

Relativistic Fe $K\alpha$ line detection in the *Suzaku* spectra of IC 4329A

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AGN II

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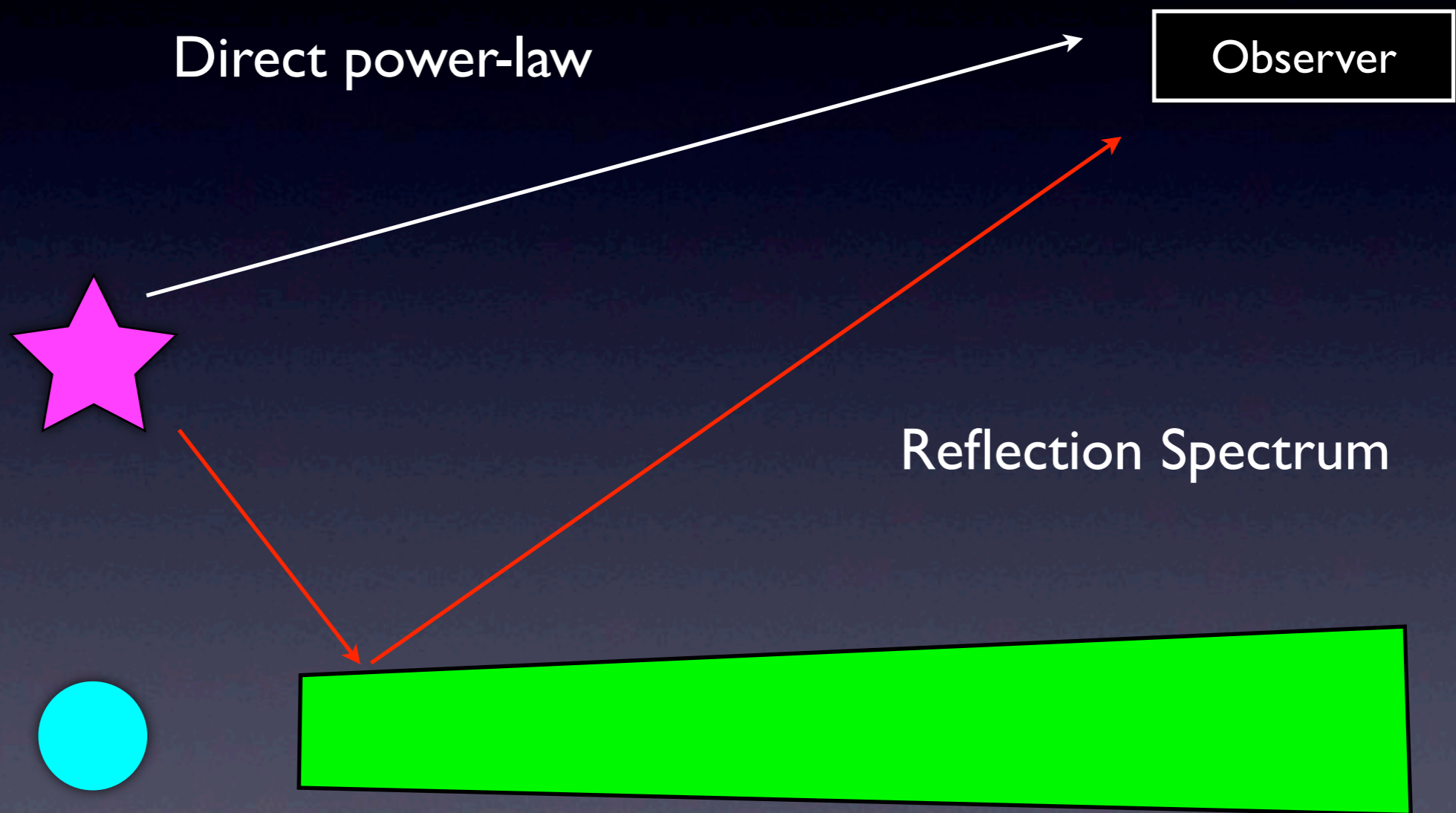


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(Very simple) physical idea



Previous work

Broad iron lines are expected to be a widespread feature in the bright AGN

- Nandra et al. 2007 → 30% no relativistic line
- de La Calle Pérez et al. 2010 → 20% no relativistic line
- Bhayani & Nandra 2011 → Relativistic effects can explain

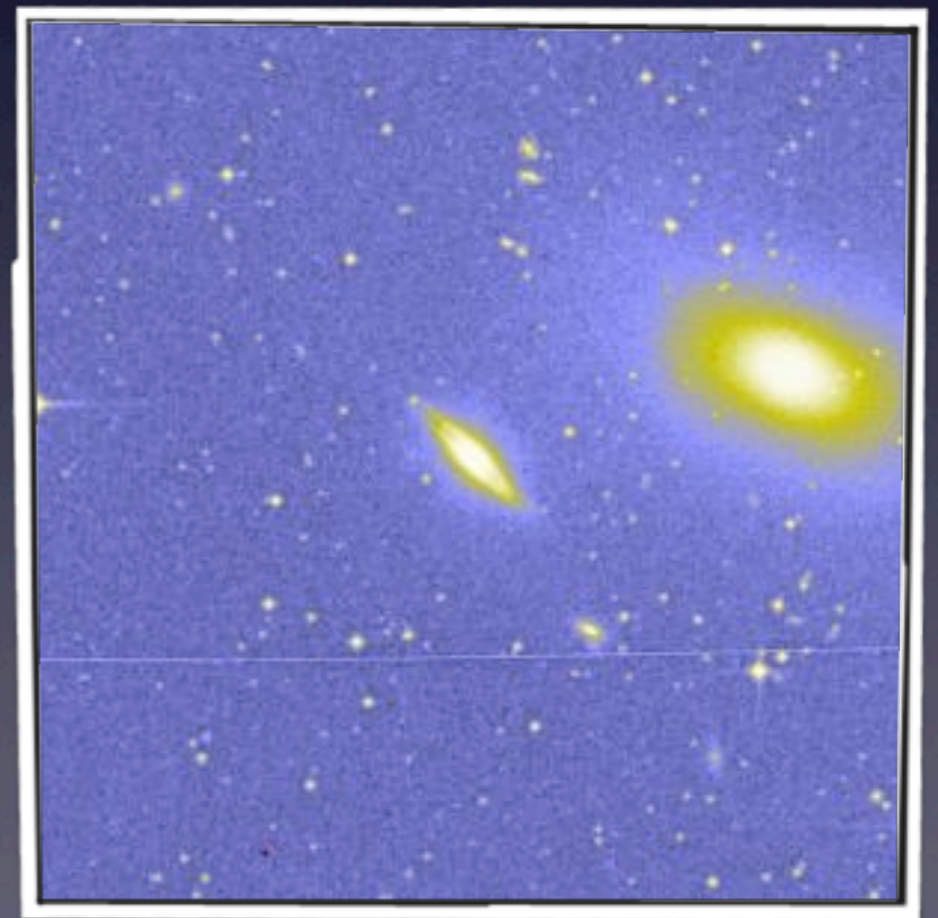
Still in some sources relativistic component is missing

