JOINT MICROLENSING AND REVERBERATION MAPPING ANALYSIS OF HE0435-1223: THE VERY EARLY DAYS

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HE0435-1223

- Quadruply-lensed quasar at z = 1.689
- First lensed quasar to be reverberation mapped
- Microlensing and reverberation mapping only viable method for probing the size scales of accretion disk and BLR
- So can be used to derive complementary size constraints of these emission regions.

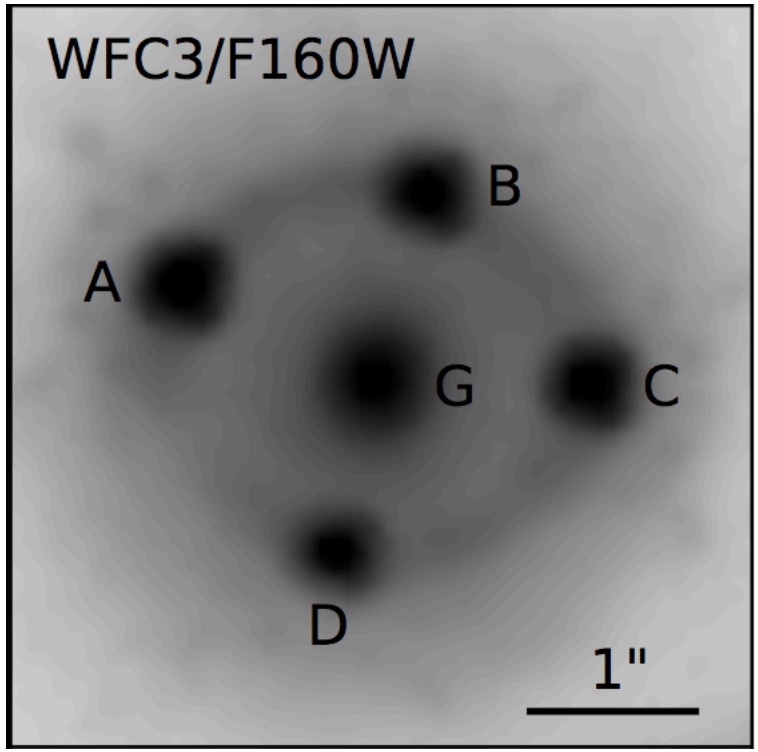

Image credit:
Wong et al. 2017

Main Science Questions

- Do the size constraints found from RM and microlensing agree?
- What does this tell us about BLR structure? Transverse vs radial size measurements.
- This object will be one of the highest redshift quasar RMed, does the found lag agree with previous findings/expectations from R-L relationship?
- Can we obtain line wings and line centre size constraints?
- Check whether we can perform snapshot microlensing without knowledge of underlying continuum variations?
- Do we see change in microlensing signal in the 6 month period?
- Geraint – Can we see the changing in BLR size with luminosity in microlensing?

