

# Markarian 1018



Meredith Powell

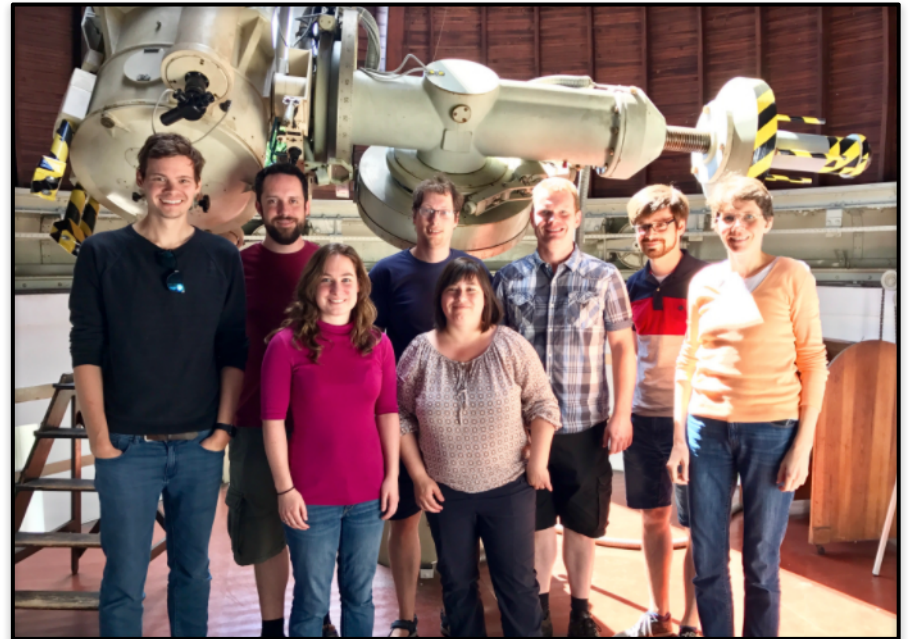
Bernd Husemann & **CARS** team

AGN Variability 2017



# CARS Team

- **Bernd Husemann, PI (MPIA)**
- **Rebecca McElroy (U. of Sydney)**
- Mirko Krumpe (AIP)
- Tanya Uruttia (AIP)
- Grant Tremblay (Yale)
- Francois Combes (Obs. de Paris)
- Scott Croom (U. of Sydney)
- Andreas Eckart (U. of Cologne)
- Gerold Busch (U. of Cologne)
- Timothy Davis (Cardiff U.)
- Jason Dexter (MPE)
- Dimitri Gadotti (ESO)
- Justus Neumann (AIP)
- Miguel Perez-Tores (IAA)
- Meredith Powell (Yale)
- Julia Scharwachter (Gemini Obs)

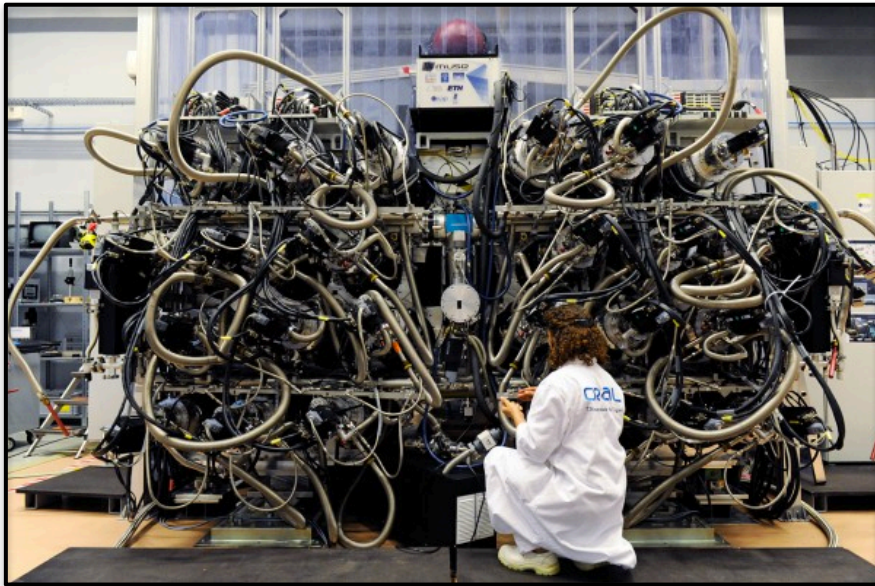




# CARS Survey

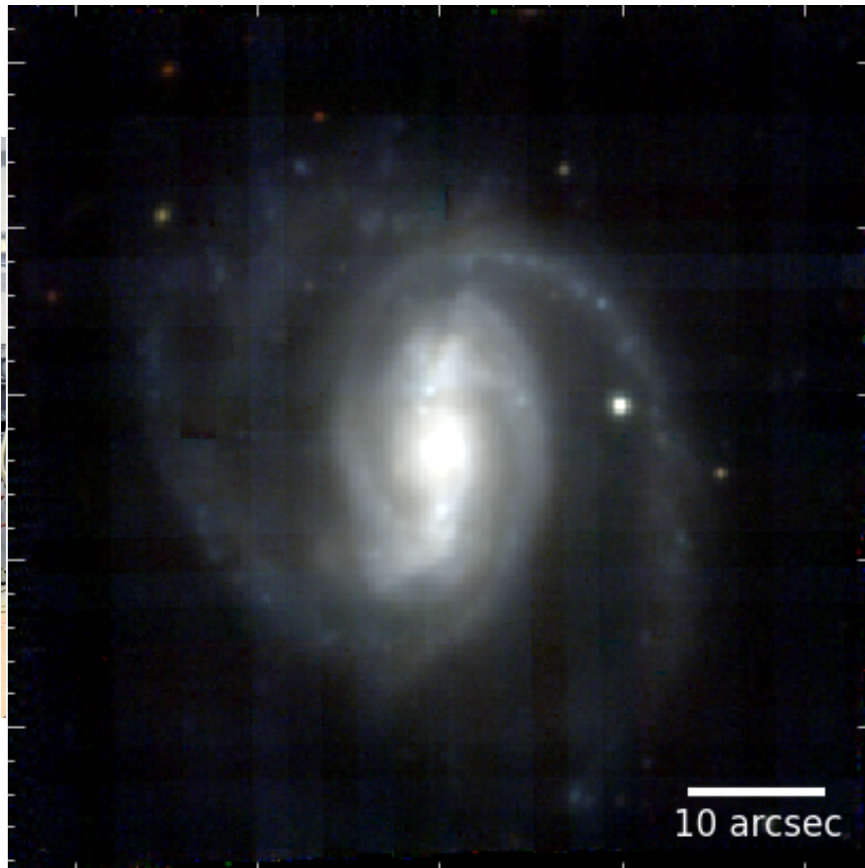
- 40 nearby type 1 AGN  
 $0.01 < z < 0.06$
- Observed with the MUSE IFU on the VLT
- Growing array of spatially resolved multiwavelength data
- Goals:
  - Characterize link between SMBH and host galaxy
  - Create reference dataset for high- $z$  AGN