Source and data

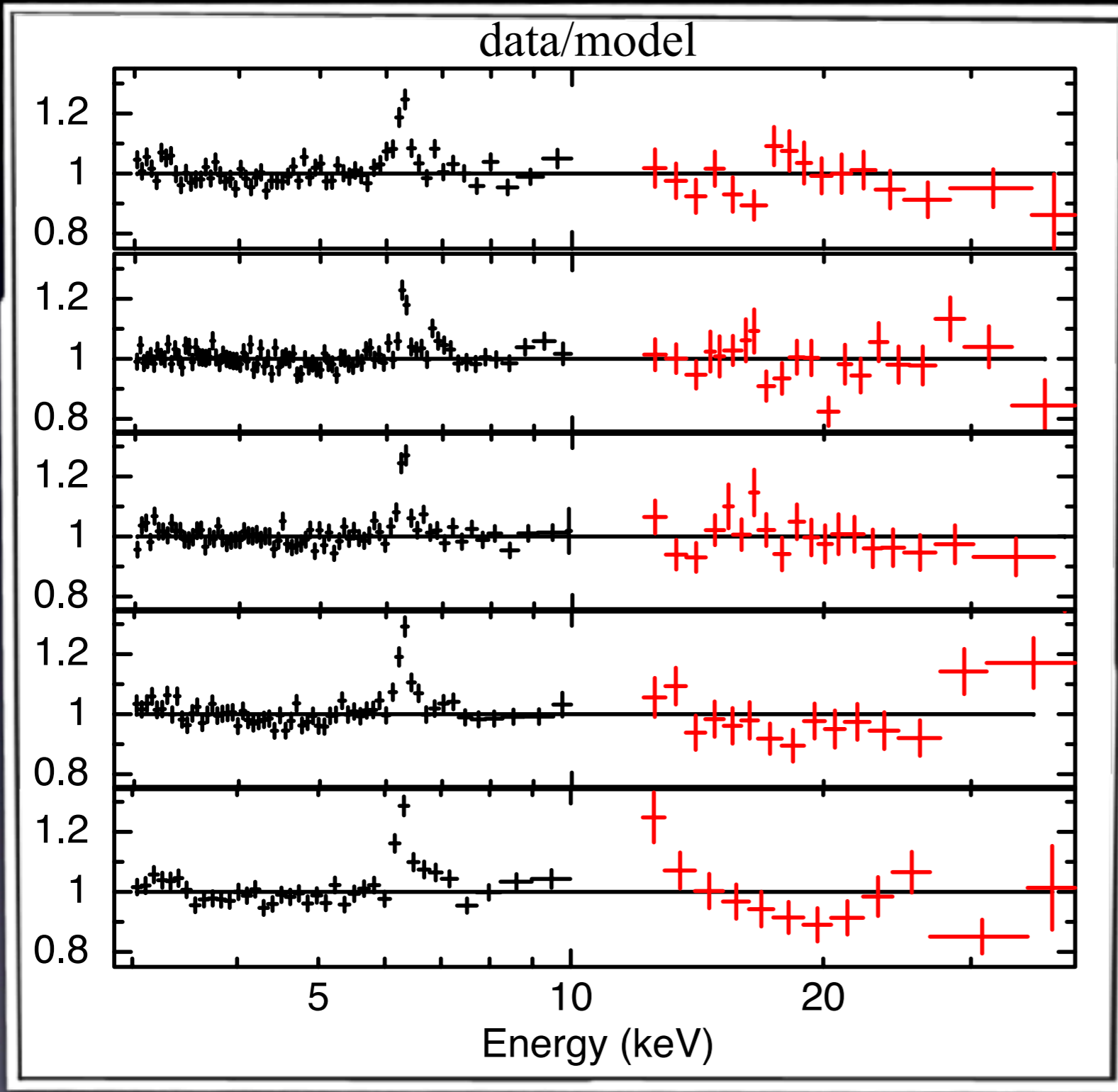
- IC 4329A is the second brightest Seyfert 1, after NGC 4151, with a flux of:

$$F \sim 2 \times 10^{-10} \text{ erg s}^{-1} \text{ cm}^{-2}$$

- Five Suzaku observations in 2007 on August 1, 6, 11, 16, 20 with an exposure of ~26 ks each.
- Total exposure of ~130 ks.