Original Program

Title:	**Reverberation Mapping of a Gravitationally-lensed Quasar**
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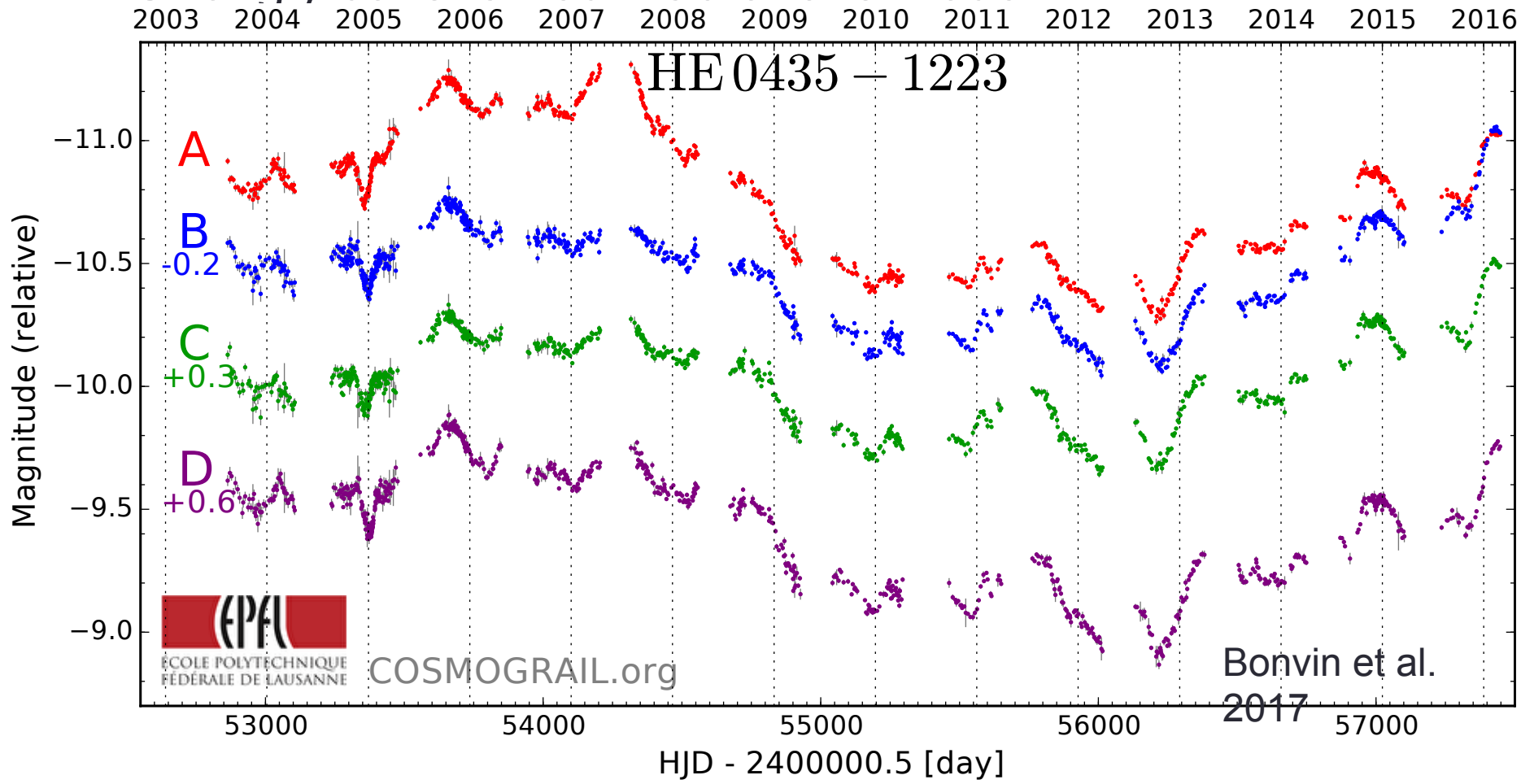
Photometric light curves

- 13 years of monitoring
- Average observing cadence was 11 &16 days
- Strongly constrained macro-lens model



