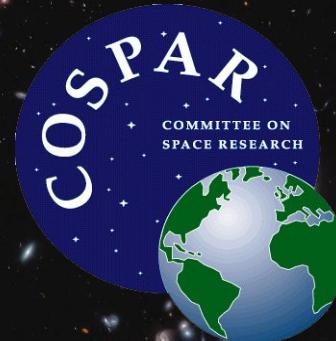


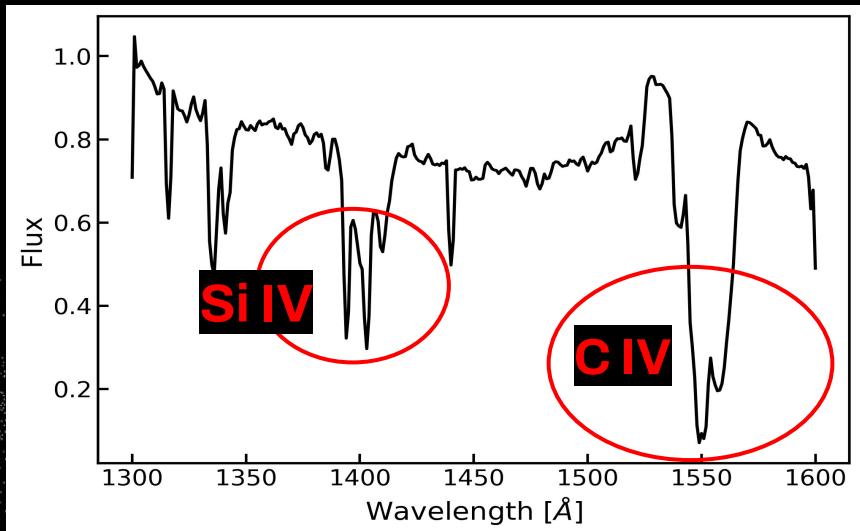
Resolving BAL Quasar Outflows: Outflow Cloud Properties Using Voigt Profile Fitting of C IV Absorption Lines

Presented by
Anjali. K. A

Indian Institute of Astrophysics



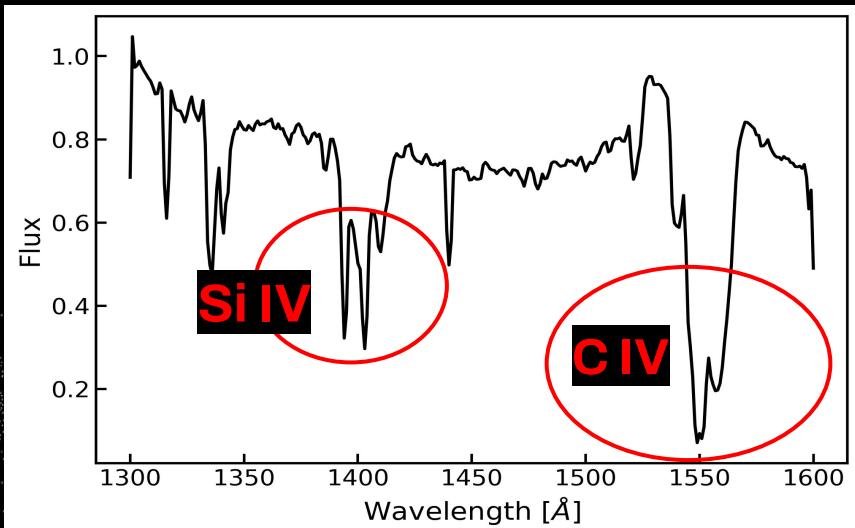
Broad Absorption Line (BAL) quasars



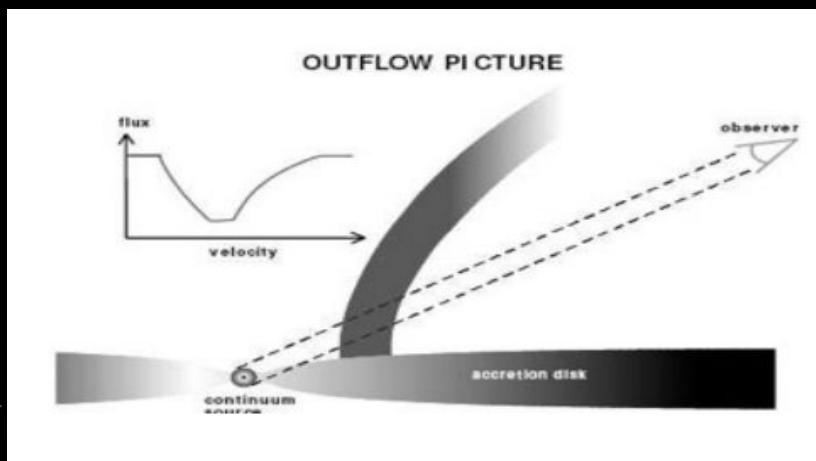
BAL quasars provide direct evidence of **energetic outflows** from quasars.