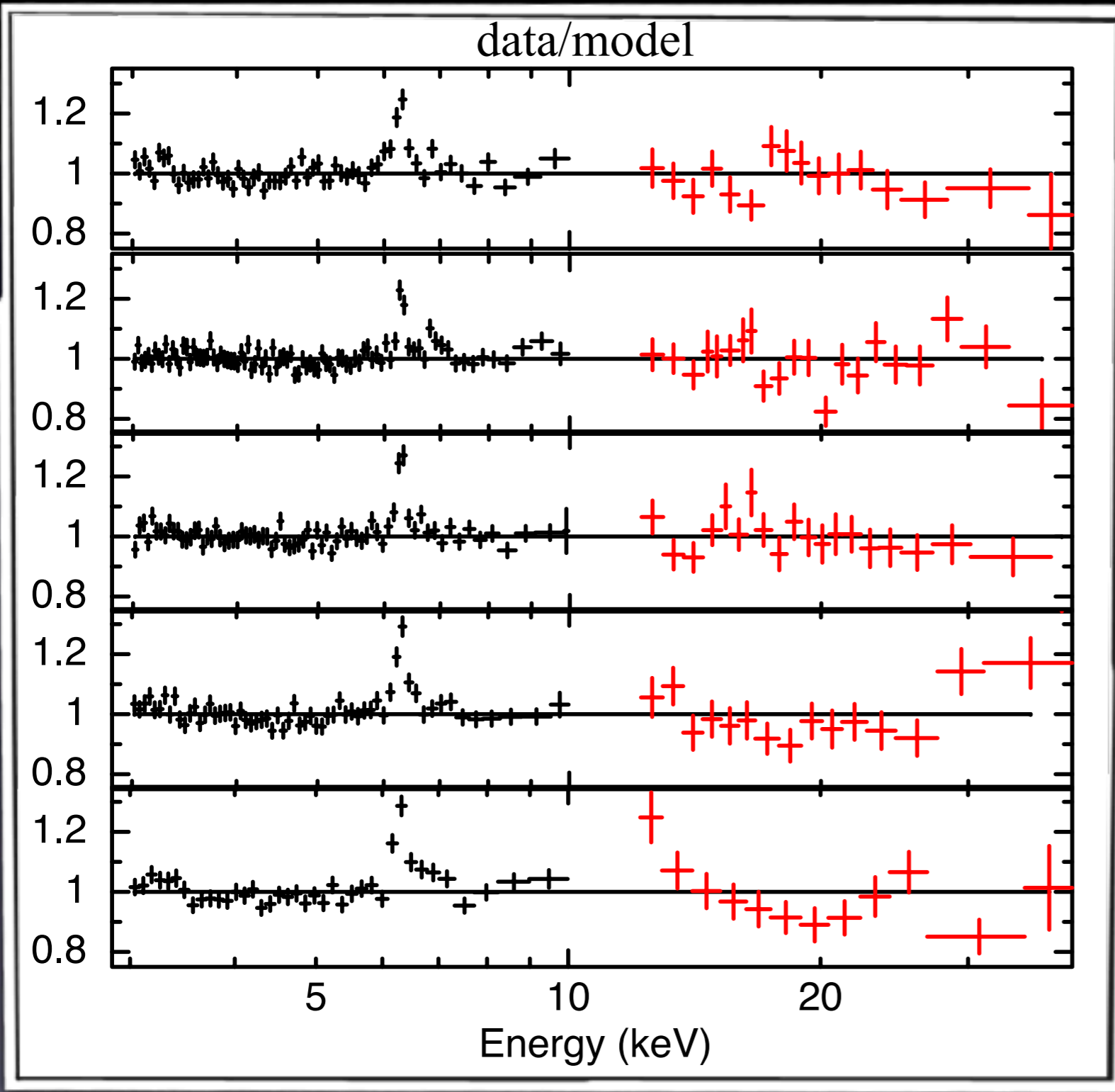
Data/Model Ratio



Strong narrow line

Model: $\text{zwabs}^* \text{pexrav}$

Data/Model Ratio