# MUSE IFU



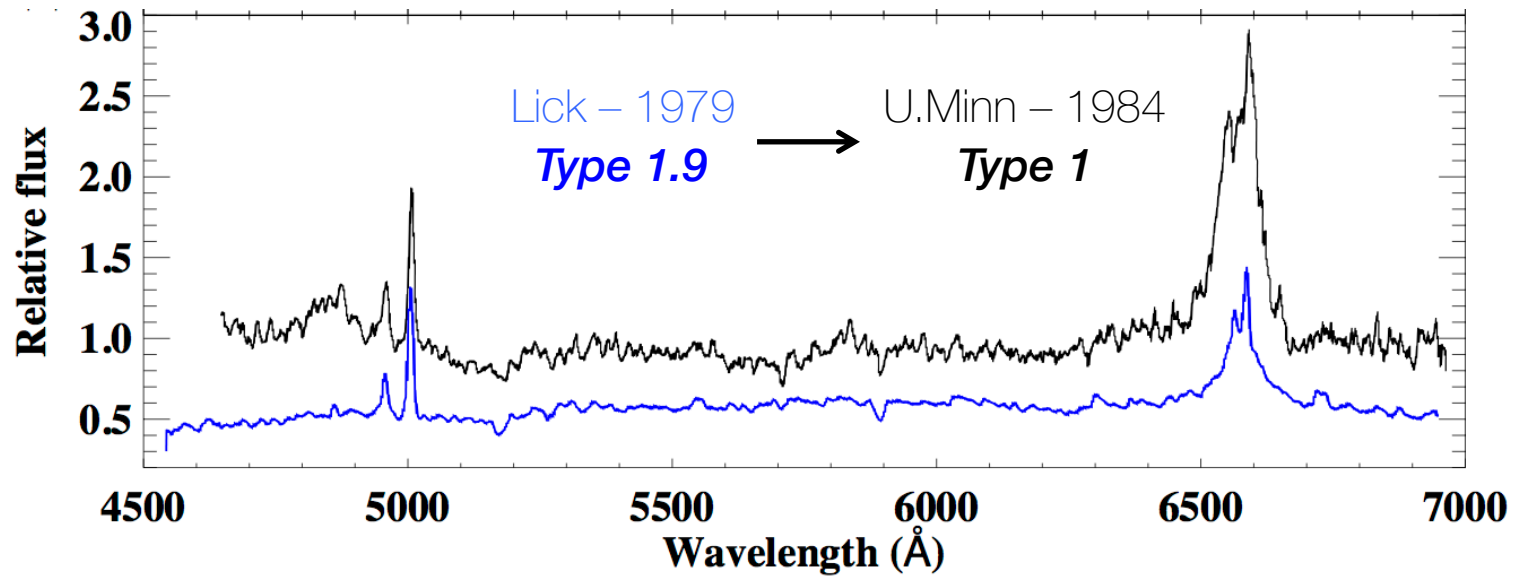
- 1 arcmin FOV
- 4700-9300 Å
- 0.2" spatial sampling
- 90,000 spectra!

# MUSE IFU

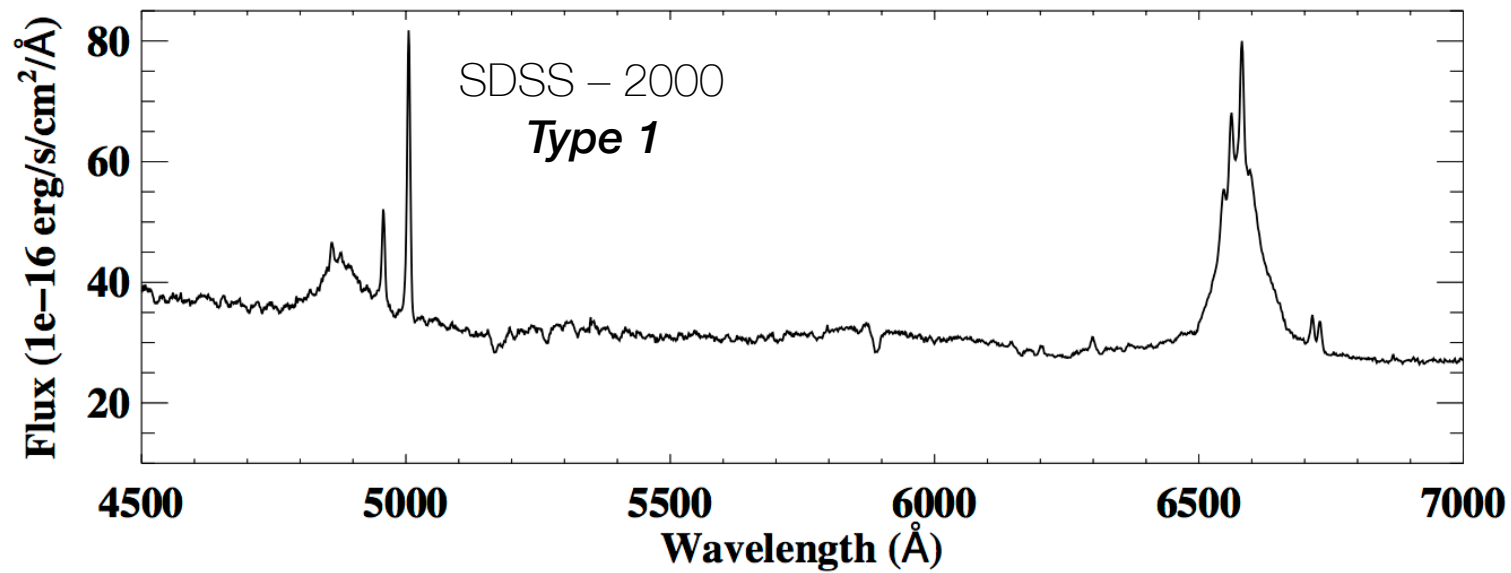


- 1 arcmin FOV
- 4700-9300 Å
- 0.2" spatial sampling
- 90,000 spectra!