- Characterized by **broad, blue-shifted absorption features**, most prominently in high-ionization lines such as C IV $\lambda\lambda$ 1548,1550 and Si IV $\lambda\lambda$ 1393,1402.
- Constitute about **10–20%** of the quasar population.

Broad Absorption Line (BAL) quasars



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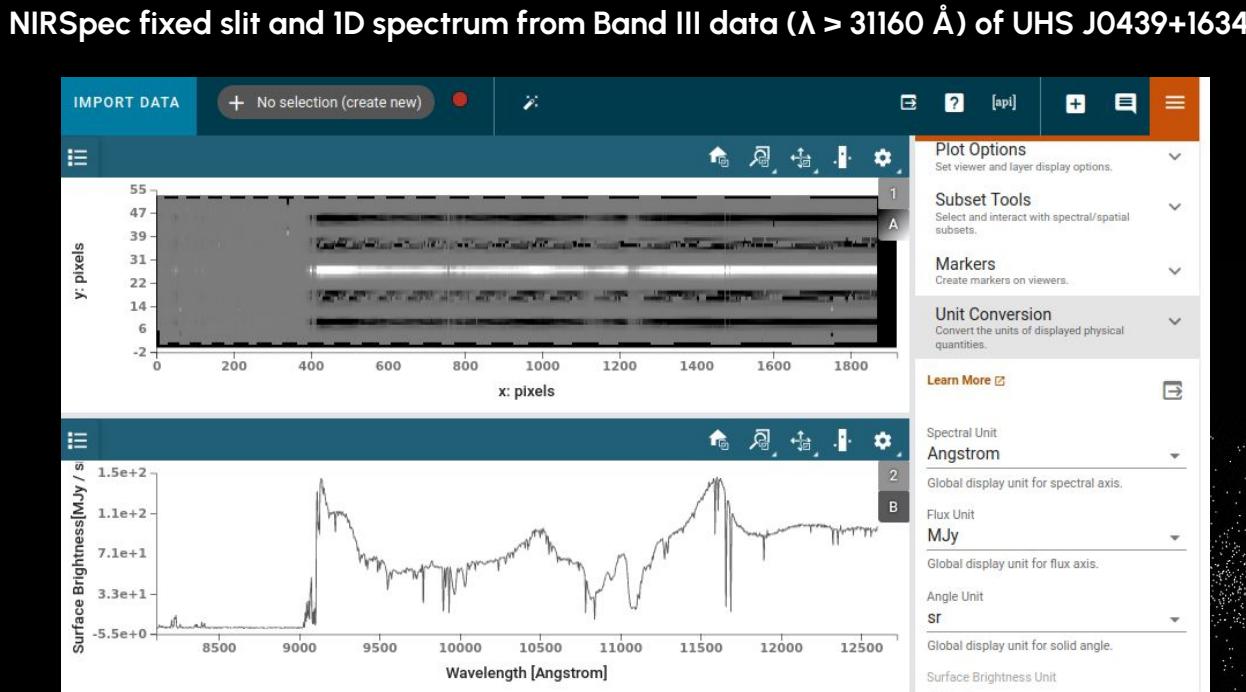
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UHS J0439+1634

Observation details:

