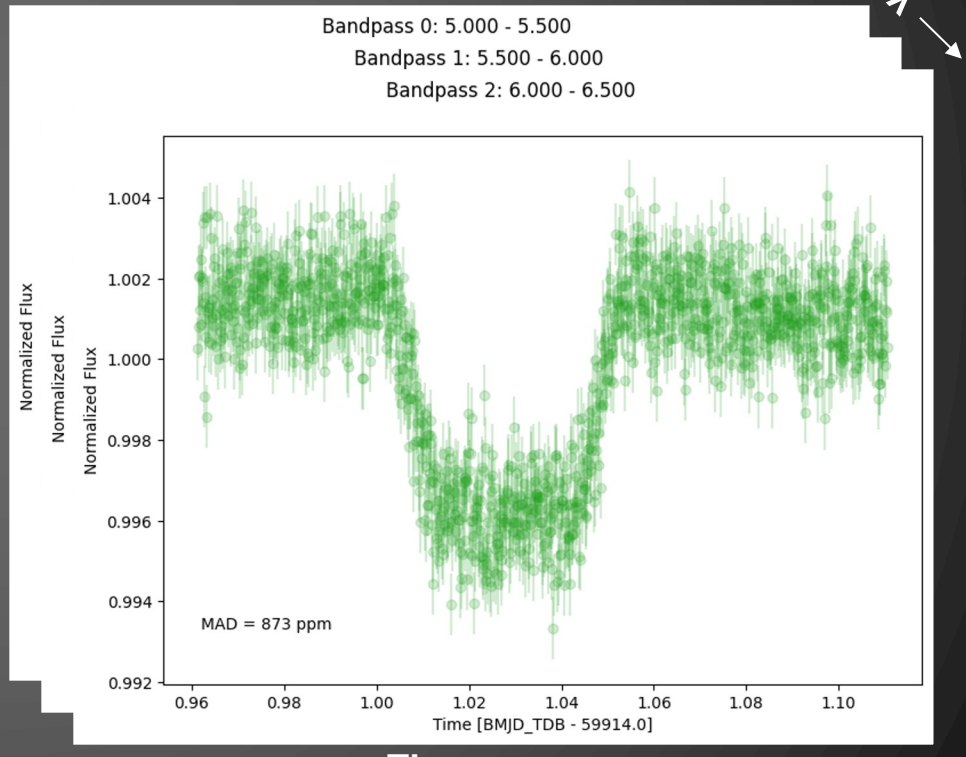
Reducing JWST Data: from raw data to light curves



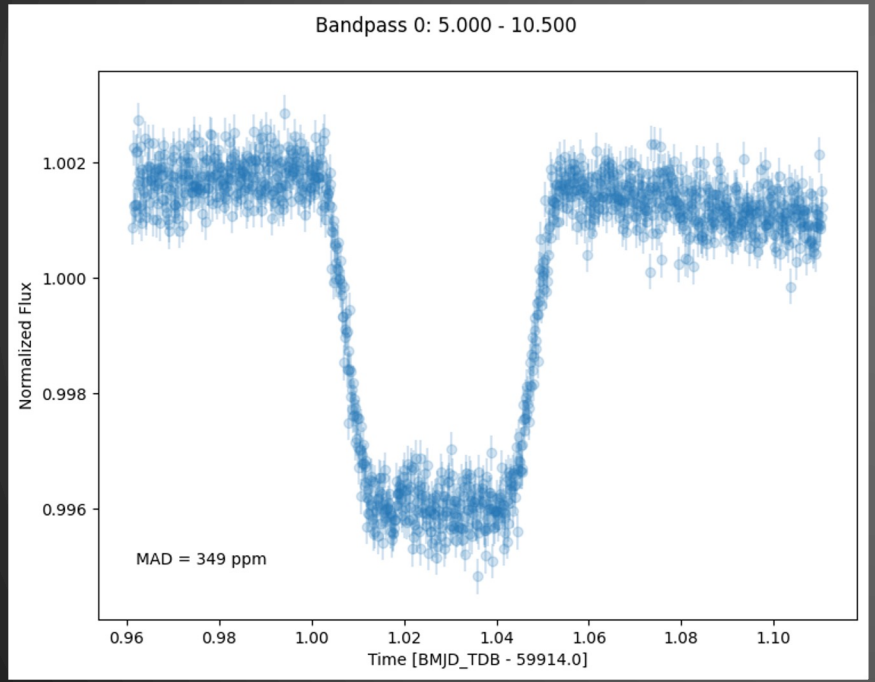
Hands-on Session I:
Reducing JWST Data: from raw data to light curves