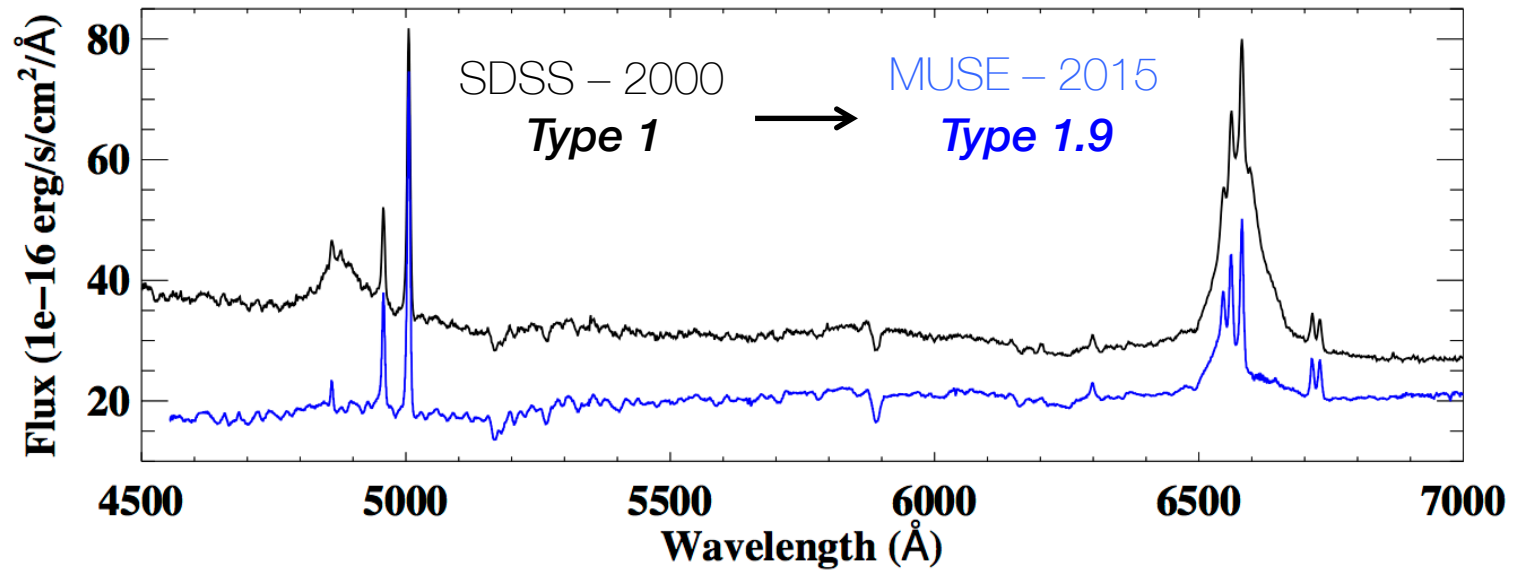
# Mrk 1018



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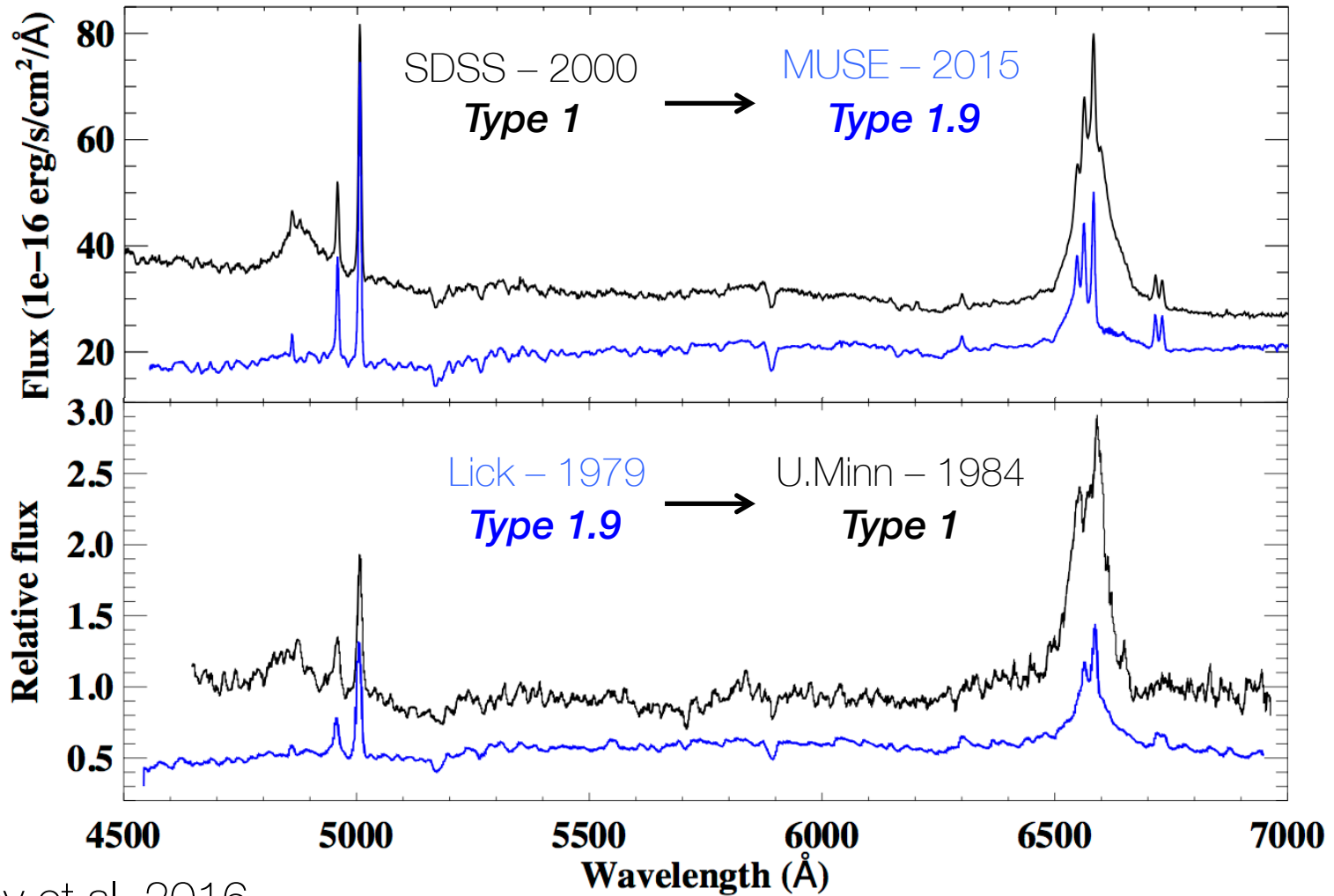


# Mrk 1018

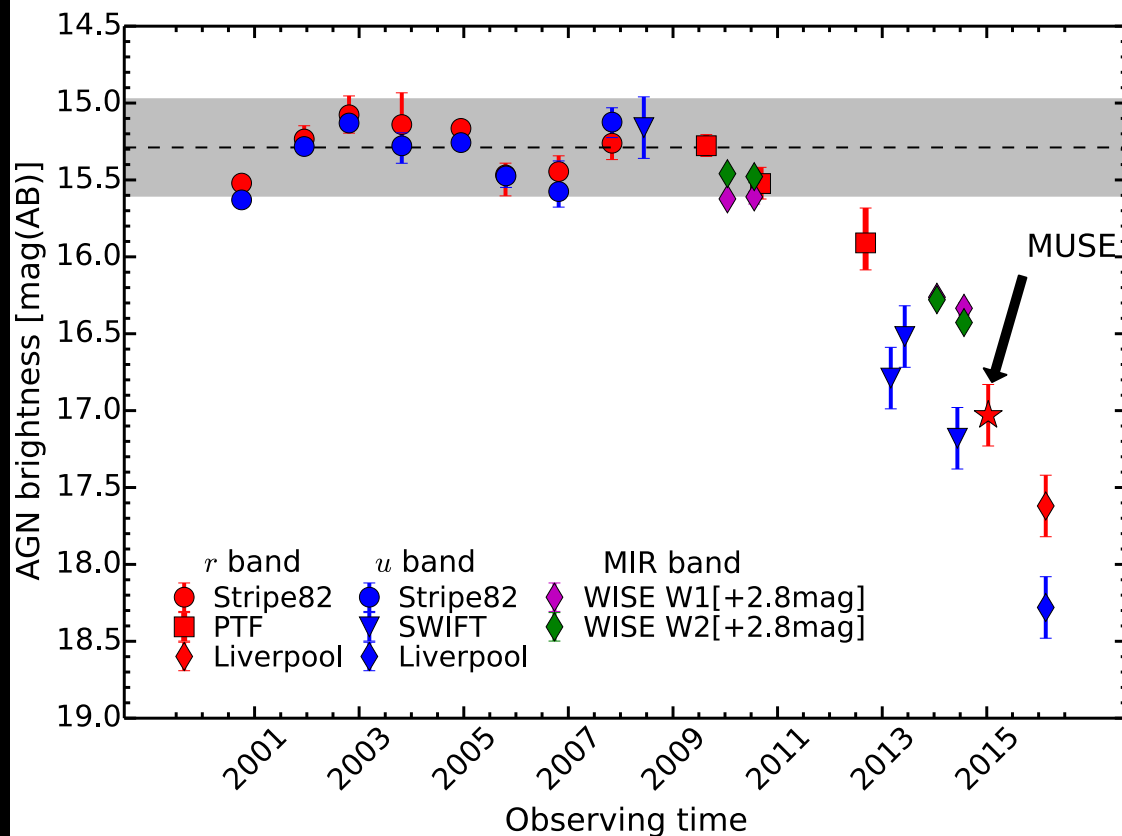




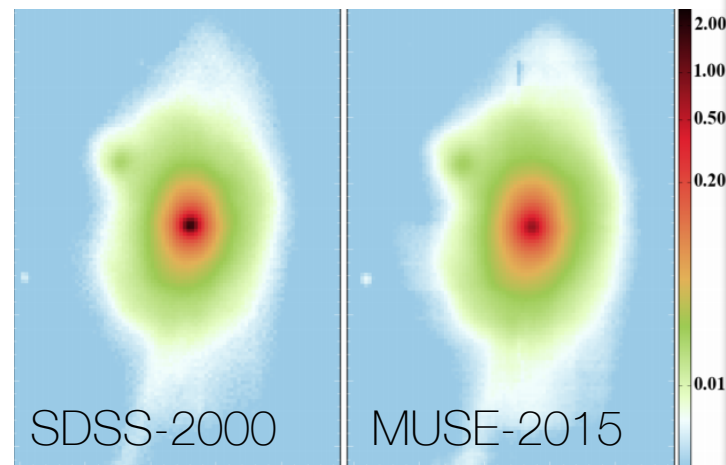
# Mrk 1018



# Light Curve



Bright Phase



Type 1.9 → Type 1 → Type 1.9

┌── 30 Years ──┐

Cause?

