The relativistic Fe emission line in XTE J1650-500: indications for gravitational light-bending?

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XTE J1650-500 is a BHC X-ray transient that was in outburst between September 2001 and June 2002
We analysed 57 RXTE observations covering the first 30 days of the outburst (Sep.6-Oct 5)
The 2.5-160 keV energy spectra reveal the presence of a relativistic Fe Kα emission line (Fig.1)
The Fe Kα line is not linearly dependent on the power-law flux: the line depends weakly on it until Sep.19, then there is evidence of a positive correlation after Sep.19 (Fig.2)

The spectral variations of the Fe Kα line observed in XTE J1650-500 (Fig.3a) are consistent with the predictions of the light bending model proposed by Miniutti & Fabian (2004) (Fig.3b)

In the framework of this model, the variability of the line can be explained by the motion above the accretion disk of a hard X-ray source located near the BH (Fig.3c): at the beginning, this source is at medium distance (2-4 \( r_g < h < 7-13 \ r_g \)), then it gradually approaches the disk reaching very short distances (< 2-4 \( r_g \)) after Sep.19

From the timing analysis of the same RXTE data set, we discovered a 250 Hz QPO (Homan et al. 2003). It is worth to note that this high-frequency QPO is first detected after Sep.19 (Fig.4)

If the hard X-ray source is associated with a jet, XTE J1650-500 suggests a link between Fe Kα emission lines, QPOs and jets