Populations of High Energy Sources in Galaxies
Proceedings IAU Symposium No. 230, 2005
E. J.A. Meurs & G. Fabbiano, eds.

doi:10.1017/S1743921306008647

IGR J16320−4751 as seen by simultaneous INTEGRAL and XMM observations

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Abstract. We present the preliminary results of simultaneous XMM-Newton and INTEGRAL observations of the highly absorbed INTEGRAL source IGR J16320-4751. We refine the X-ray position with XMM-Newton, and then examine the spectral properties of the source using both satellites, separating two periods visible in the lightcurves, an initial flare and a more steady period. We show that the source spectrum and its behaviour are compatible with IGR J16320-4751 being a pulsar accreting from a high mass companion.

Keywords. Neutron stars, accretion, X-ray: observations, stars:individual IGR J16320−4751.

1. Introduction

IGR J16320-4751 was discovered during an INTEGRAL observation of 4U 1630-47 (Tomsick *et al.* 2003). Analyses of archival data showed IGR J16320-4751 is the hard X-ray counterpart to AX J16319-4752. A public ToO with XMM led to a first (arsec accuracy) X-ray position, leading to the identification of 2 infrared counterpart candidates (Rodriguez *et al.* 2003). Recently re-analysis of XMM+ASCA data led to discovery of 1300s pulsation (Lutovinov *et al.* 2005), indicating IGR J16320-4751 is probably a pulsar. We present here the first results of the analysis of strictly simultaneous XMM and INTEGRAL observations of this enigmatic source. Deep analysis of these data will be presented in Rodriguez *et al.* (2005, submitted to MNRAS).

2. Refining the position using old and new data

We produced PN images from our last observation (August 2004), and MOS images from the 2003 XMM ToO. Using ep_detect chain we can refine the X-ray position of the source to RA = $16^h\ 32^m\ 01.9^s$, DEC = $-47^\circ\ 52'\ 26.9''$ ($+/-3''$). This new position supports more strongly the association of IGR J16320-4751 with the northern source in Fig. 1 of Rodriguez *et al.* (2003).

3. Spectral analysis

Two distinct "epochs" have to be separated for spectral analysis, "flare" and "non-flare", as shown in Fig. 2. We then fitted the spectra with simple model of (absorbed) power law and high energy cut-off plus Gaussian and iron edge. The data are well represented, but a soft excess is seen in the non-flare spectrum. The best fit parameters are reported in Fig. 2 for each of the two periods. In particular the main difference between the flare and non flare period seems related to variations of the absorption column

† On behalf of a larger collaboration.

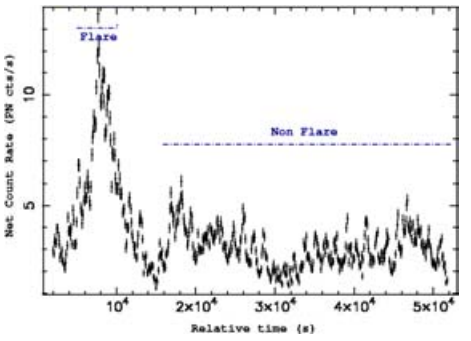

Figure 1. XMM 2–12 keV lightcurve showing the periods of flare and non-flare.

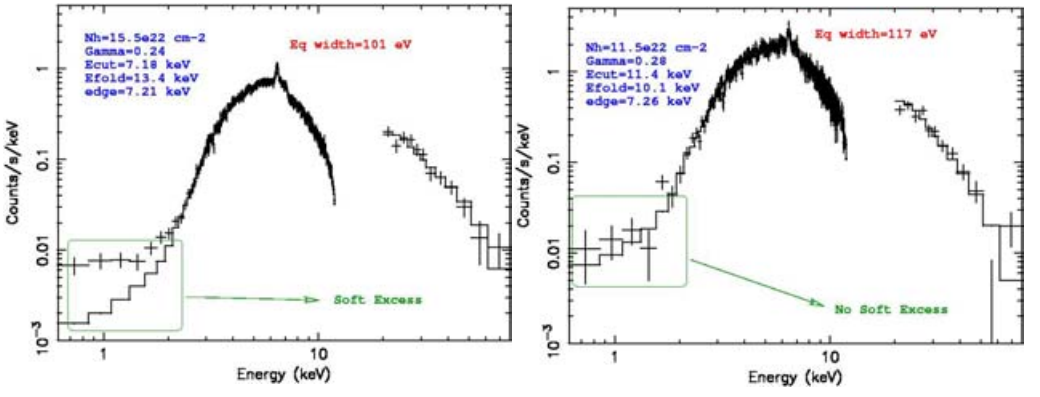

Figure 2. Left: Non-flare XMM/PN INTEGRAL/ISGRI spectrum. **Right:** Flare XMM/PN INTEGRAL/ISGRI spectrum. In both case the best model is superimposed as a line, while the main spectral parameters are reported in the panels.

density, although some evolution of the cut off energy and folding of the cut off is also visible.

4. Conclusion

The timing and spectral analysis reported here, although quite preliminsry, are strongly indicative of a pulsar primary given the presence of X-ray pulsations. In addition the spectral parameter of IGR J16320−4751 are clearly similar to those usually reported for systems containing a high mass star, therefore further suggesting it is a high mass X-ray binary (Rodriguez *et al.* 2003; Lutovinov *et al.* 2005).

Acknowledgements

I would like to acknowledge the great help of A. Bodaghee, M. Cadolle-Bel, A. Paizis & J. Zurita for various aspects of the work presented here.

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