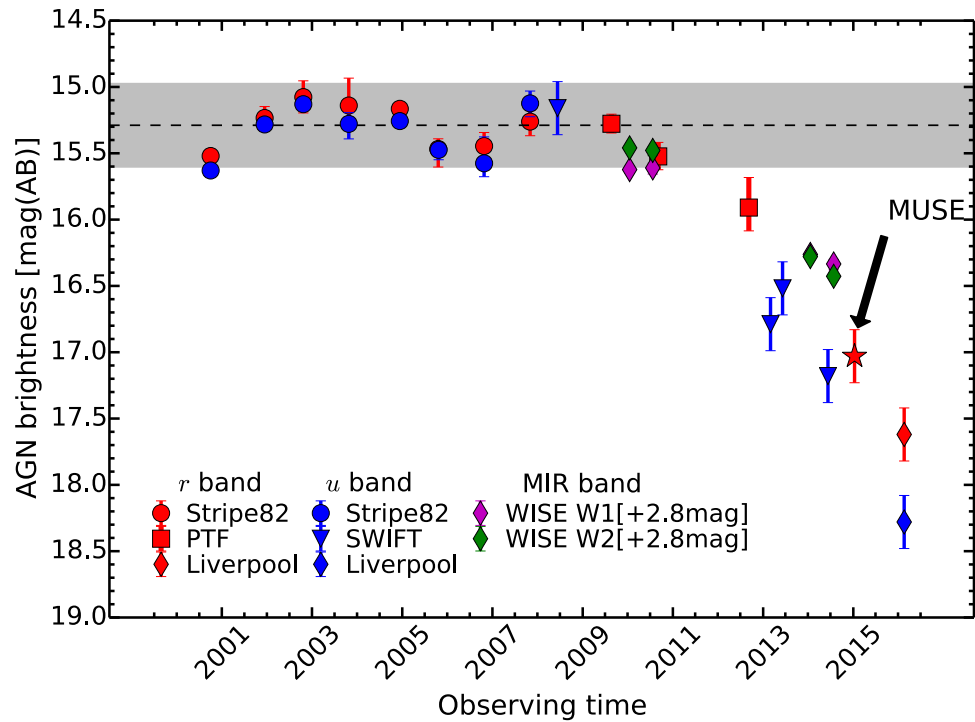
# Cause?

- TDE?



# Cause?

- ~~TDE?~~

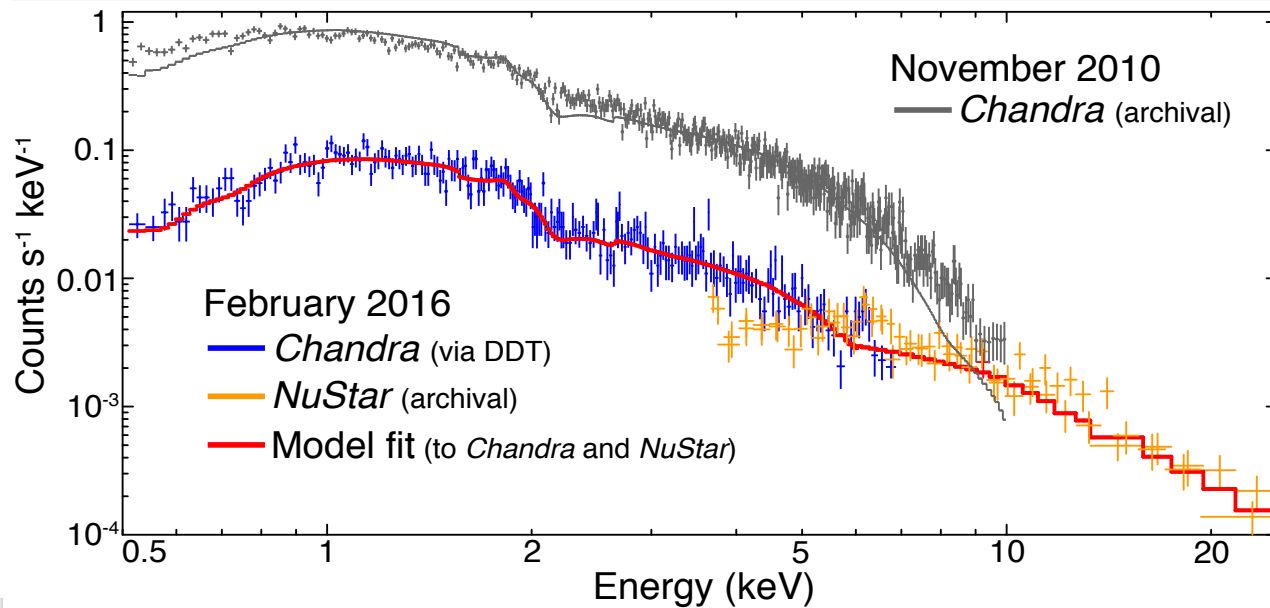


# Cause?

- ~~TDE~~
- Obscuration?