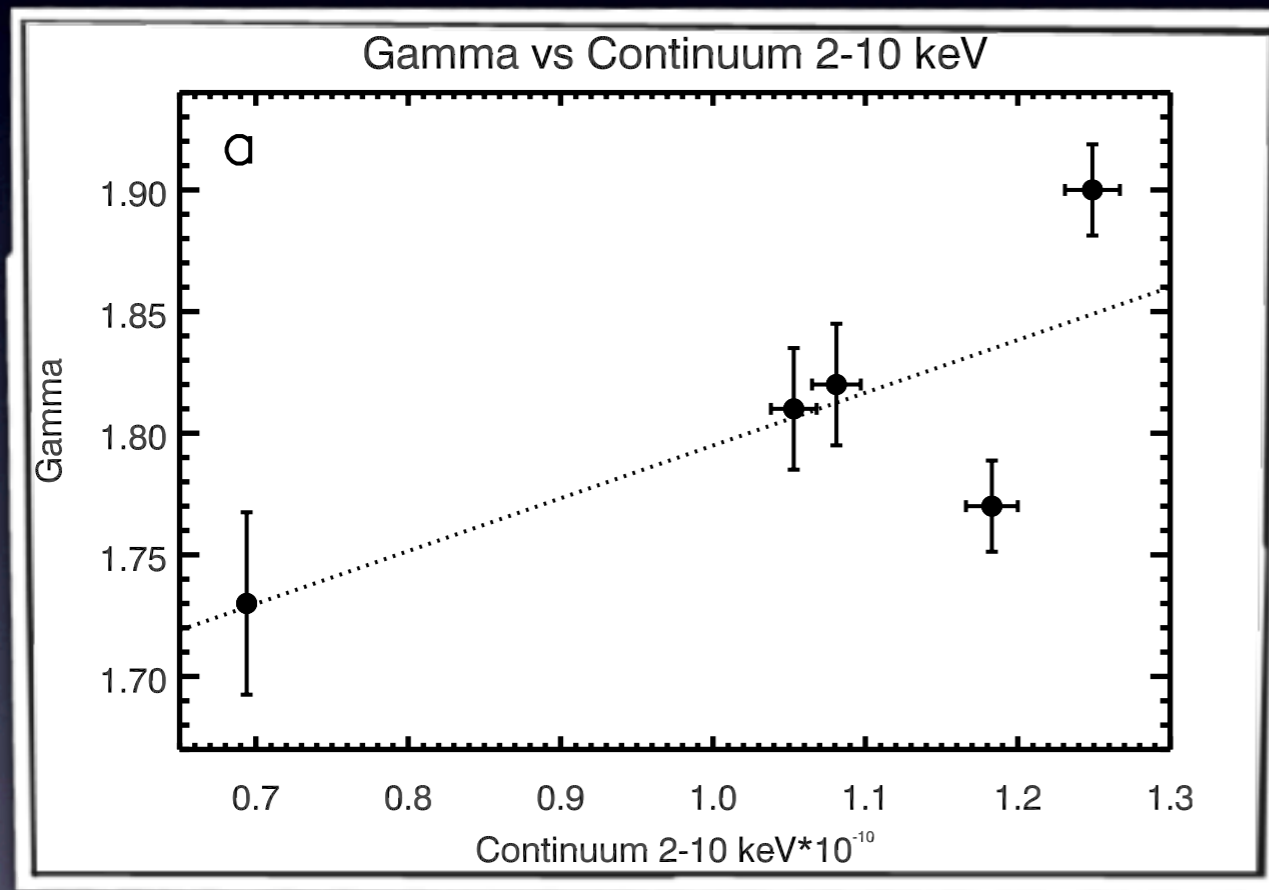
Strong narrow line



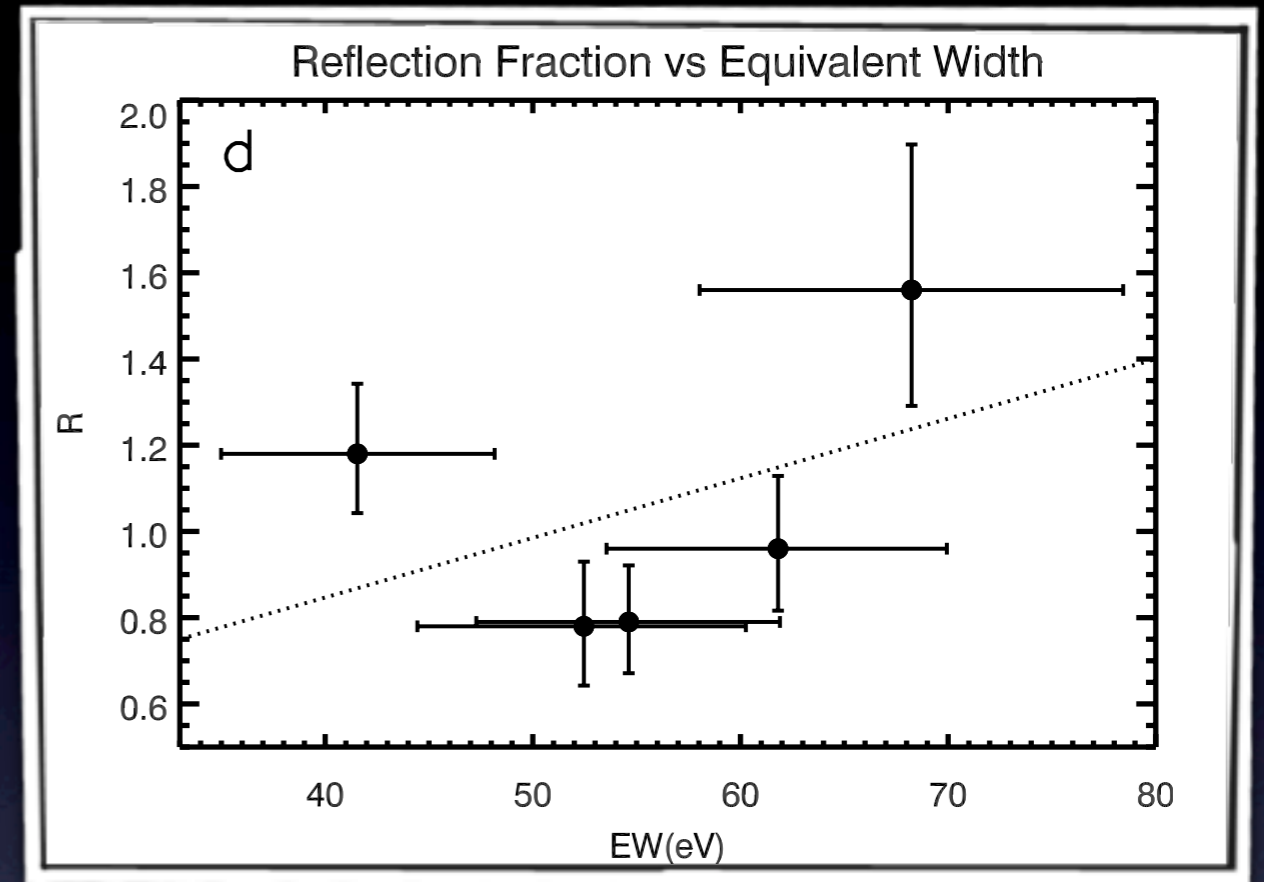
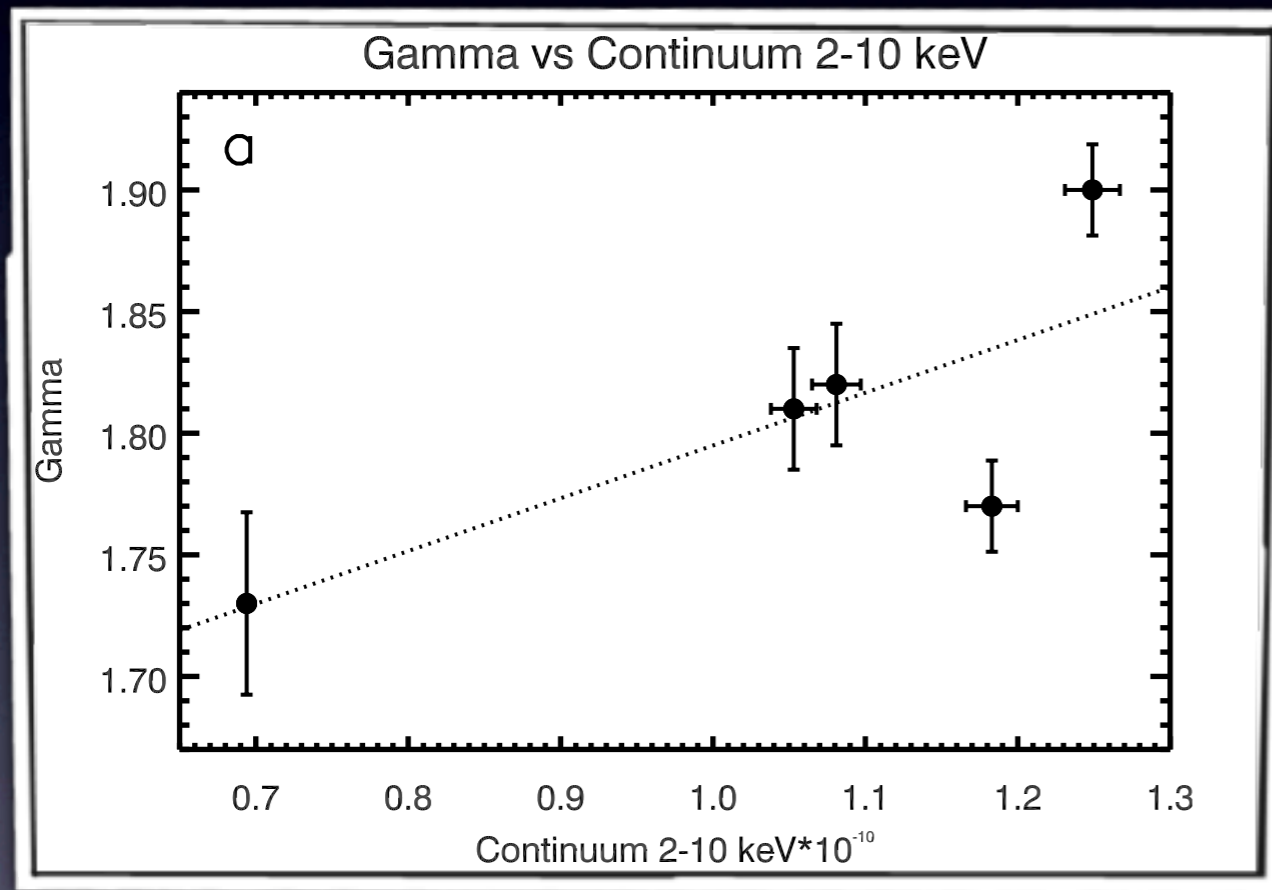
and broad line?