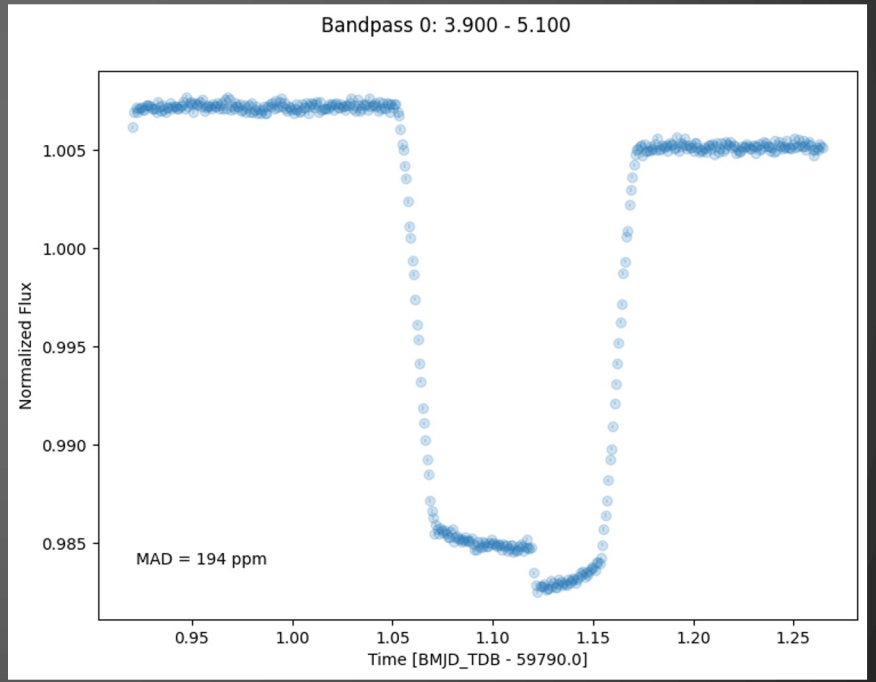
Hands-on Session I:
Reducing JWST Data: from raw data to light curves

WASP-43b MIRI/LRS Eclipse



Time →

WASP-39b NIRSpec/G395H Transit



Time →

Hands-on Session II:

Fitting JWST Data: from light curves to planet spectra

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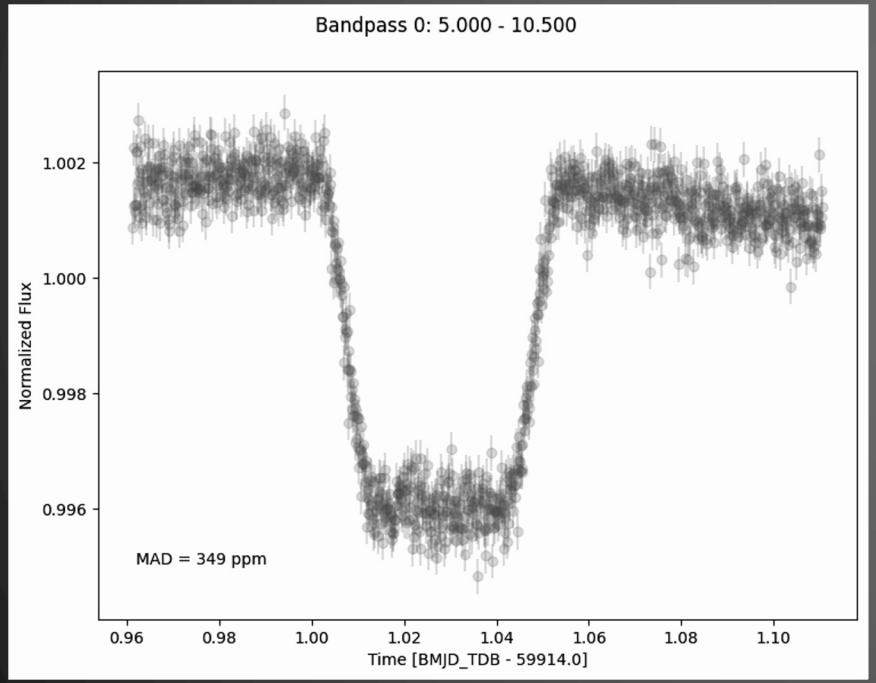
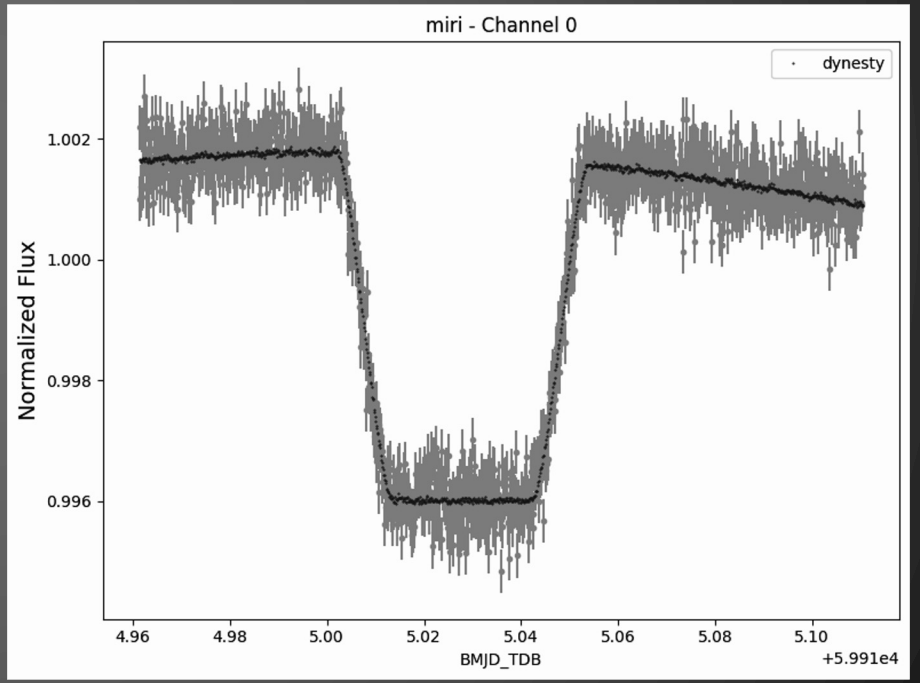
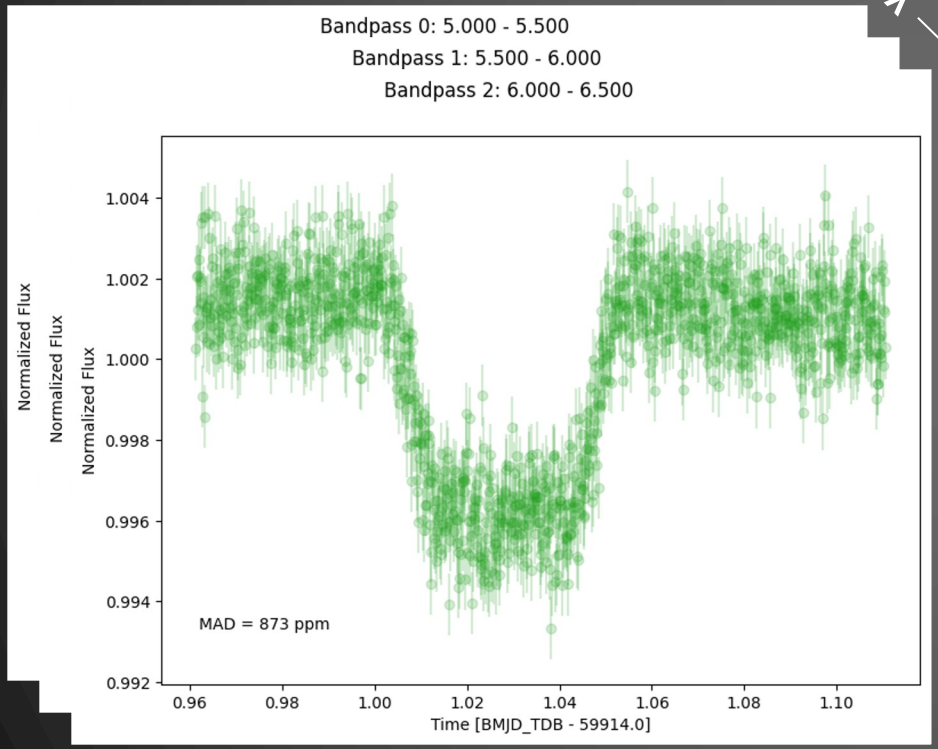