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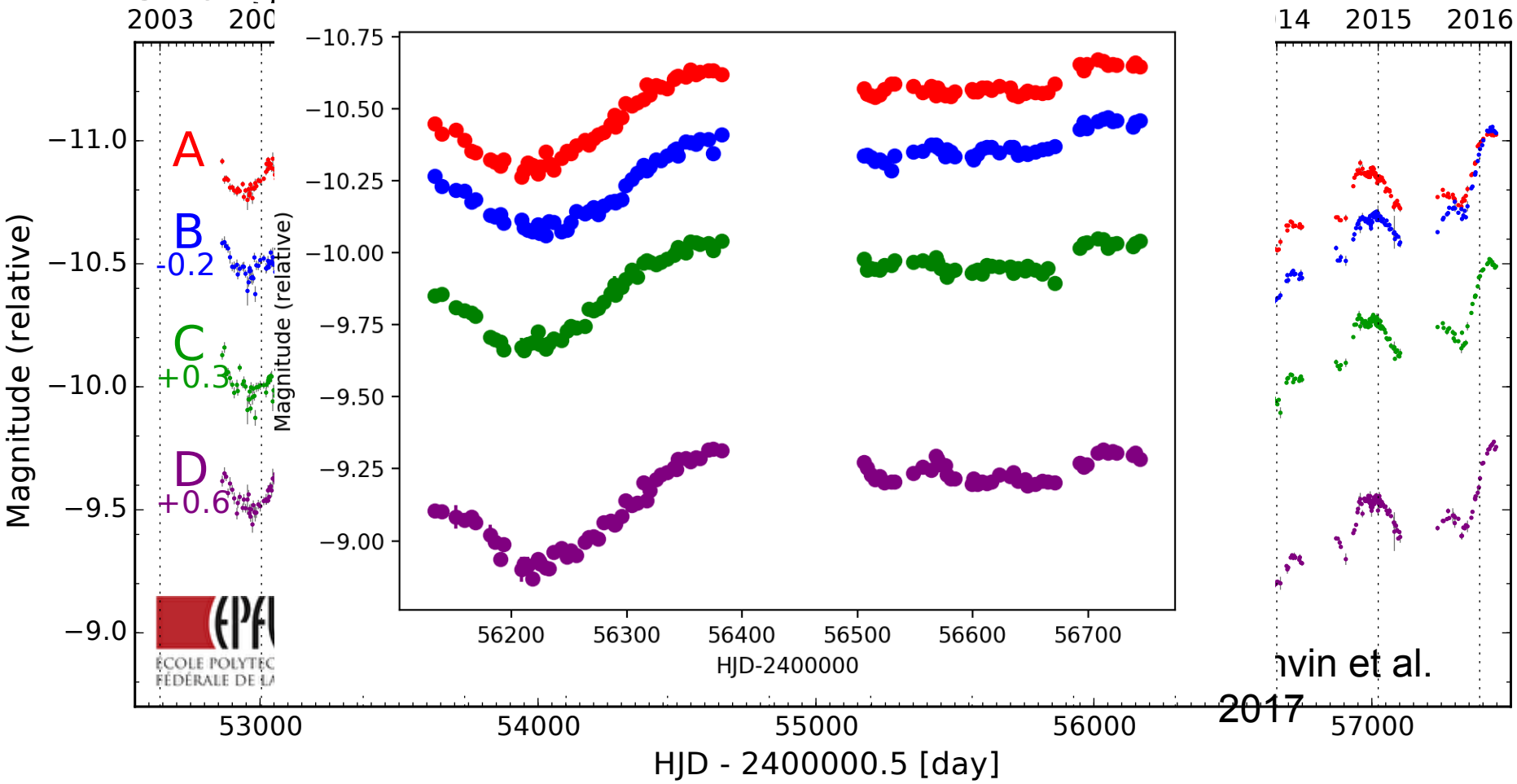
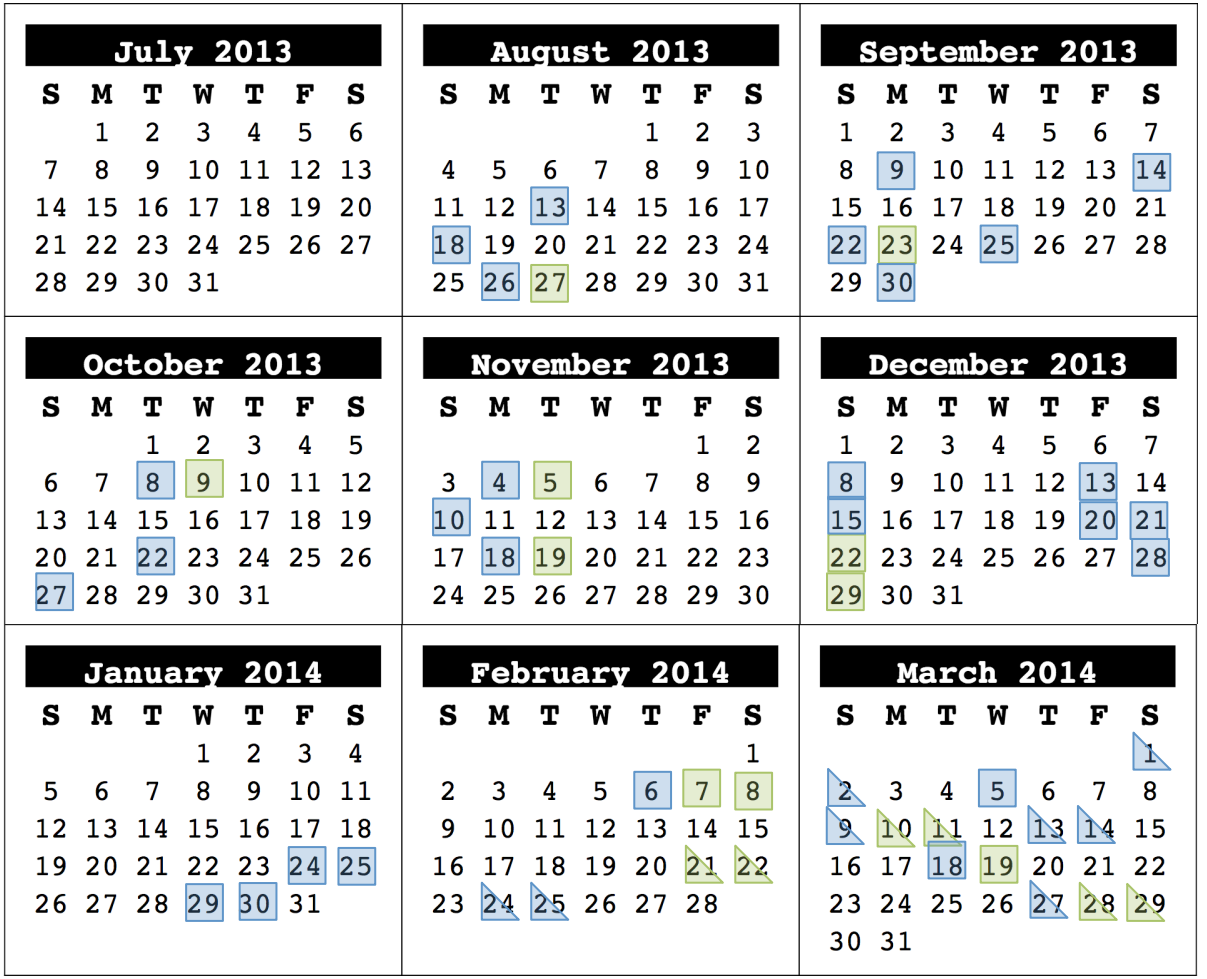