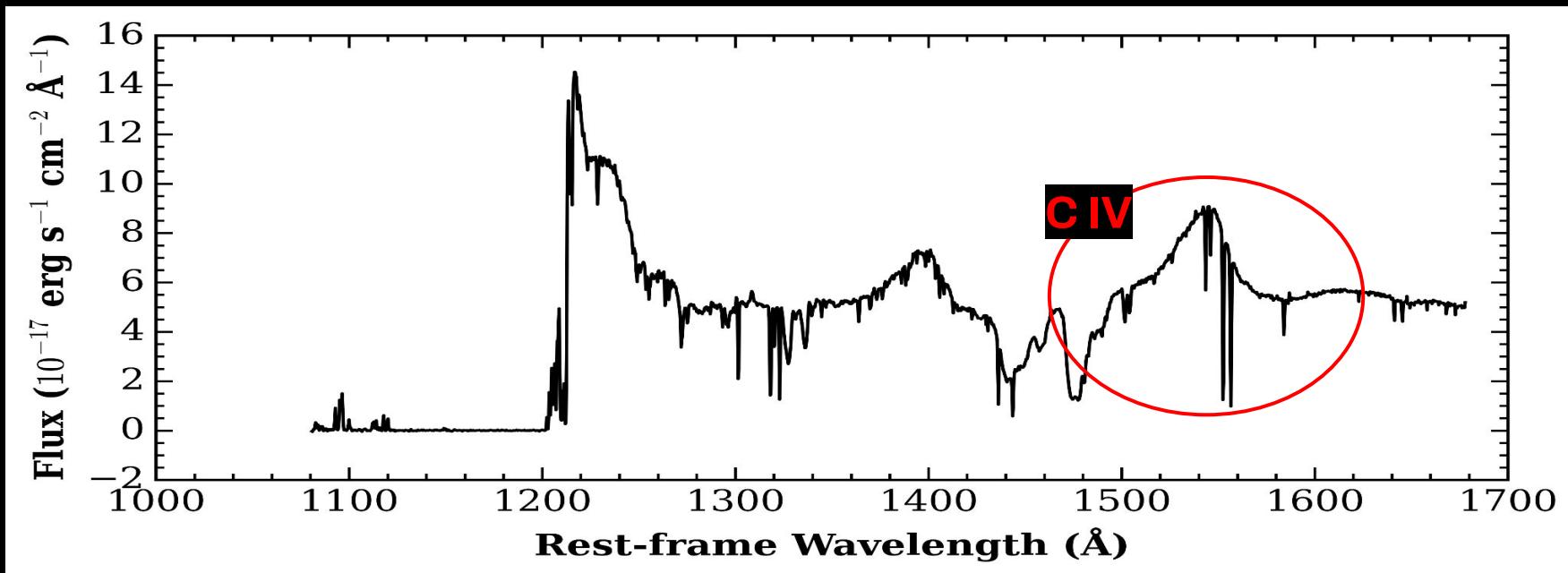
- ⟩ $z = 6.521$
- ⟩ Mode: FS
- ⟩ Date: 24 Jan 2023
- ⟩ PID: 1222
- ⟩ PA [deg]: 210.8

(L. Christensen et al. 2023)