Time →

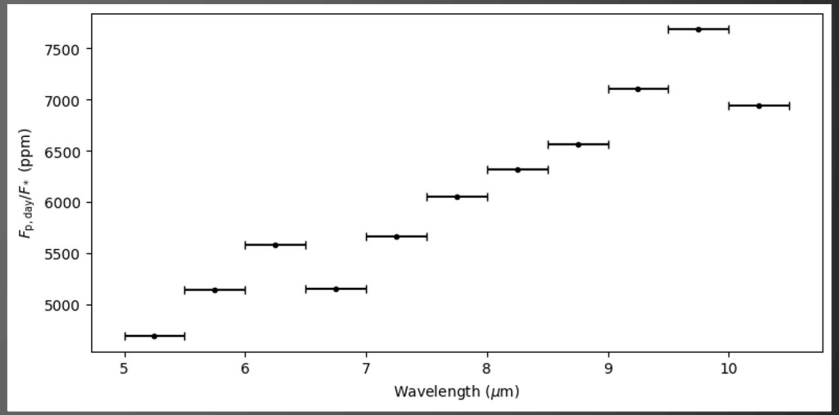


Time →

Hands-on Session II:
Fitting JWST Data: from light curves to planet spectra

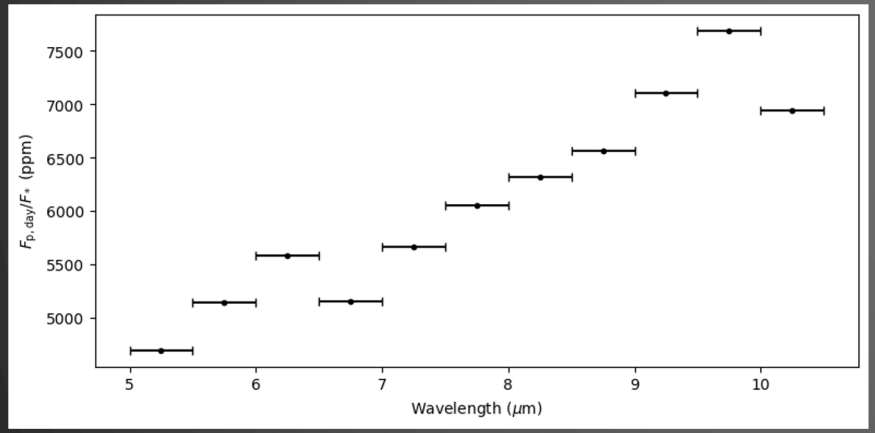


Time →

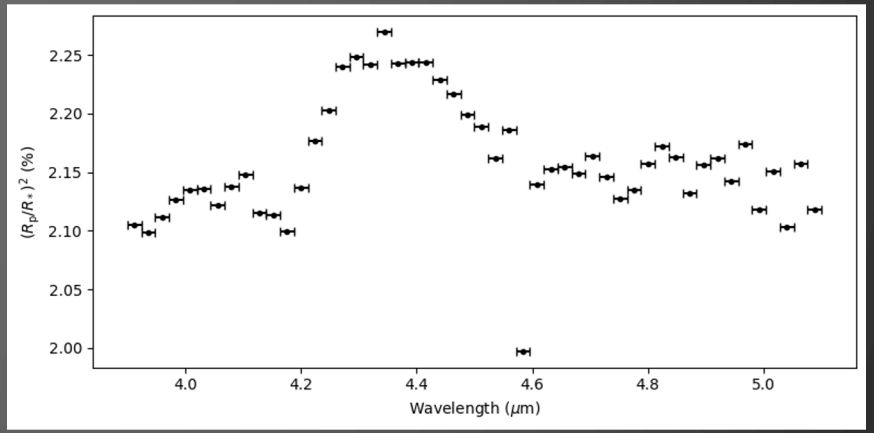


Hands-on Session II:
Fitting JWST Data: from light curves to planet spectra