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- ~~Obscuration?~~



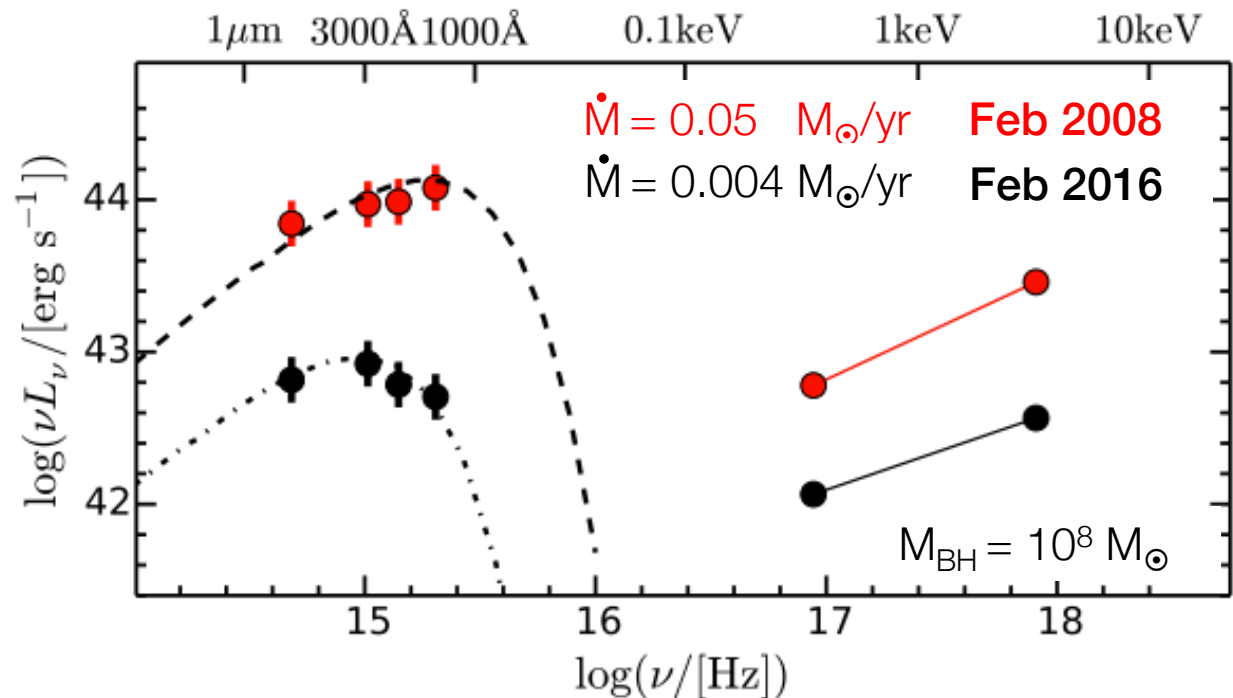


# Cause?

- ~~TDE~~
- ~~Obscuration~~
- Change in accretion rate

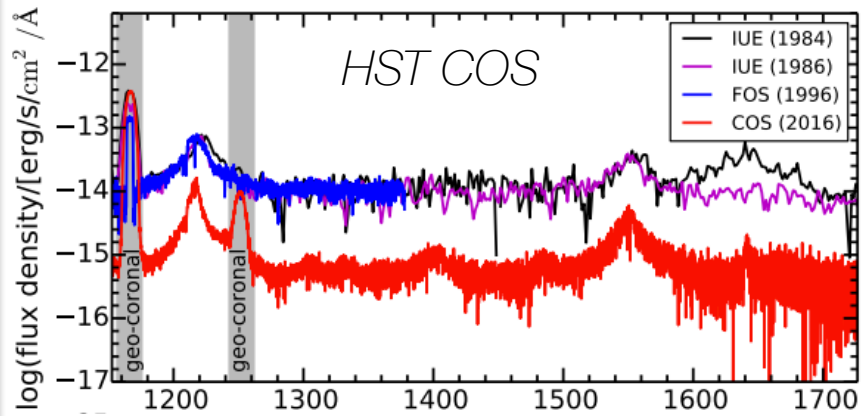
# Cause?