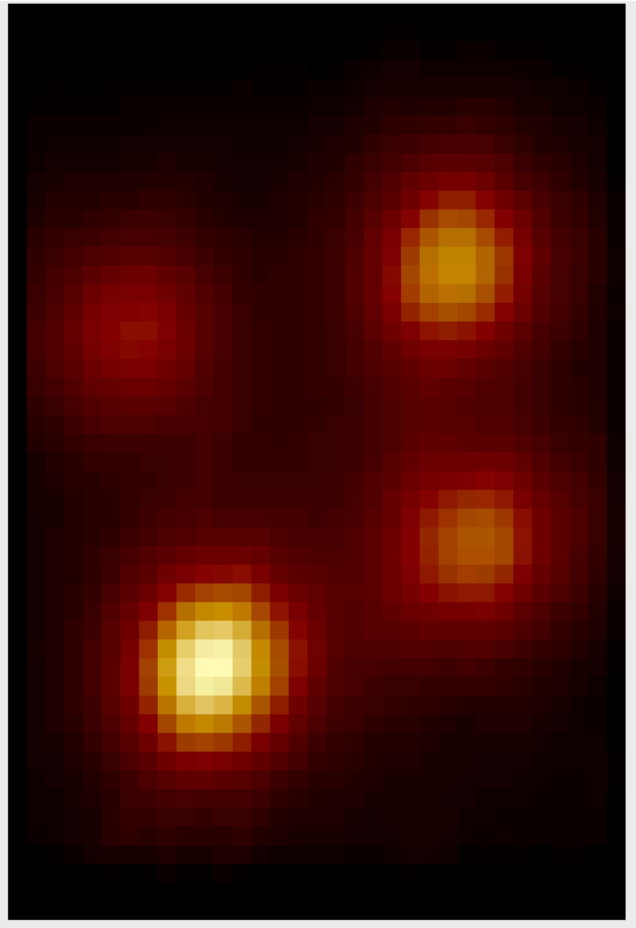
GMOS IFU data

- Gemini South
- 13 epochs
- Taken over 6 months
- C IV lag is estimated to be 24−70 days
- Delays (Bonvin et al 2017):
  - AB:-8.8 days
  - AC:-1.1 days
  - AD:-13.8 days