WASP-43b MIRI/LRS Eclipse



WASP-39b NIRSpec/G395H Transit



Hands-on Session III:
Forward Modeling with PICASO

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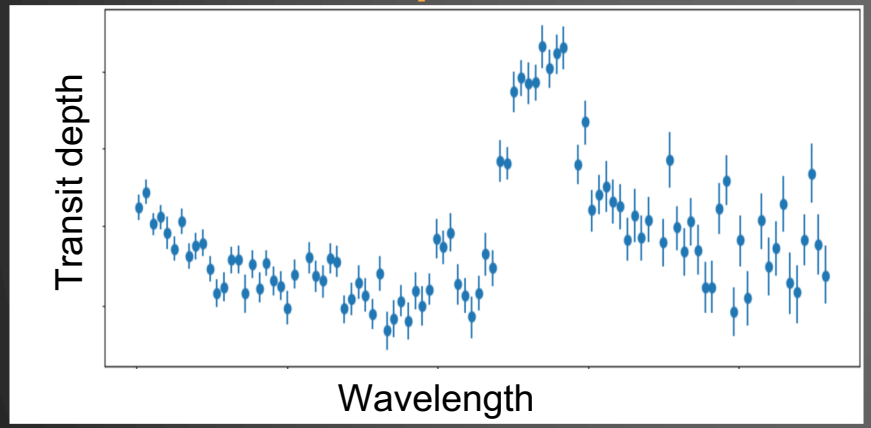
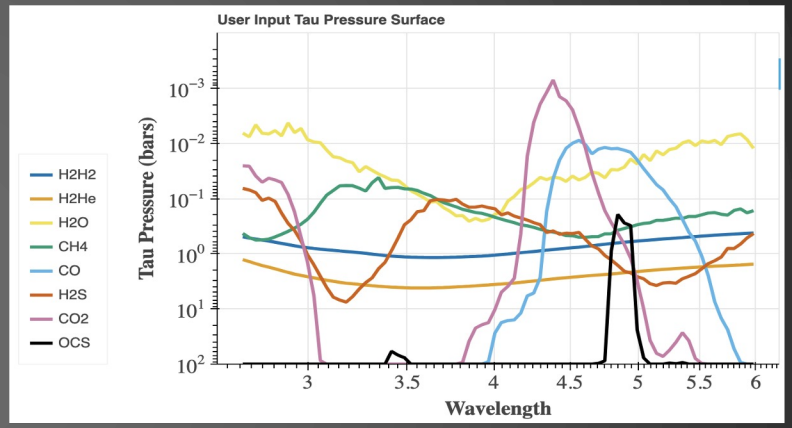
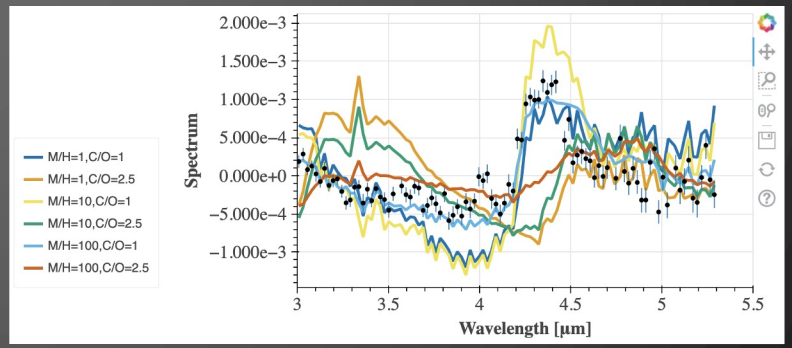
PICASO

