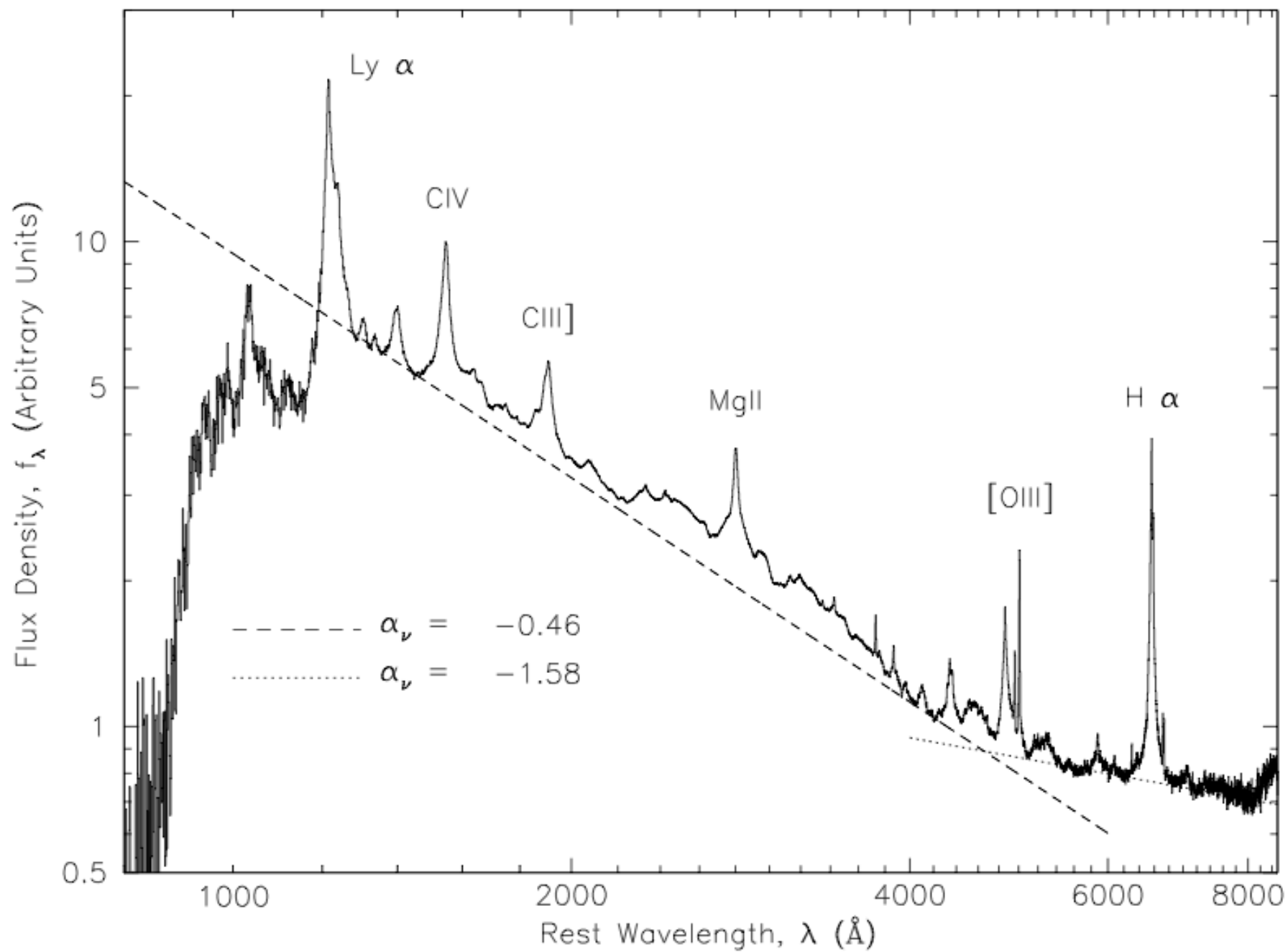