- ~~TDE~~
- ~~Obscuration~~
- Change in accretion rate ✓



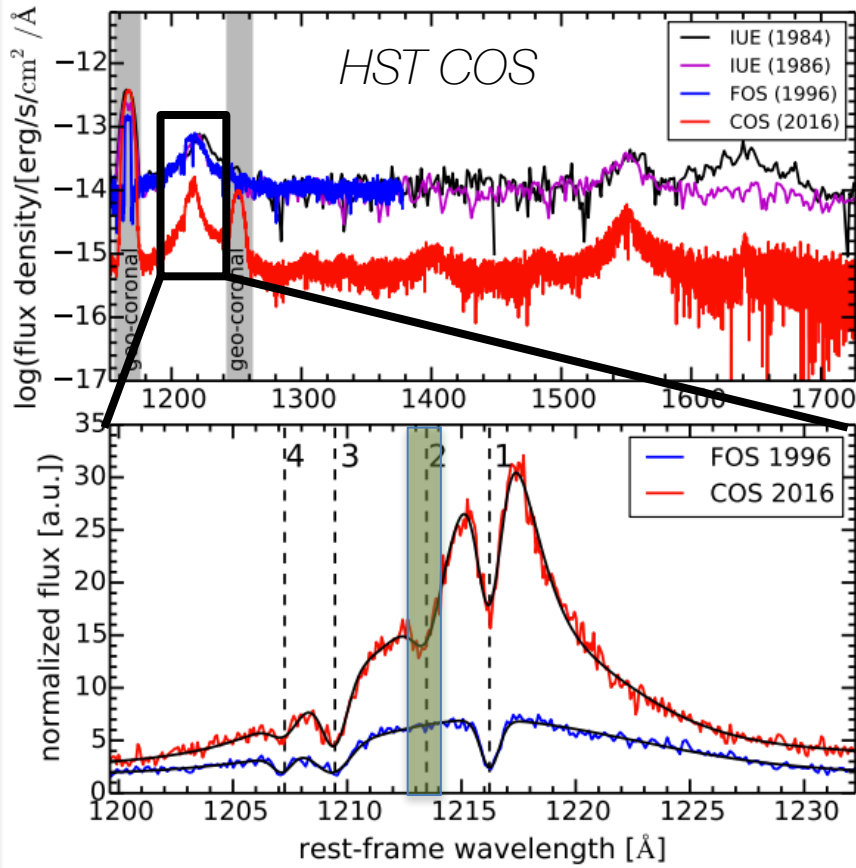
# Emission Lines

UV



# Emission Lines

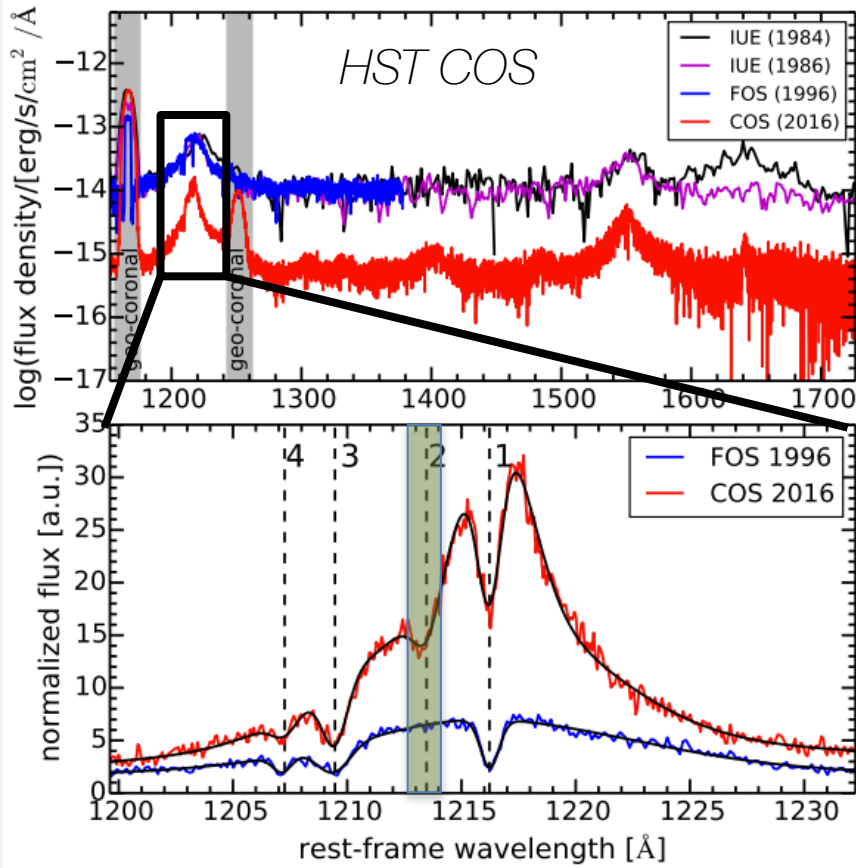
UV



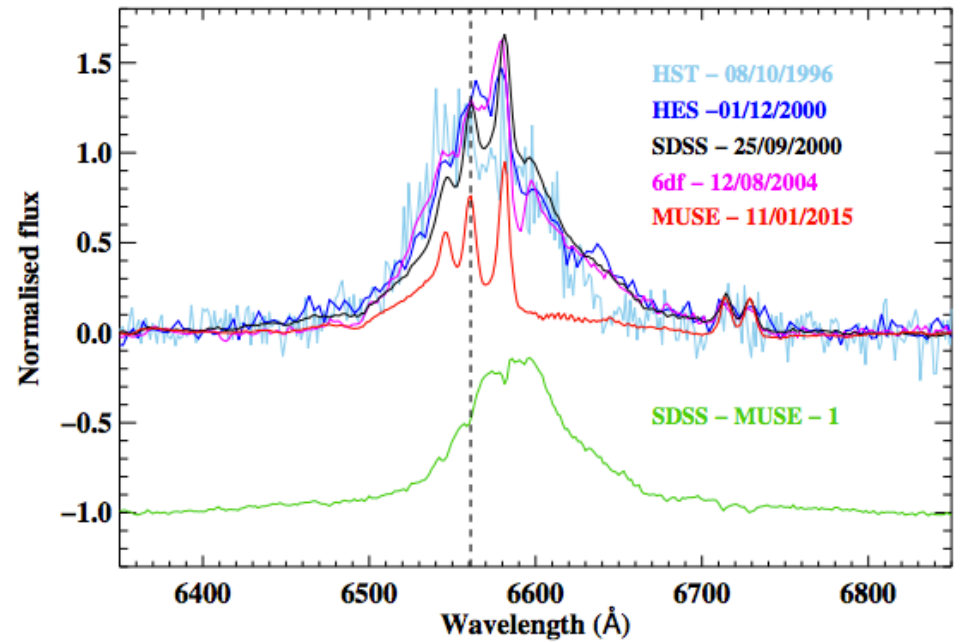
New Ly- $\alpha$  absorption line

# Emission Lines

UV



H- $\alpha$  line comparison

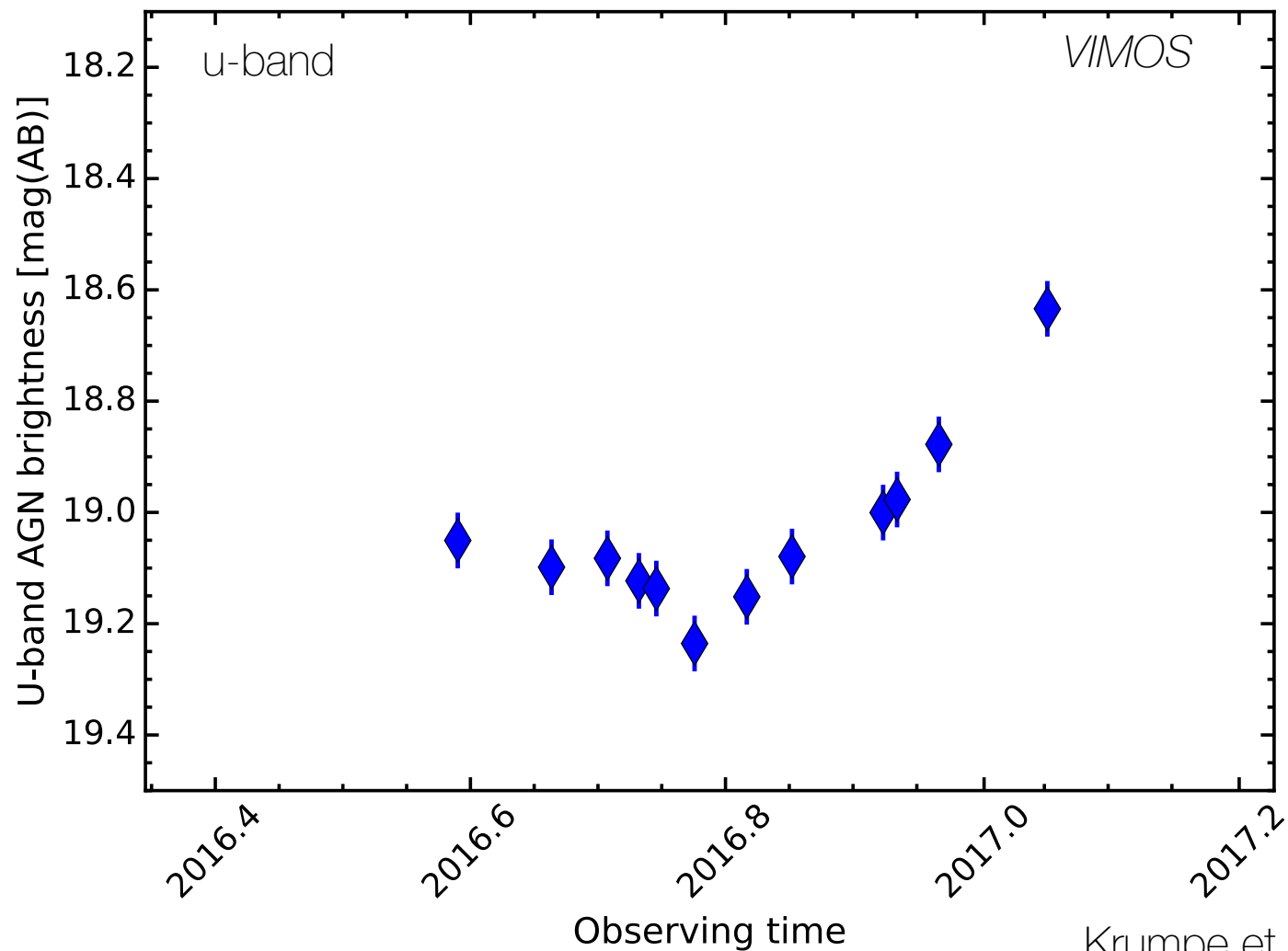


New Ly- $\alpha$  absorption line

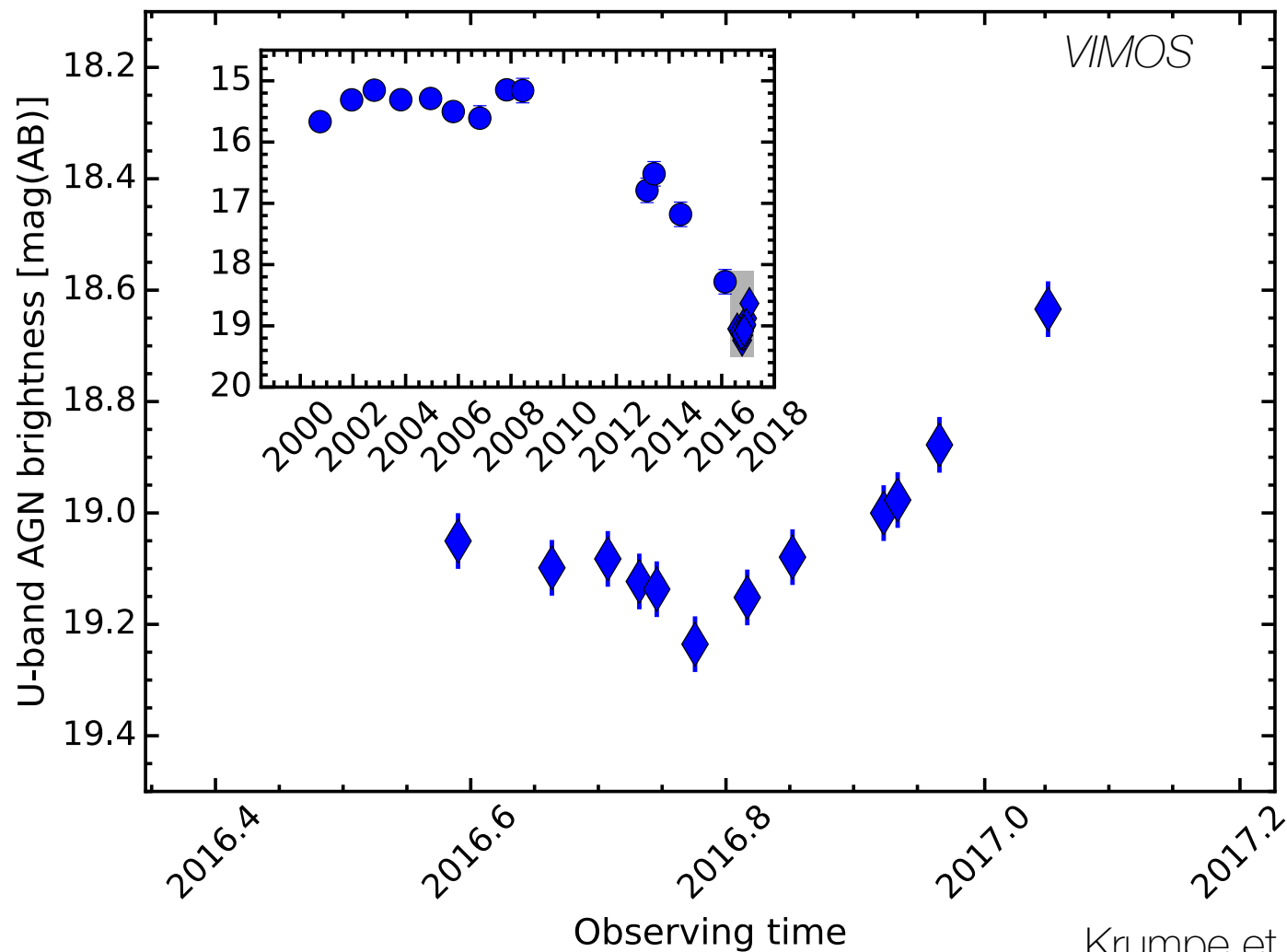
Blueshifted H- $\alpha$  broadline

Recent Changes...