WASP-39b NIRSpec/PRISM Transit



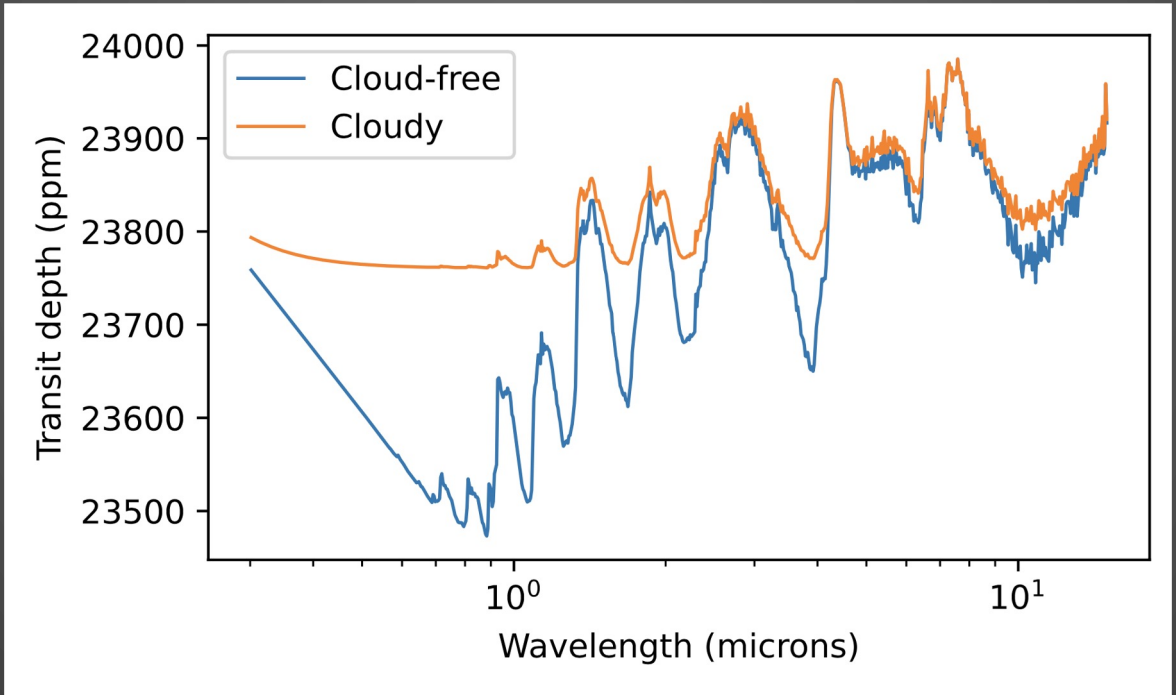




Hands-on Session IV:
Retrievals using petitRADTRANS

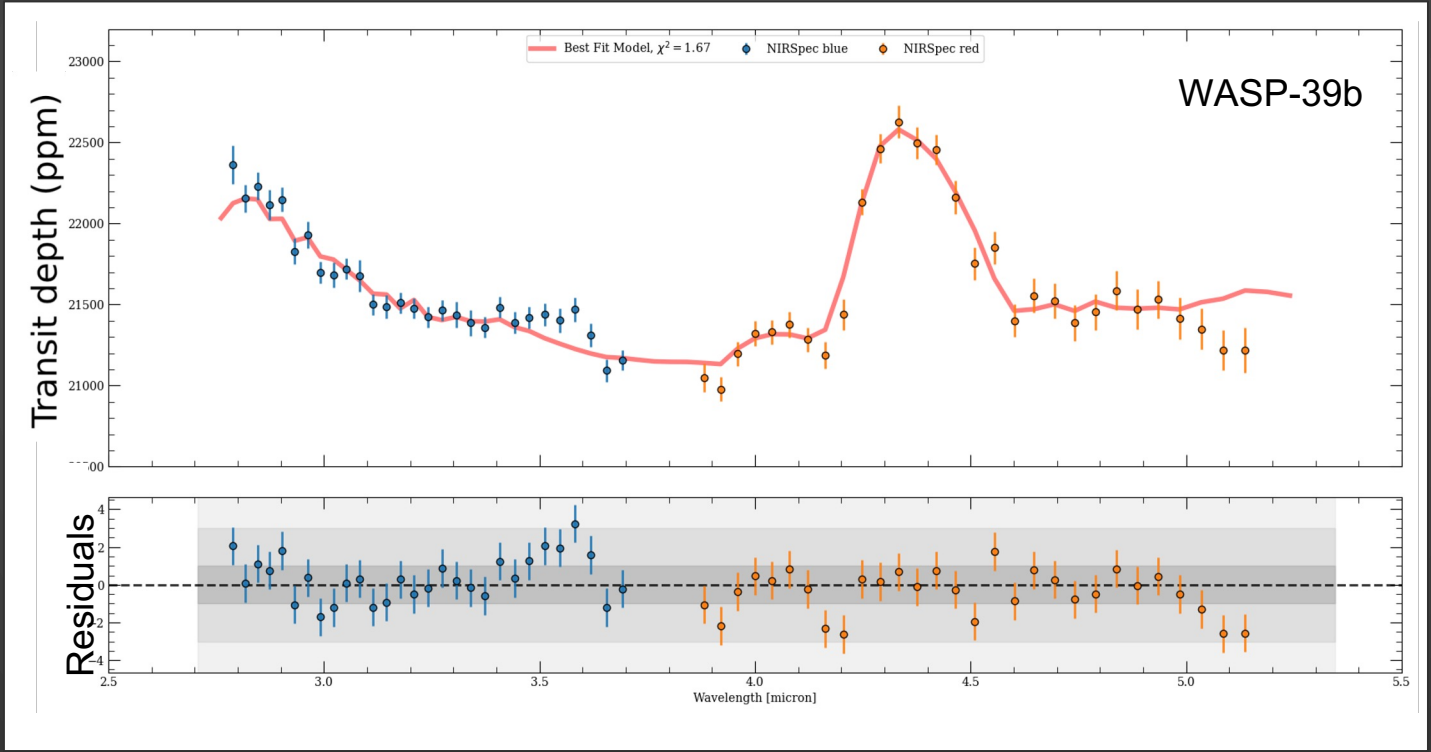
Hands-on Session IV:
Retrievals using petitRADTRANS (pRT)

