Relativistic Fe Kα line detection in the *Suzaku* spectra of IC 4329A

Giulia Mantovani, Kirpal Nandra, Gabriele Ponti

*MNRA*SL 442, L95–L99 (2014)
(Very simple) physical idea

Direct power-law

Reflection Spectrum

Observer
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
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 \( \sim 26 \text{ ks} \) each.
• Total exposure of \( \sim 130 \text{ ks} \).
Data/Model Ratio

Strong narrow line

Model: zwabs*pexrav
Data/Model Ratio

Model: zwabs*pexrav

Strong narrow line

and broad line?

Energy (keV)
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 2-4σ for single observation

Model: zwabs*(pexrav+zgauss)
Data/model Ratio

Model: zwabs*(pexrav+zgauss)

~5.5σ significance
• Fe Kα (6.4 keV)
• Fe Kβ (7.06 keV) flux 11.3% of Kα
• Ni Kα (7.47 keV) flux 5% of Kα
• Compton Reflection (pexrav)
• Fe Kα Compton shoulder

Nandra et al. 2007
Data/model Ratio

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

Model:
zwabs*(cutoffpl+pexmon+kdblur2*pexmon)
Evidence for a Fe XXVI narrow emission line (6.94 keV)

Model:
zwabs*(cutoffpl+pexmon+kdblur2*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