A low mass X-ray binary system consists of a compact object (e.g. a neutron star) and a main-sequence companion star with a mass around one solar mass. The compact object accretes matter via Roche lobe overflow and an accretion disc is formed around it. Close to the surface of the neutron star relativistic effects can be observed in the accretion disc. Such extreme conditions have an influence on both the spectral and the timing behaviour of a source. The most prominent spectral feature is a broad fluorescence iron line. Due to relativistic effects, like the relativistic Doppler effect and the gravitational redshift, the line has a characteristic shape. The shape depends on the inner radius of the disc which can be used to constrain the radius of the neutron star to an upper limit. With the help of the kilohertz quasi–periodic oscillations (kHz QPOs) also conclusions on the mass of a neutron star can be drawn. The frequencies of those QPOs can be related to the spin of the neutron star and the frequency of the keplerian orbit at the inner radius of the disc (e.g. Miller et al., 1998). The keplerian frequency depends on the radius and the mass of the compact object.

4U 1735–44 is a low mass X-ray binary with a neutron star. The companion star has a mass of 0.5±0.4 M_☉ (Casares et al., 2009) and the orbital period was determined to be 4.654 hr (Corbet et al., 1986). It was classified as an Atoll Source by Hasinger & van der Klis (1989). An iron line was reported by Ng et al. (2010) with an equivalent width of 46 eV. Two kHz QPOs were discovered by Wijnands et al. (1998) and Ford et al. (1998) in the orbital period package XSPEC (Arnaud, 1996). The spectrum was fitted with a combination of a blackbody from a multicolor disk (diskbb in XSPEC, see Mitsuda et al. 1984) and a combination of Fe-XVII and Fe-XVIII. The iron fluorescence line was fitted by a Gausian with an equivalent width of 53 eV. The line was also fitted with a relativistic accretion disk model (diskline, Fabian et al. 1989). Additionally, a systematic uncertainty of 0.5 % was applied to the model. The best-fit results are reported in the table below. The reduced χ^2 was 1.36 (188 d.o.f.) and 1.14 (174 d.o.f.) respectively.

### Table: Best-fit results

<table>
<thead>
<tr>
<th>Parameter</th>
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<tbody>
<tr>
<td>Parameter</td>
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<td>5 columns</td>
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<tr>
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<td>Norm</td>
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</table>

### References


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**The low mass X–ray binary system 4U 1735–44**

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**Introduction**

The BeppoSax was an Italian-Dutch mission (1996–2002) which allowed to study the broad band spectrum from 0.1-300 keV with an effective area of 150 cm^2 at 6 keV and a spectral resolution of 8% FWHM. The Proportional Counter Array (PCA) aboard the NASA RXTE mission (1995–present) is able to perform observations with a time resolution of 1 μs in an energy range from 2-60 keV (Jahoda et al., 1996). A 25 ks observation was performed simultaneously with one of the BeppoSax observations and another 25 ks observation covered the same period as the introduced XMM-Newton observation.

**Used X-ray satellites: BeppoSax, XMM, RXTE**

BeppoSax was an Italian-Dutch mission (1996–2002) which allowed to study the broad band spectrum from 0.1-300 keV with an effective area of 150 cm^2 at 6 keV and a spectral resolution of 8% FWHM. The BeppoSax data were acquired with the X-ray spectral analysis package XSPEC (Arnaud, 1996).

**Analysis**

We analysed the first BeppoSax observation (performed in March 2000) with an exposure time of 39 ks (M confuse et al. 2002) and all four instruments aboard BeppoSax were fitted with the X-ray spectral analysis package XSPEC (Arnaud, 1996).

The BeppoSax data were acquired with the X-ray spectral analysis package XSPEC (Arnaud, 1996).

**Conclusions & Outlook**

We have shown that in the low mass X-ray binary system 4U 1735-44 a broad iron line is present. Whether this line is relativistically broadened cannot be excluded or confirmed with the help of the BeppoSax data. Also the XMM data show no significant evidence if the line is relativistically broadened or not (which was shown by Ng et al., 2010). A more detailed study of pile-up and its effects will be performed.

In the Color-Color diagrams as well as the presented lightcurves a good overlap of the BeppoSax and the RXTE as well as the XMM and the RXTE observations is confirmed. We have shown that the source was during all observations in the banana state of an Atoll source. The spectral changes along the path of the Color-Color diagram will be investigated for the BeppoSax and the XMM data.

A detailed timing analysis of the RXTE data will be performed to check for kHz QPOs and the timing behaviour in general. If kHz QPOs will be found a simultaneous study of the broad iron line and the kHz QPOs will be possible.

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**References**