Notebook 1: calculating spectra with pRT



Hands-on Session IV:
Retrievals using petitRADTRANS (pRT)

Notebook 2: transmission retrievals on JWST data

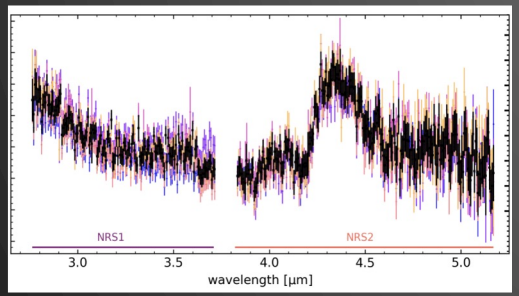


Group Projects
(Thursday)

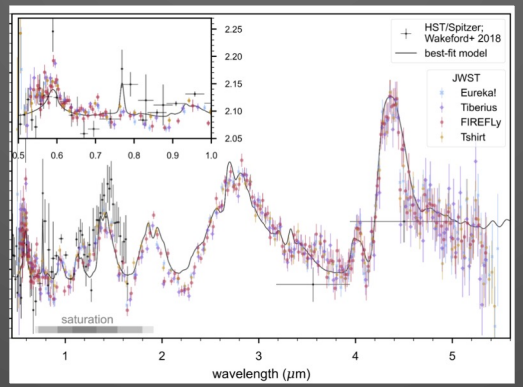
Group Project 1:
Near-IR Transmission Spectrum of WASP-39b

- Extend your work on the NIRSpec/G395H NRS2 transit of WASP-39b
- Reduce and fit one or more of:
  - NIRSpec/G395H NRS1 (2.9 - 3.7 microns)
  - NIRSpec/PRISM (0.6 - 5.2 microns)
  - NIRCam/F322W2 (2.5 - 4.0 microns)