Model: $zwabs * pexrav$

Spectral Variability

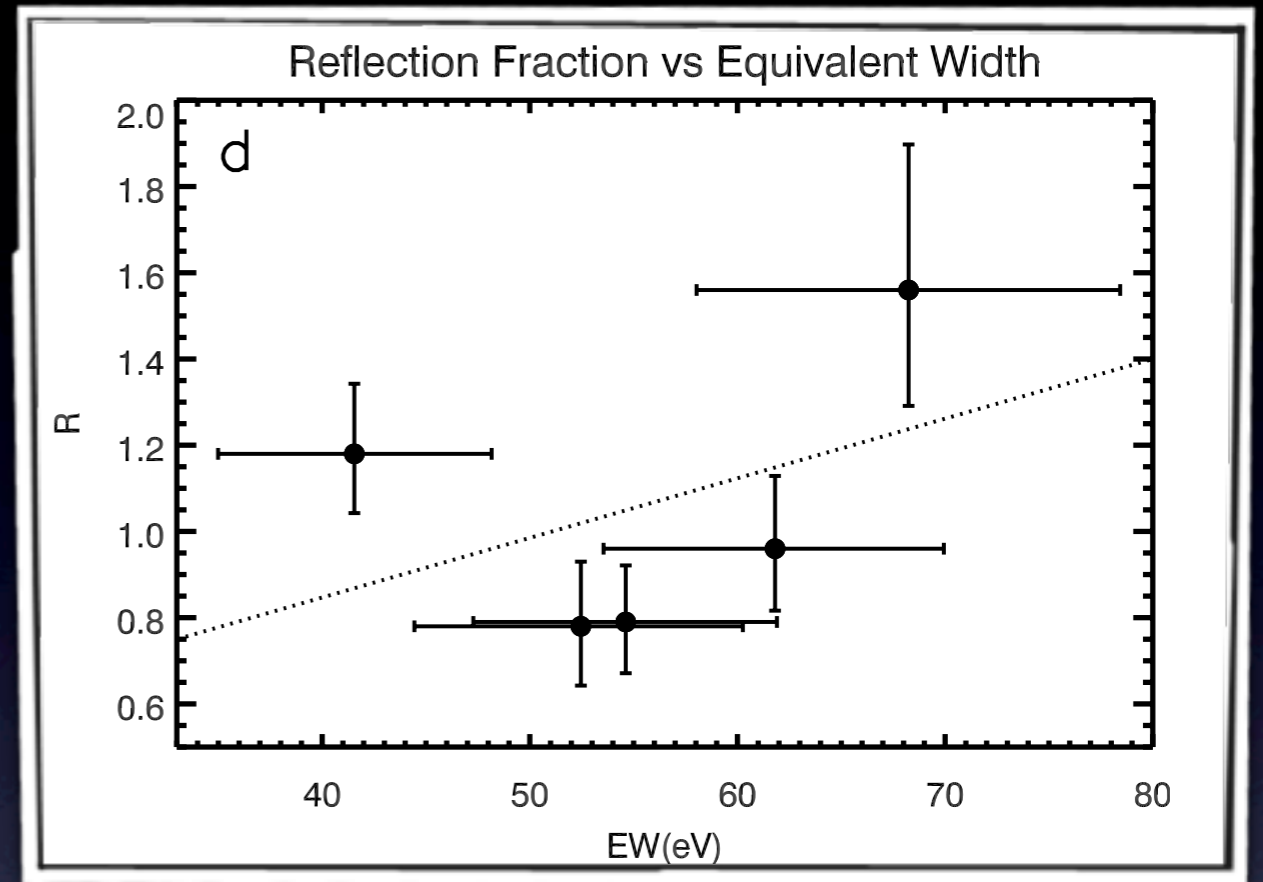
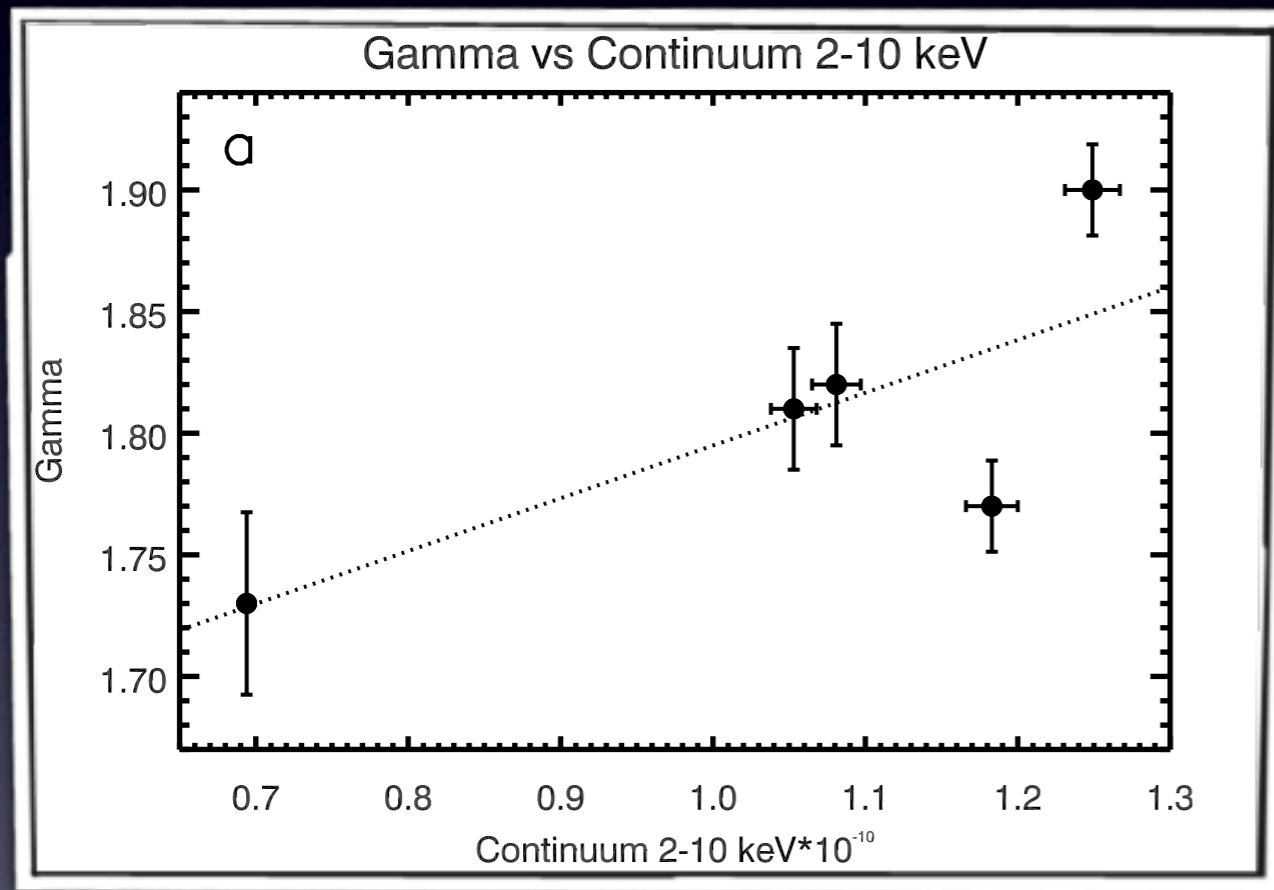