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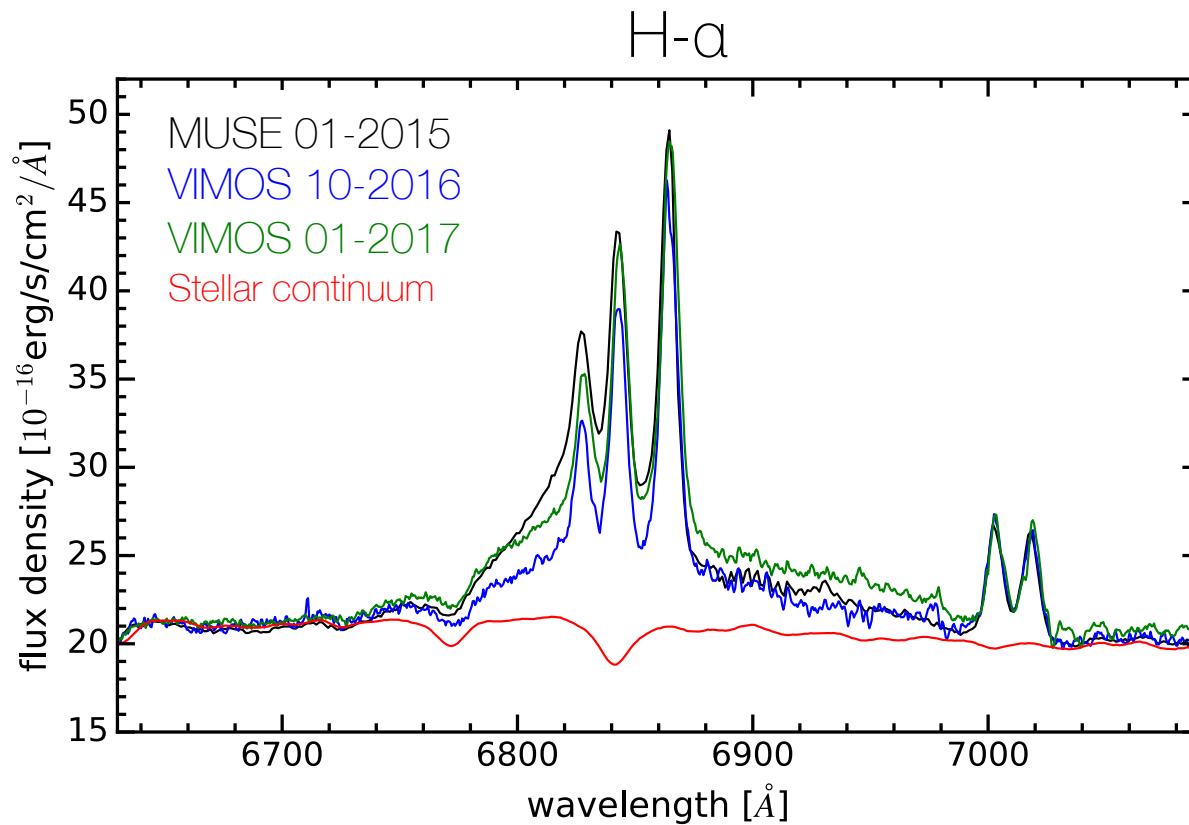


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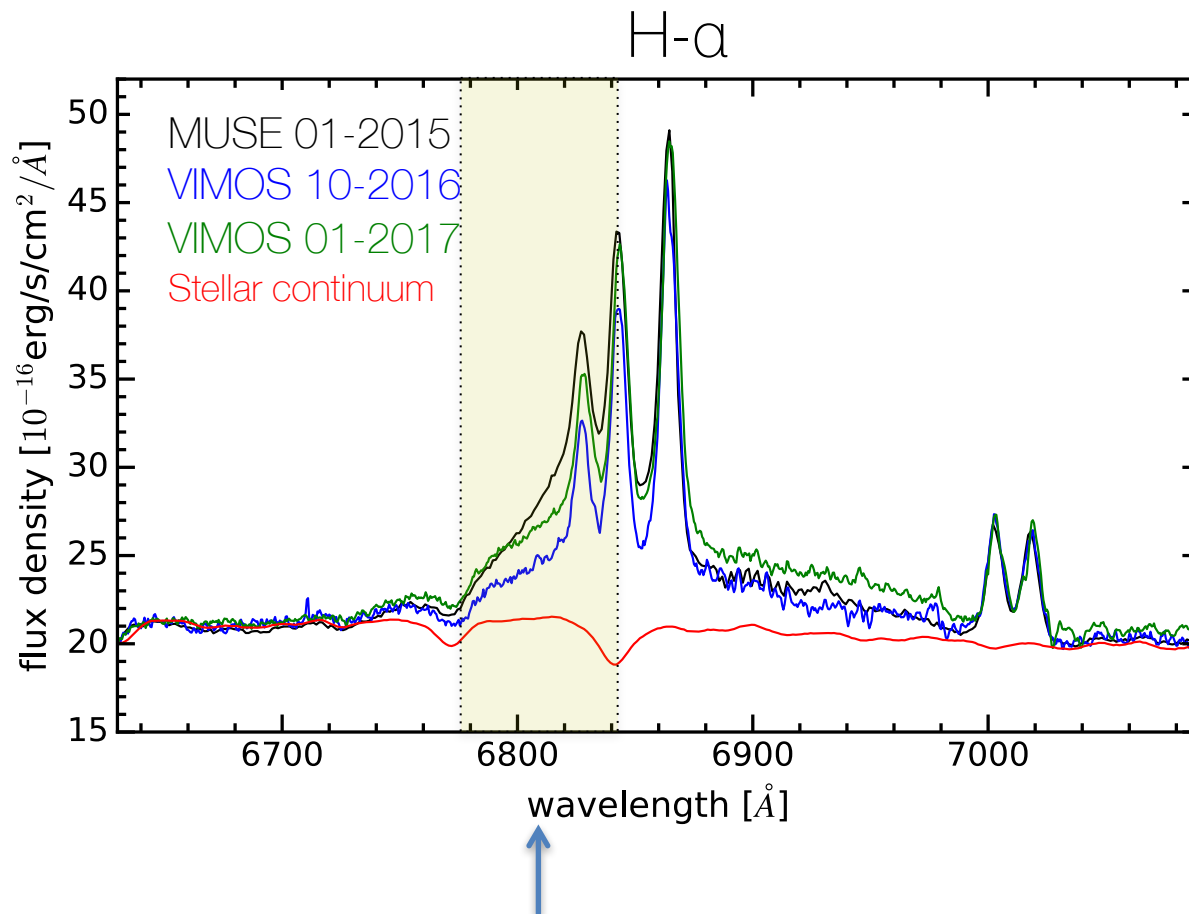