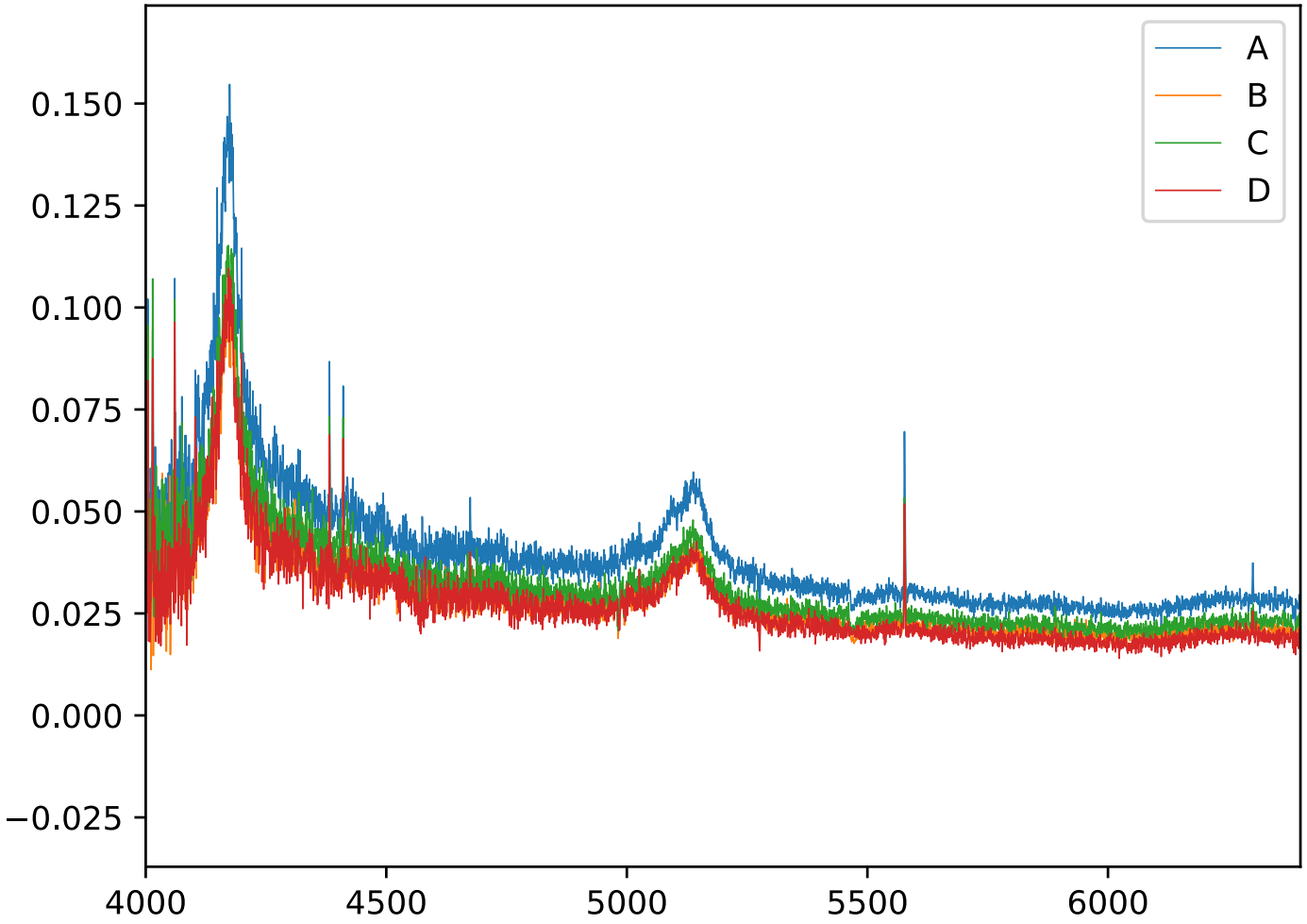


Early Results

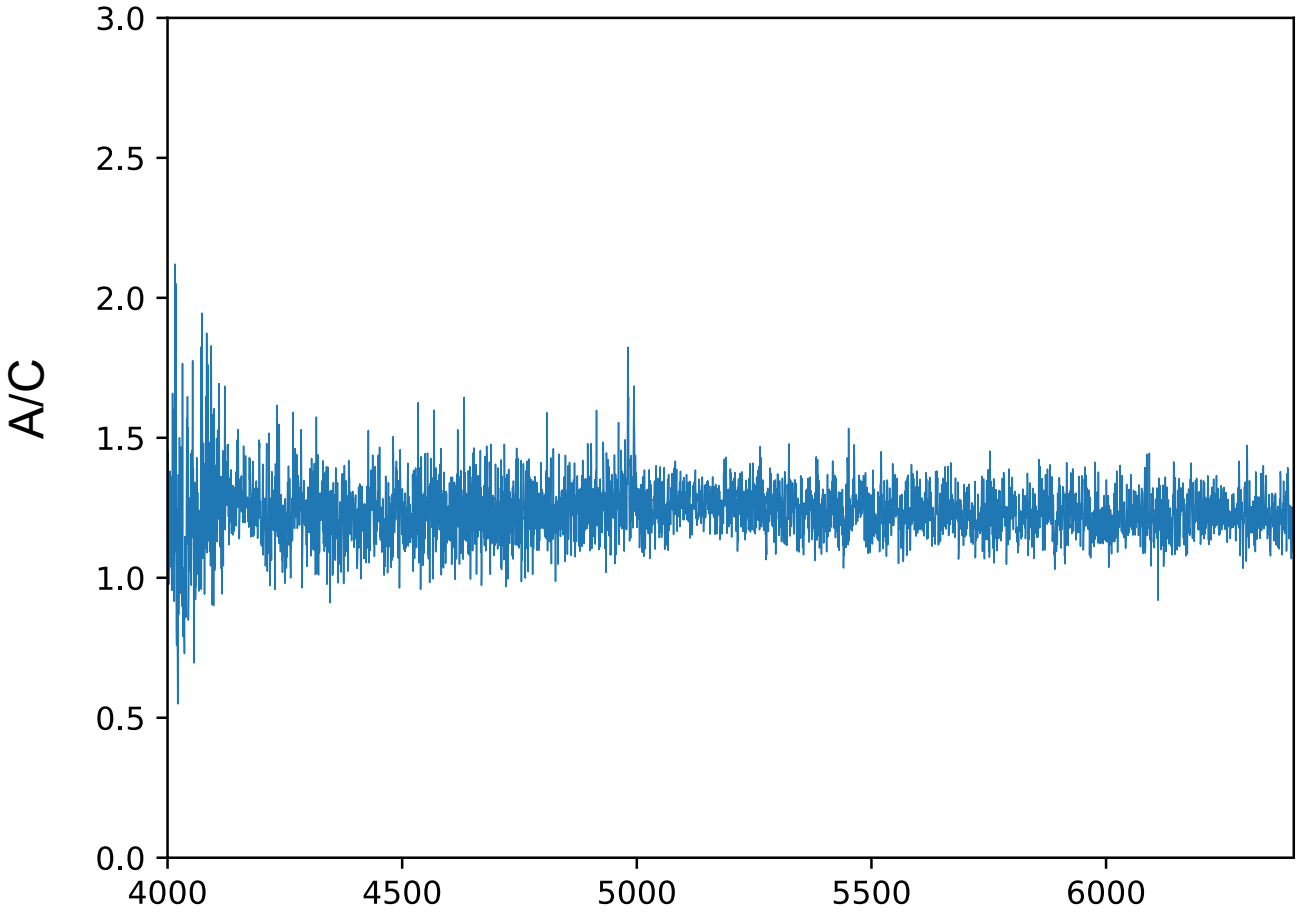
- Early Results – First night reduced (for the first and a half times)