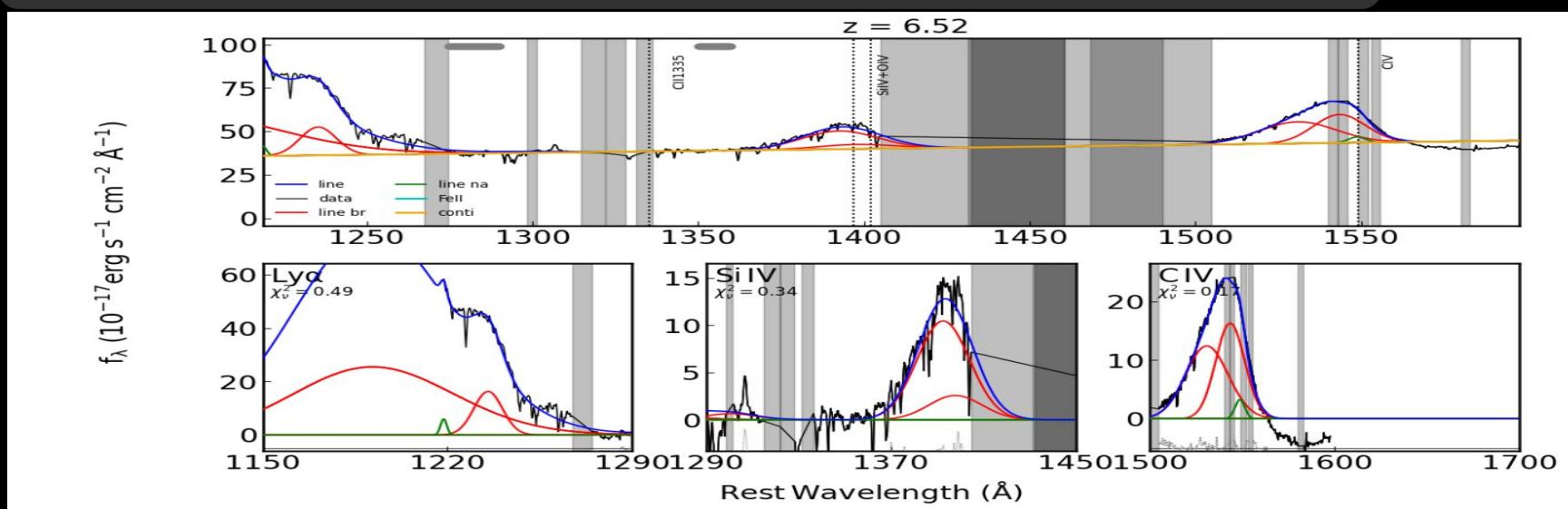
UHS J0439+1634

NIRSpec fixed slit and 1D spectrum from Band III data ($\lambda > 31160 \text{ \AA}$) of UHS J0439+1634.



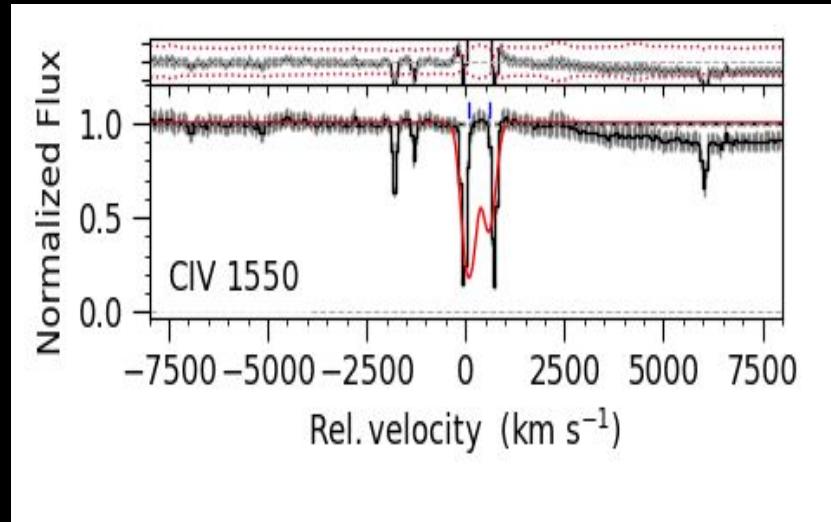
Continuum normalization of UHS J0439+1634 using PyQSOFit

- The emission lines are then fitted using Gaussian profiles.
- The continuum is modeled using several components, including a power-law, polynomial, Fe II emission, and the Balmer continuum, with the fit performed in line-free windows.



Voigt Profile Fitting

- Voigt Fit by J. K. Krogager (Krogager 2018)
- Each component is described by its redshift (or velocity relative to the systemic redshift), the Doppler parameter b , and the logarithm of the column density.



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Best fit parameters:

CIV 1548, 1550
 $v = +585.8 \pm 14.3$

b

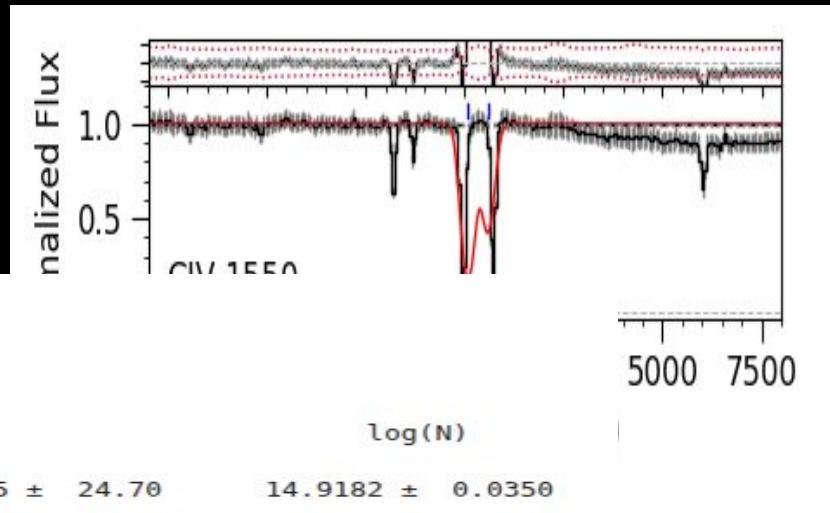
200.15 ± 24.70

log(N)

14.9182 ± 0.0350

Total Column Densities:

$\log N(CIV) = 14.917 \pm 0.035$



Thank You!