Spectral Variability



R consistent with a narrow line?

Spectral Variability

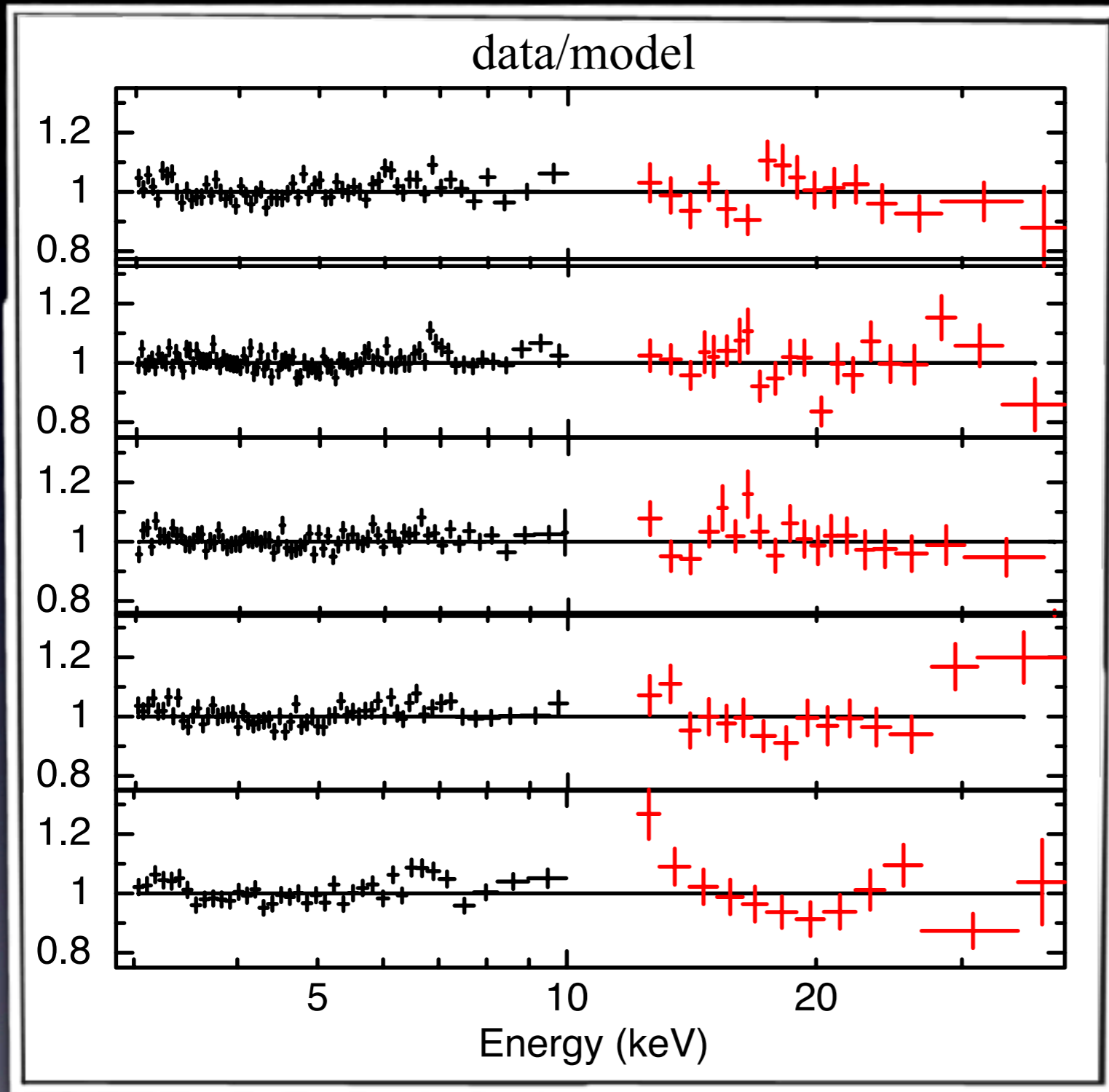


R consistent with a narrow line?



Broad component?