Early results

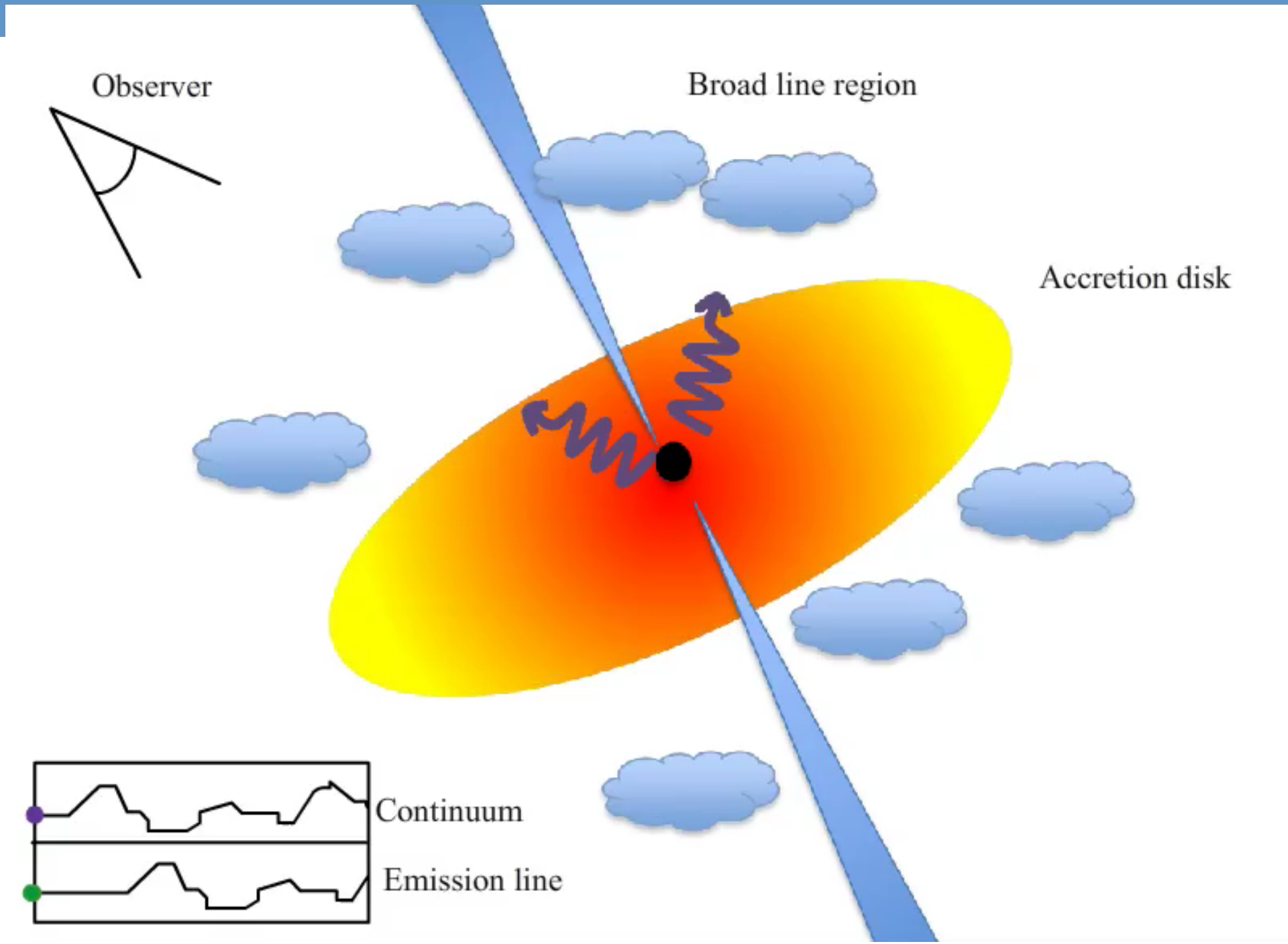


Early results



Major issue

- Flux calibration was supposed to be done using galaxy flux, compared to known HST flux. However, galaxy flux in IFU data low.
- Could we scale up to match Cosmograil data. Need a good knowledge of microlensing.
- Any help welcome!


Observer
Broad line region
Accretion disk
Continuum
Emission line