Average Iron Line Emission from Distant AGN

A. Corral, M.J. Page, F.J. Carrera, X. Barcons, S. Mateos, J. Ebrero, M. Krumpe, A. Schwope, J.A. Tedds, and M.G. Watson

Abstract We have developed a new method to construct a high SNR X-ray average spectrum for type 1 and type 2 AGN in order to measure the main properties of the Fe Kα emission line. Our method takes into account all the possible contributions to the continuum around the emission line, and an estimate of the significance of any excursion above this continuum can be obtained from it. We applied this method to the identified AGN within AXIS and XWAS, 606 type 1 and 117 type 2 AGN, and obtained average spectra for both AGN types. We found an unresolved emission line on the final average spectrum of type 1 and 2 AGN with an $EW \sim 100$ eV, corresponding to neutral or low-ionization Fe Kα emission, thus emitted far from the central source. We also found that the EW of this narrow line becomes weaker as the luminosity increases, the so-called Iwasawa–Taniguchi effect. A clear relativistic component in the Fe Kα line is not present in the average spectra and the continuum is best represented by a mixture of absorbed power laws plus a moderate reflection component for type 1 AGN. In the case of type 2 AGN, the statistics turned out to be insufficient to distinguish between a reflection component and a relativistic line. We estimated the EW of any relativistic contribution to be <400 eV and <300 eV at 3σ confidence level for type 1 and type 2 AGN, respectively. Our results are in excellent agreement with studies of local AGN, whereas we obtain a much lower value for the relativistic line EW than studies at higher redshifts.

A. Corral
Instituto de Física de Cantabria (CSIC-UC), 39005 Santander, Spain, and INAF-OAB, via Brera 28, 20121 Milan, Italy
e-mail: amalia.corral@brera.inaf.it

F.J. Carrera, X. Barcons, and J. Ebrero
Instituto de Física de Cantabria (CSIC-UC), 39005 Santander, Spain

M.J. Page
Mullard Space Science Laboratory, University College London, Holmbury St. Mary, Dorking, Surrey RH5 6NT, UK

S. Mateos, J.A. Tedds, and M.G. Watson
X-ray & Observational Astronomy Group, Department of Physics and Astronomy, University of Leicester, Leicester LE1 7RH, UK

M. Krumpe and A. Schwope
Astrophysikalisches Institut Potsdam, An der Sternwarte 16, D-14482 Postdam, Germany

J.M. Diego et al. (eds.), *Highlights of Spanish Astrophysics V*, Astrophysics and Space Science Proceedings, DOI 10.1007/978-3-642-11250-8_36,