STUDYING THE IRON LINE COMPLEX IN THE BRIGHT SEYFERT GALAXY NGC 5506

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This grant was to support the reduction and analysis of our approved XMM observation of the nearby Seyfert 2 galaxy NGC 5506. The observation has been carried out simultaneously with a BeppoSAX observation of the same source. The proposal was aimed to study in detail the Compton reflection component and the complex Iron K line of this source, combining the still unique capability of BeppoSAX in hard X-rays (to strongly constrain the reflection component, and then the intrinsic nuclear continuum), and the sensitivity of XMM at the energy of the Iron Line complex.

NGC 5506 is one of the brightest AGN in hard X-rays and has been intensively studied in the past. GINGA detected the complex iron line as well as the reflection component. Both ASCA (spectroscopically) and Rossi-XTE (through variability analysis) suggested that the FeK line is complex, possibly made up of several distinct components. The centroid of the FeK complex in a subsequent BeppoSAX observation was bluer than the 6.4 keV energy of the relatively low-ionization iron Kalpha transition.

NGC 5506 has been observed simultaneously by NewtonXMM and BeppoSAX on February 2-3 2001.

We have reduced and analyzed both the NewtonXMM and the BeppoSAX data, and have written and published a paper on our results (appeared in Volume 377 (page 31) of A&A-Letters). Our main results can be summarized as follows: (a) we confirm that the FeK line is complex, and for the first time disentangle its components: we find that at least two components made up the FeK complex, one neutral and narrow, at 6.4 keV (rest energy), and another one either broader and highly ionized, at about 6.7 keV (rest frame), or, in turn, made up of two narrow and unresolved components from the He-like and the H-like ions of Fe; (b) the two possible solution for the high-ionization Fe-K component, are statistically indistinguishable. However, physically, a blend of two narrow lines from photoionized matter seems to be preferable to emission of a relativistically broadened line from an ionized accretion disk; (c) The bulk of the Compton reflection continuum originates in neutral matter, and is therefore associated with the narrow FeK line at 6.4 keV: they are most likely emitted by distant matter.