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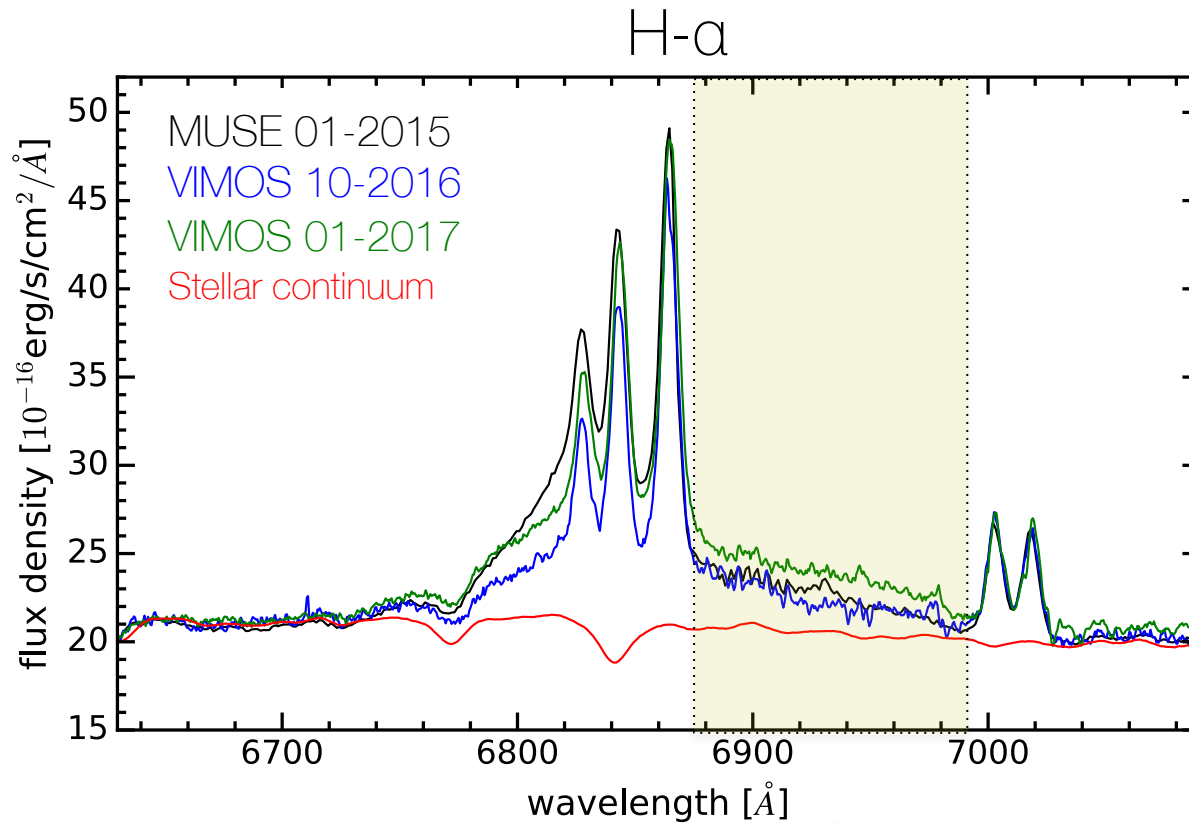


# Recent Changes...



Reduced blueshifted component

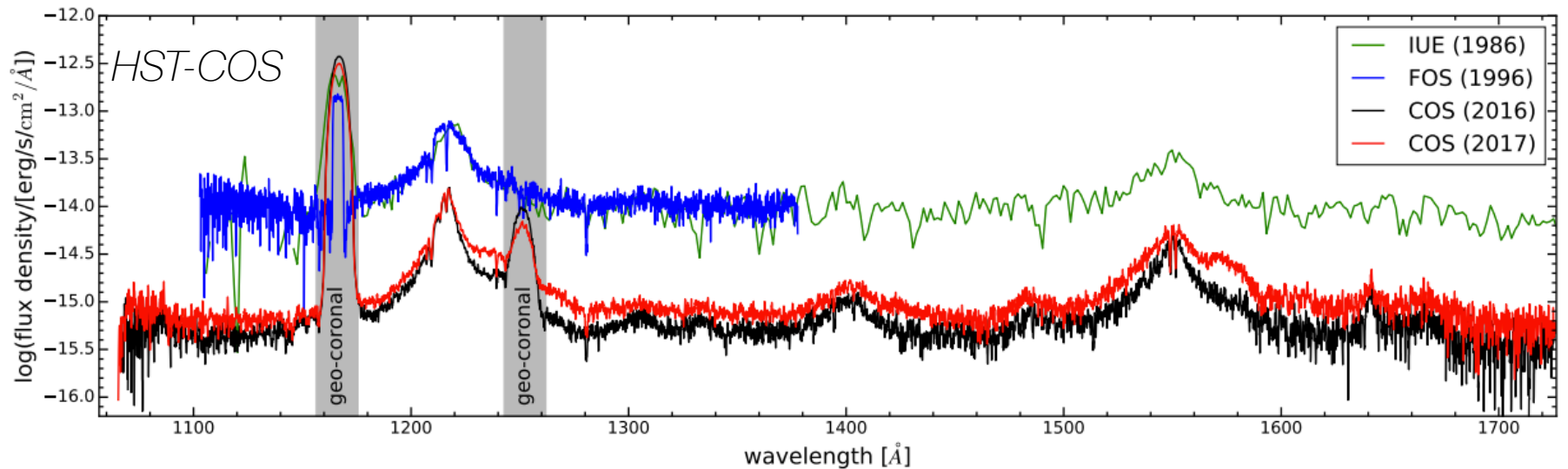
# Recent Changes...



↑  
Increased red wing

# Recent Changes...

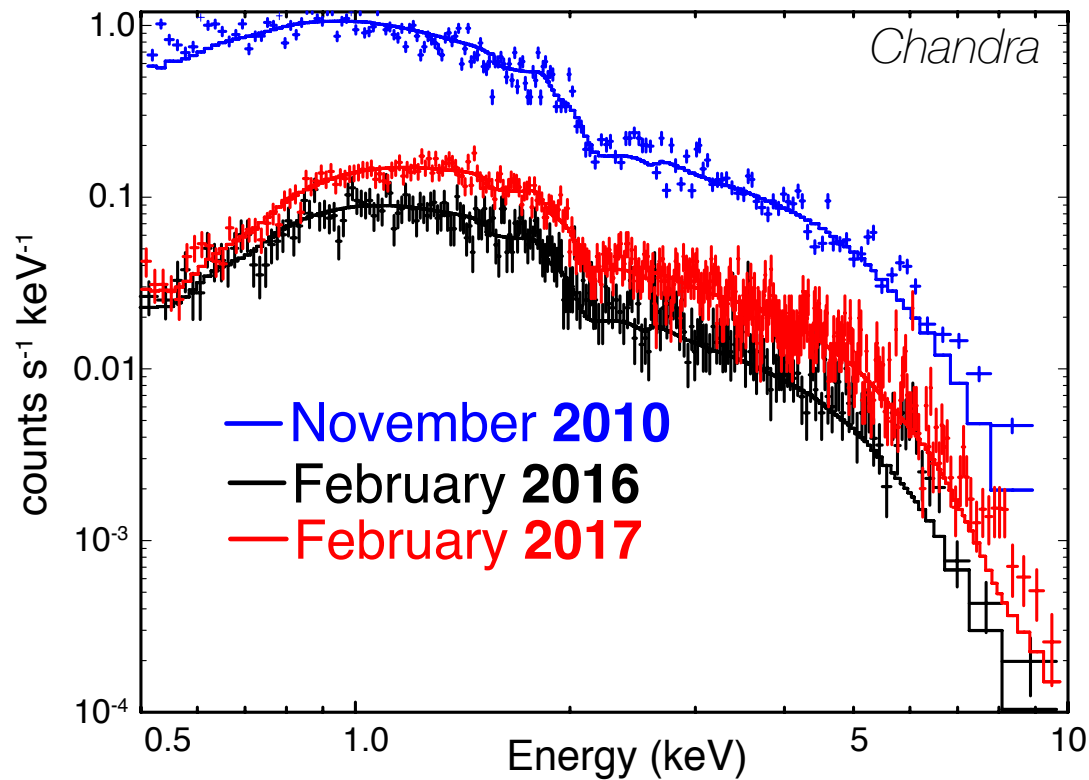
UV



New red bumps in *both* Lyman- $\alpha$  and CIV

# Recent Changes...

X-ray





# Summary

- Mrk 1018 undergoing major accretion reconfiguration
  - Obscuration and TDE ruled out
- Possible scenarios
  - Onset & shutdown of outflow
  - Interactions in binary SMBH system
  - ???
- Stay tuned!



[www.cars-survey.org](http://www.cars-survey.org)