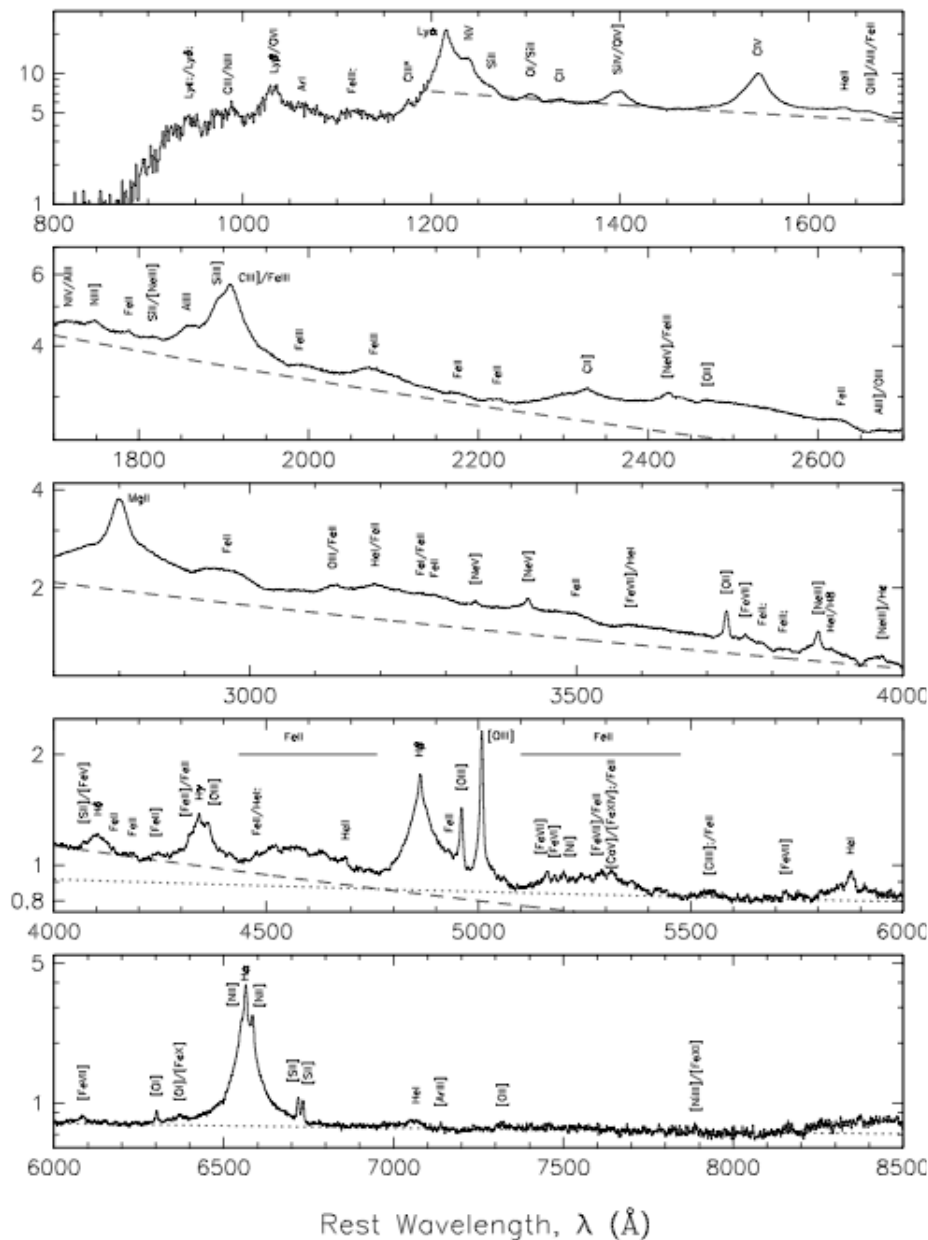