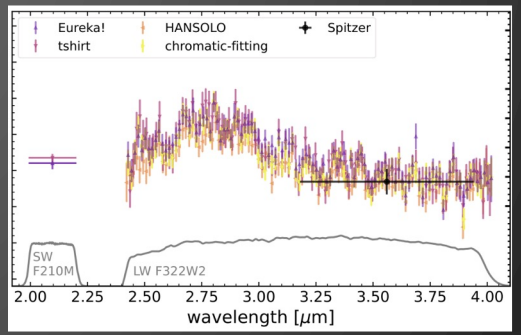
NIRSpec/G395H



NIRSpec/PRISM

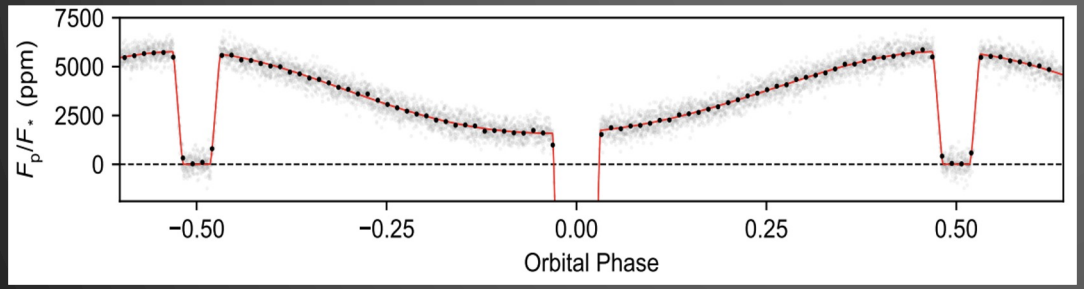


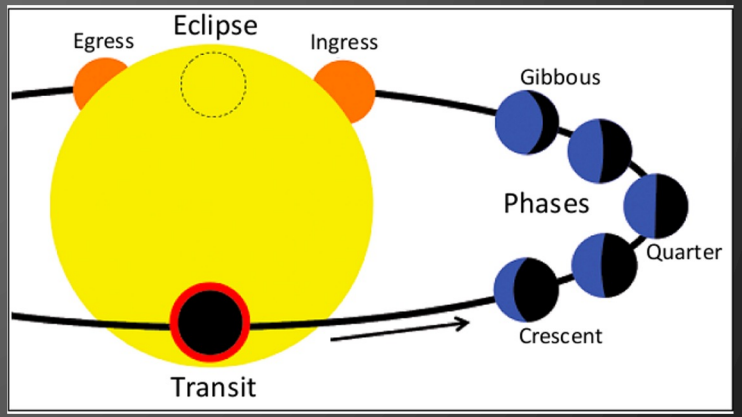
NIRCam/F322W2



Group Project 2:
Mid-IR Phase Curve of WASP-43b

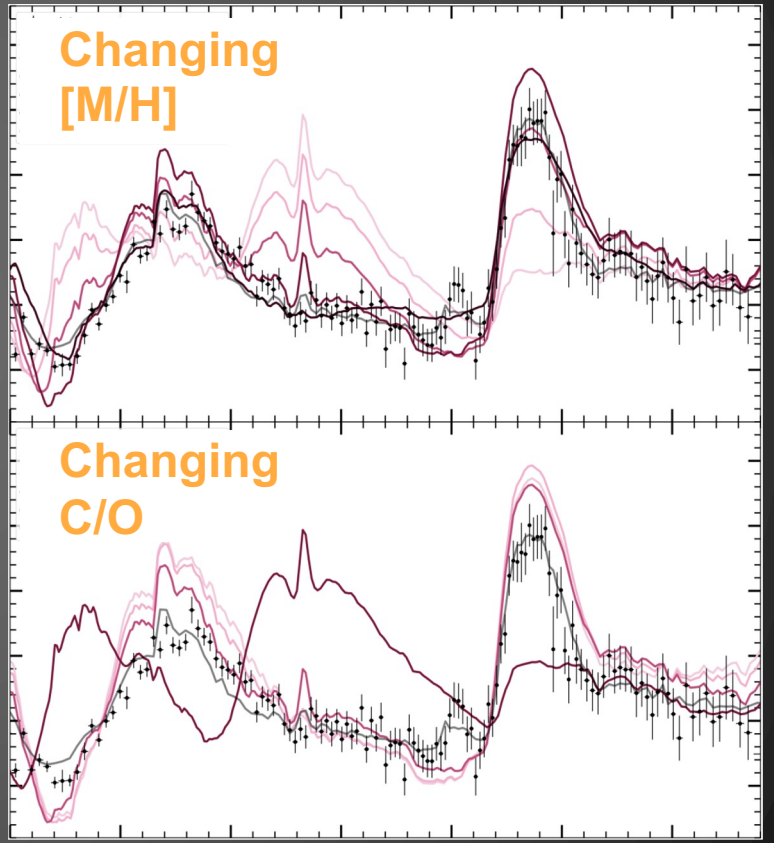
- Extend your work on the MIRI/LRS eclipse of WASP-43b
- Reduce and fit the full-orbit phase curve
- Learn about day–night heat transport





Group Project 3:
Grid Search: Fitting models to Data

- Extend your work on PICASO grid models for the NIRSpec/PRISM observations of WASP-39b
- Use grid fitting tools to analyze the reduced spectra from:
  - NIRISS/SOSS
  - NIRSpec/G395H
  - NIRSpec/PRISM
  - NIRCam/F322W2
- Interpret the grid fits and any differences between the different instruments



Group Project 4:
Emission Spectrum Retrieval of the Hot Jupiter WASP-77 Ab

Combine your knowledge of Notebooks 1 & 2 of Hands-on Session IV:
reproduce the results of August et al. 2023. What is the atmospheric composition?