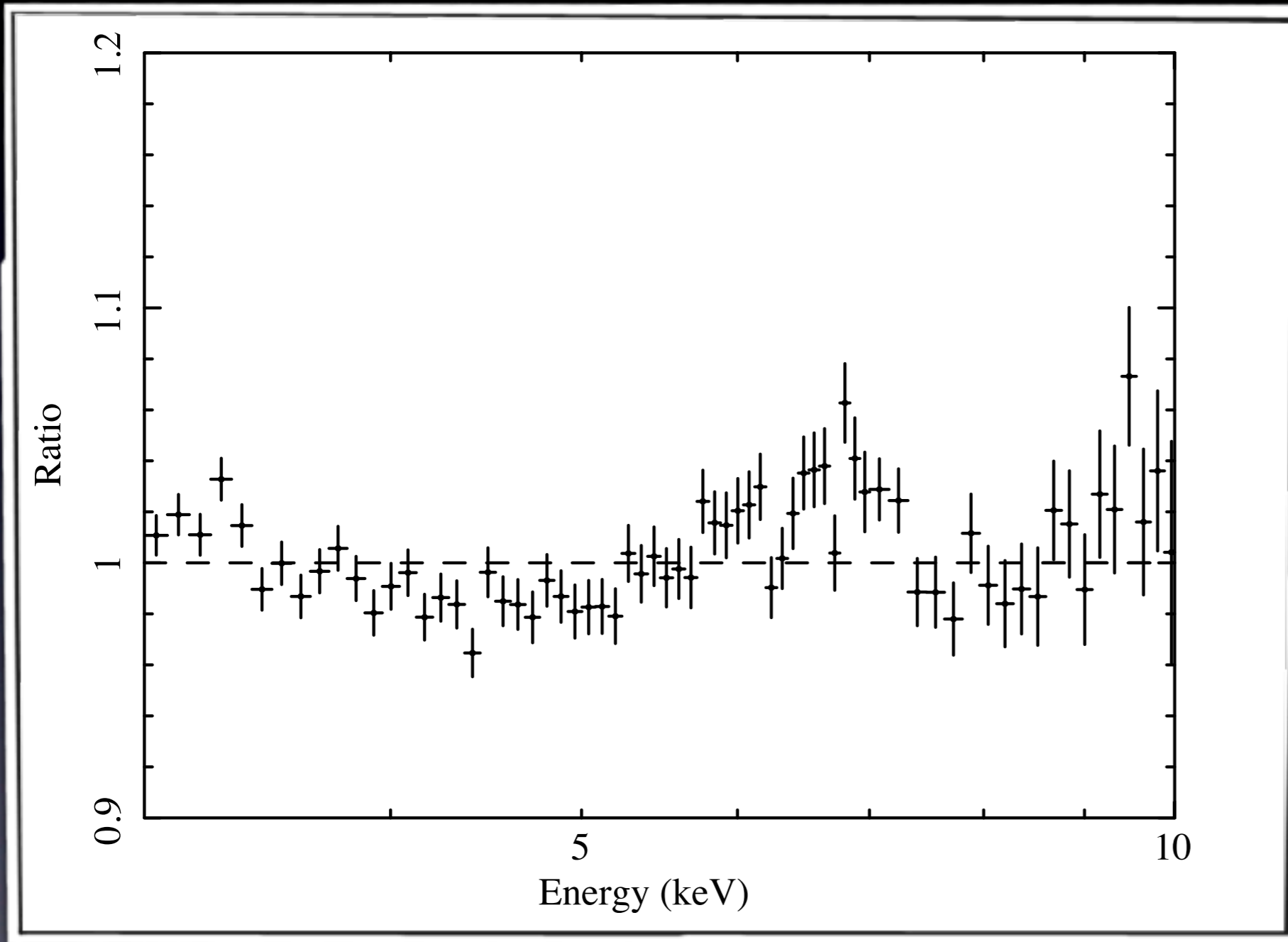
Data/Model Ratio



Significance between $2-4\sigma$ for
single observation

Model: $zwabs*(pexrav+zgauss)$

Data/model Ratio

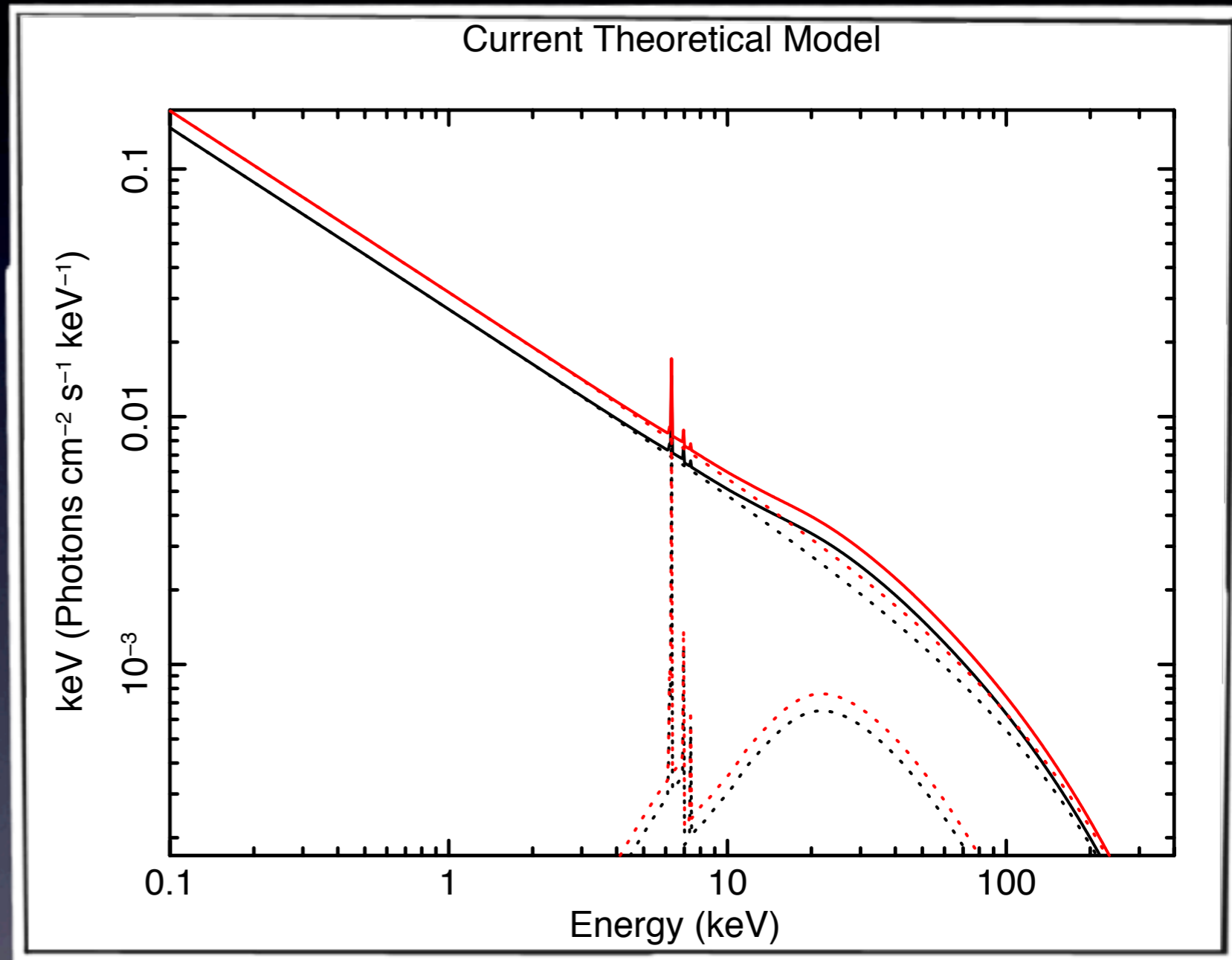


$\sim 5.5\sigma$ significance

Model: $\text{zwabs}^*(\text{pexrav}+\text{zgauss})$

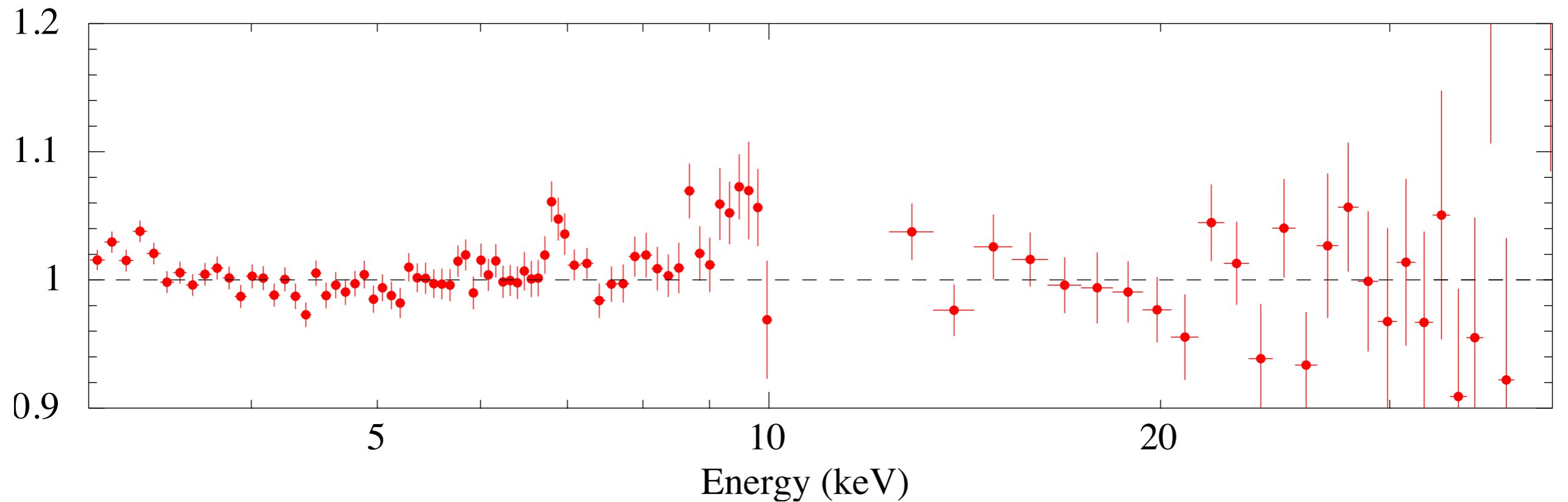
Pexmon model

- Fe $K\alpha$ (6.4 keV)
- Fe $K\beta$ (7.06 keV) flux
11.3% of $K\alpha$
- Ni $K\alpha$ (7.47 keV) flux 5%
of $K\alpha$
- Compton Reflection
(pexrav)
- Fe $K\alpha$ Compton shoulder



Nandra et al. 2007

Data/model Ratio

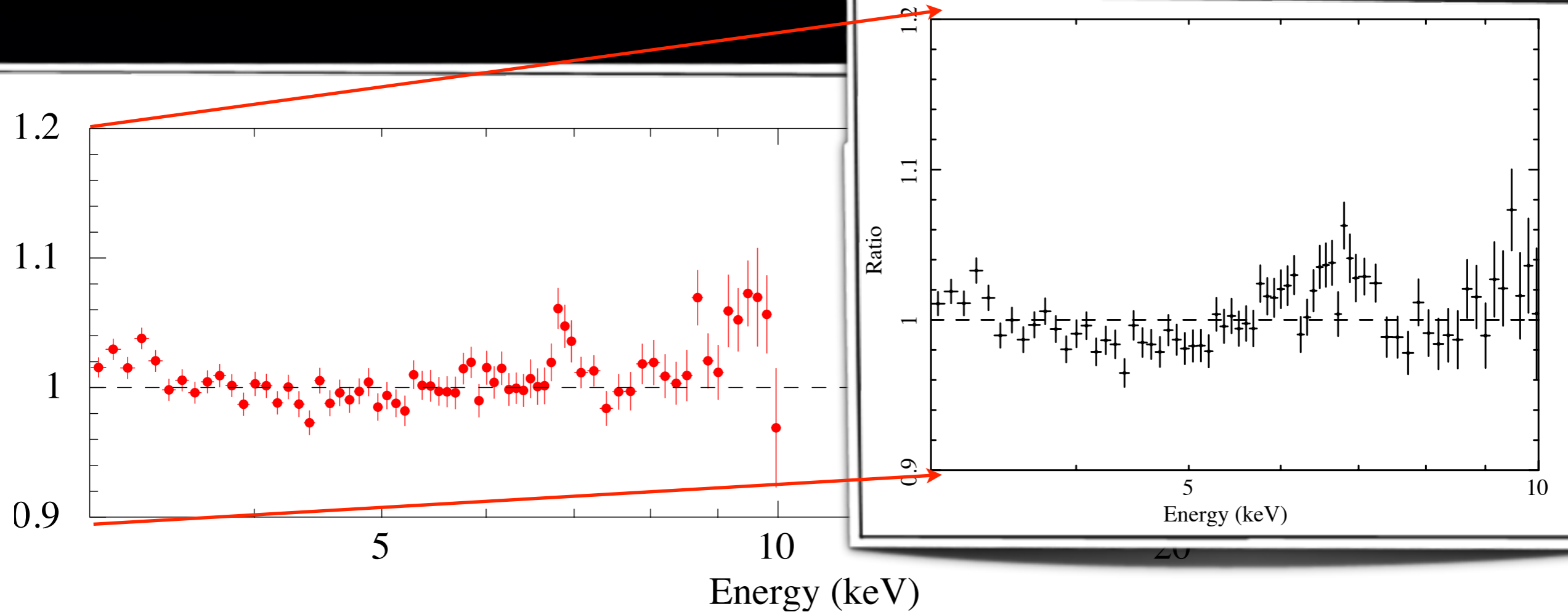


Evidence for a Fe XXVI narrow emission line (6.94 keV)

Model:

$\text{zwabs} * (\text{cutoffpl} + \text{pexmon} + \text{kdblur} * \text{pexmon})$

Data/model Ratio



Evidence for a Fe XXVI narrow emission line (6.94 keV)

Model:

$\text{zwabs}^*(\text{cutoffpl}+\text{pexmon}+\text{kdblur2}^*\text{pexmon})$

Summary

Missing relativistic component in AGN?

- Brightest Seyfert: IC 4329A
- Narrow component in single short observation
- Relativistic component in the combined spectra with high significance
- Data consistent with the narrow and the broad iron line components tracking the Compton Hump.

Very high signal-to-noise ratio is required to disentangle relativistic line components in AGN