AGN SPECTRAL DECOMPOSITION: A BAYESIAN APPROACH

June, 26-28, 2013



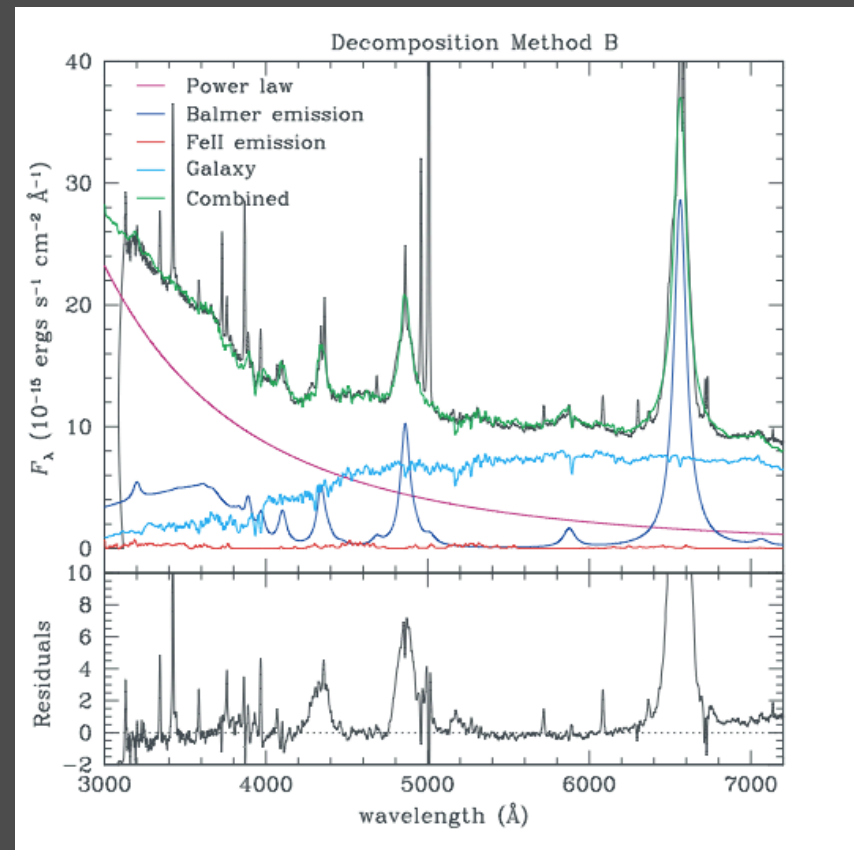
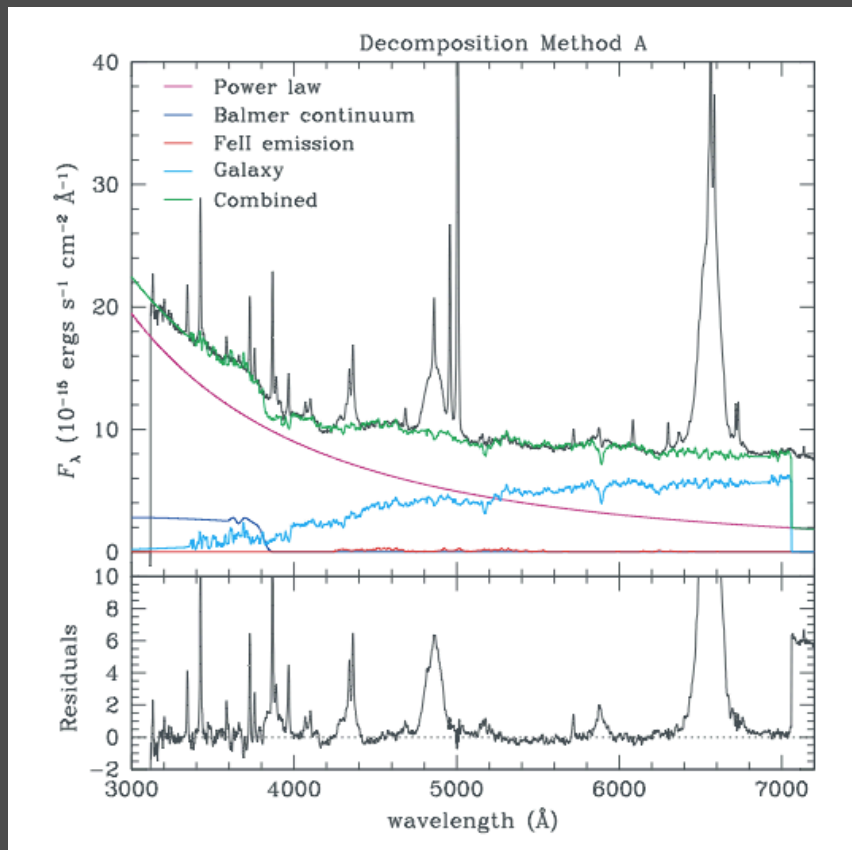


SPECTRAL DECOMPOSITION IS FUNDAMENTAL TO UNDERSTAND DETAILED STRUCTURE OF AGN

- Reverberation Mapping (L_{AGN} – Isolate broad components)
- M_{BH} estimates from scaling relations
- Host component studies
- Emitting gas properties

PREVIOUS WORK: BEST-FIT SOLUTION THROUGH OPTIMIZATION ALGORITHMS

Is there room for improvement?

