

Relativistic Reflection in a sample of Seyfert 1



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ABSTRACT: Broad iron lines are expected, and observed, to be a widespread feature in bright AGN. However, a significant fraction of object misses a disk line component. We extracted from the sample of all Seyfert 1 galaxies the ones with no detection of a broad Fe K α line, to investigate the physical cause of this absence. We analysed all archival Suzaku observations that, thanks to the broad energy band, allows us to investigate the connection between broad Fe K α line and reflection continuum. Our analysis shows that relativistic FeK α line are ubiquitous features in the spectra of Seyfert galaxies, but are often difficult to detect without very high quality data. We also investigate the relation between the Fe K α line and the reflection continuum. For most of the sample, the strength of the reflection component is consistent with that of the line.

We first focused our attention on IC 4329A, the brightest object of the sample. The five Suzaku observations were fitted with a model which includes a neutral absorber at the redshift of the source, a cut-off power law together with reflection continuum and a narrow FeK α component. We then added to the previous model a relativistic FeK α component and fitted each single spectrum. A relativistic Fe K α line is detected with high significance only when all the observations are combined and the S/N ratio increases. The combined data to model ratio, where only the continuum and the narrow Fe K α component are fitted, are plotted in Figure 1. Residuals above 5 keV indicate the presence of a broad relativistic line. This demonstrates that high statistic is a fundamental key to reveal broad Fe K α lines (Mantovani et al., 2014).

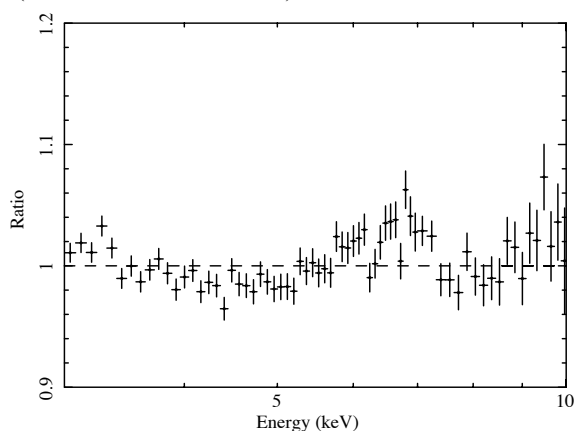


Figure 1: Ratio of data/model between 3-10 keV when only the continuum and the narrow Fe K α component are fitted.

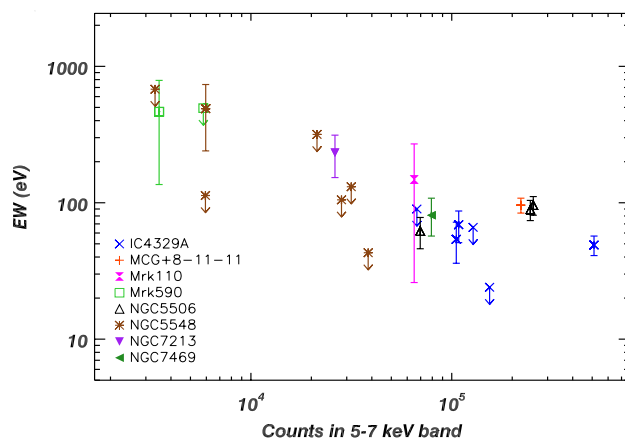


Figure 2: Relativistic Fe line Equivalent Width as a function of the counts in the 5-7 keV band.

We then extended this analysis to a sample of Seyfert 1 galaxy where the broad component was not detected in previous XMM-Newton observations (Nandra et al. 2007). Figure 2 presents the results of this work. The relativistic FeK α line is detected only in the observations where the statistics in the 5-7 keV energy band is sufficiently high in order to disentangle this feature from the underlying continuum (Mantovani et al. 2016).

We then fitted the spectra with the self-consistent model *pexmon* (Nandra et al., 2007), which links the emission of the FeK α line and the Compton reflection component. The data in our sample are consistent with both the narrow and broad Fe line tracing the emission at high energies. This results confirms that they are features of the same reflection spectrum.

References:

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