abstract

We report on the first XMM-Newton observation of the highly X-ray variable, radio-quiet, Narrow-Line Seyfert 1 galaxy IRAS 13224–3809 obtained during the guaranteed time programme with a 64 ks exposure. The most remarkable spectral feature is a sharp drop, by a factor \( \sim 5 \), in the spectrum at 8 keV. This is a similar, but stronger, feature to that which we found in 1H 0707–495. Significant flattening of the hard X-rays spectrum occurs when the source flux decreases. The flattening of the spectrum can be modelled as an increase in the column density.

At 1.5 keV the spectrum is dominated by a giant soft X-ray excess, and at around \( \sim 1.2 \) keV there is a significant absorption feature detected, most probably due to ionized Fe L absorption. The new X-ray spectral properties detected with XMM-Newton in IRAS 13224–3809 support a partial covering interpretation, i.e. the presence of dense material inside the accretion-disc region partially obscuring the emission from the accretion disc. However, the sharpness of the feature, if due to photoelectric absorption, is surprising and may require an alternative explanation. One possibility which does fit the whole spectrum is that it is dominated by ionized reflection rather than absorption. The unusual spectral properties detected with XMM-Newton from Narrow-Line Seyfert 1 galaxies increase the known spectral complexity of active galactic nuclei and should further stimulate a combined theoretical and observational effort to achieve a better understanding of the physics of the innermost regions of AGN.