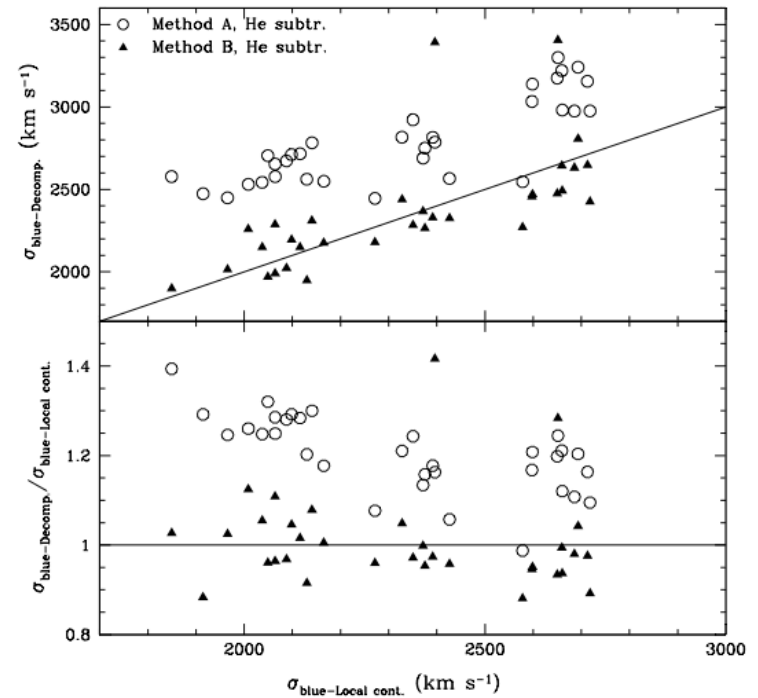
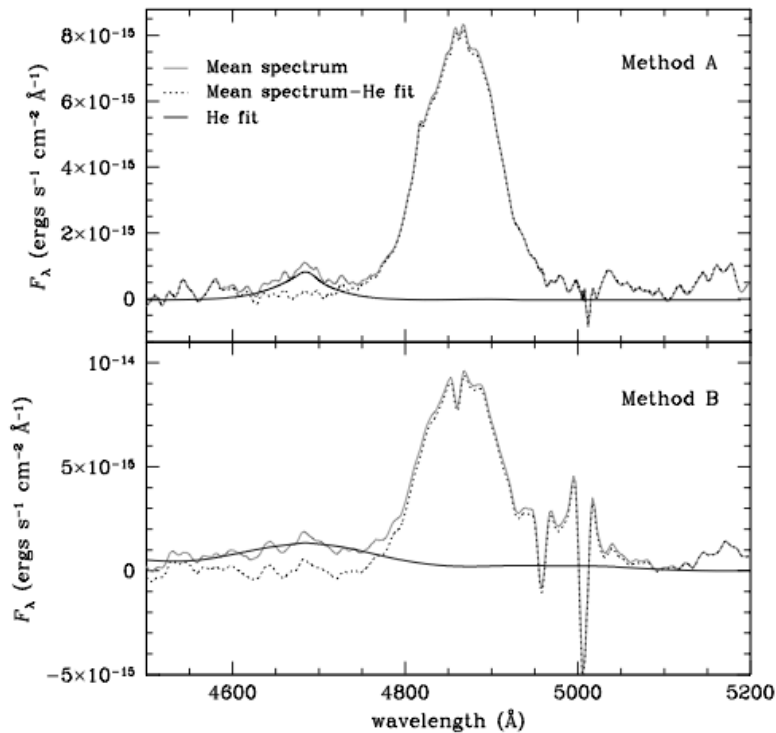


SAME SPECTRUM, DIFFERENT FITTING PROCEDURES

Method A $L(5100) = (4.84 \pm 0.37) 10^{-15}$

Method B $L(5100) = (7.05 \pm 1.28) 10^{-15}$ (galactic extinction?)

Hubble Imaging $L(5100) = (4.45 \pm 0.37) 10^{-15}$



SAME SPECTRUM, DIFFERENT FITTING PROCEDURES,
DIFFERENT ASSUMPTIONS



DIFFERENT BROAD H β PROFILES

QUESTIONS (only a few)

- Can we properly quantify the uncertainties on the model?
- How much does the best fit model depend on the initial guess?
- Can we improve our sampling of the parameter space?
- Can we increase the number of components while efficiently exploring the parameter space?
- Can we have a better handle on the correlation between individual components?
- How can we properly take into account uncertainties on the continuum model while estimating the M_{BH} ?
- Is it possible to introduce a uniform approach to allow direct comparisons?
- How can we compare classes of models?

FUTURE WORK: BAYESIAN APPROACH

(Probability of the model given the data)

MCMC algorithm to sample the probability distribution

- Test a wide variety of models
- Description of the correlations and degeneracies among components

THINGS WE WILL EXPLORE:

- How will the differences depend on the S/N of the spectrum?
- How will the differences depend on the wavelength coverage?
- Are there observations that will help breaking the degeneracies?