Populations of High Energy Sources in Galaxies
Proceedings IAU Symposium No. 230, 2005
E. J. A. Meurs & G. Fabbiano, eds.
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doi:10.1017/S1743921306008635

IGR J17252−3616: an accreting pulsar observed by *INTEGRAL* and *XMM-Newton*

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Abstract. IGR J17252−3616 is the hard X-ray counterpart of EXO 1722−363. The regular monitoring by *INTEGRAL* shows that IGR J17252−3616 is a persistent source with an average count rate of ∼6.4 mCrab in the 20–60 keV energy band. A follow-up observation with *XMM-Newton* showed that the source is located at R.A. (2000.0) = $17^h\,25^m\,11.4^s$ and Dec. = $-36^\circ 16' 58.6''$ with an uncertainty of $4''$.

The source is a binary X-ray pulsar with a spin period of 413.7 s. The spectral shape is typical for an accreting pulsar except that a huge intrinsic absorption and a cold iron fluorescence line are detected. The absorbing column density and cold iron line do not vary with the pulse period. The observations suggest that the source is a wind-fed accreting pulsar accompanied by a supergiant star.

Keywords. X-rays: binaries, X-rays: individual: IGR J17252−3616 = EXO 1722−363.

1. Introduction

EXO 1722−363 was discovered by EXOSAT in June 1984 (Warwick, Norton, Turner, *et al.* 1988). From Ginga observations in 1987 and 1988, Tawara, Yamauchi, Awaki, *et al.* (1989) and Takeuchi, Koyama & Warwick (1990) detected a pulsation of 413.9 s, important variations of the intensity in X-rays, a hard spectrum with important low-energy absorption and an emission line at 6.2 keV. Corbet, Markwardt & Swank (2005) resolved the orbital period of 9.741 days and detected a varying high column density with RXTE data. These investigations conclude that the system is a high mass X-ray binary (HMXB).

2. Observations & Analysis

INTEGRAL is a hard X-ray and γ-ray observatory of the European Space Agency (ESA). A total exposure of 6.5 Ms was accumulated between MJD 52671 and 53294. A follow-up observation with *XMM-Newton* was performed on March 21, 2004, for three hours (MJD 53085.542–53085.667).

We focused our work on *INTEGRAL* IBIS/ISGRI and *XMM-Newton* EPIC instruments. The data were reduced with OSA 4.2 and SAS 6.1.0. Images, light curves and spectra were generated. For ISGRI, a detailed timing and spectral analysis was performed

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https://doi.org/10.1017/S1743921306008635 Published online by Cambridge University Press

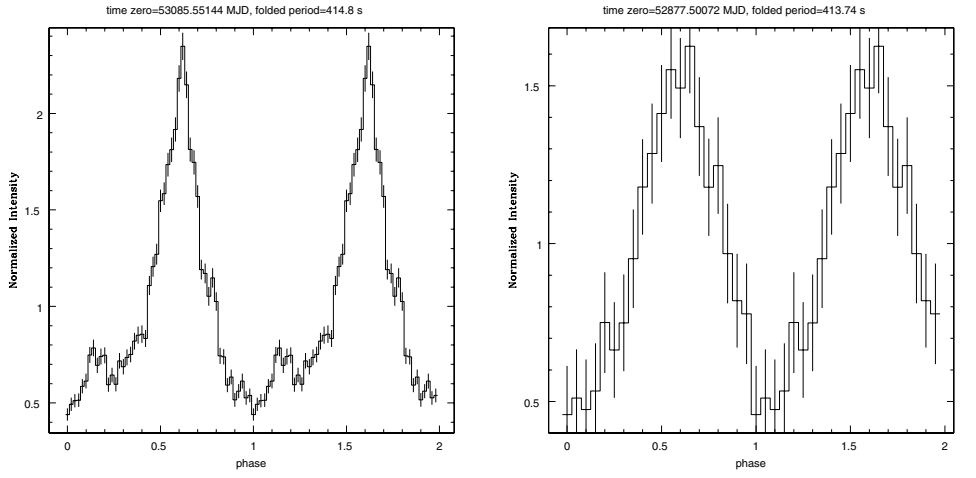

Figure 1. Folded light curves. *left:* pn, 0.5–10 keV; *right:* ISGRI, 20–60 keV.

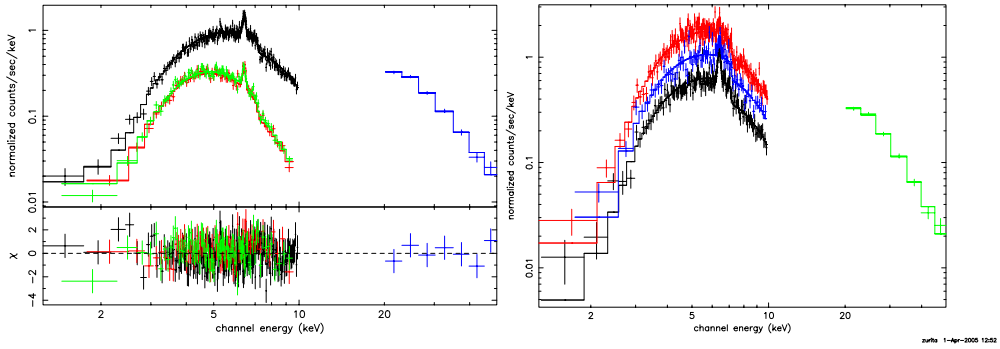

Figure 2. Combined EPIC+ISGRI spectra. The ISGRI spectrum is in the hard X-ray band. *left:* Average pn and MOS[12] spectra; *right:* Phase-resolved spectra for pn.

on revolution 106 (MJD 52877.4–52880.4) where the source reached its maximum flux. A pulsation has been detected in both pn and ISGRI data of 415 ± 5 s and 413.7 ± 0.4 s, respectively (see Fig. 1). The spectrum can be fitted with a flat power law plus an energy cutoff ($\Gamma \sim 0.02, E_{\rm c} \sim 8.2\,{\rm keV}$, χ^2/d.o.f.=401/376) or with a comptonized model ($kT_{\rm e} \sim 5.5\,{\rm keV}, \tau \sim 7.8$, χ^2/d.o.f.=401/376, see Fig. 2 *left*). The spectrum also indicates a large hydrogen column density of $N_{\rm H} \sim 15\,10^{22}\,{\rm atoms\,cm^{-2}}$ suggesting an intrinsic absorption. The Fe Kα line at 6.4 keV is clearly detected. Phase-resolved spectroscopy does not show any variation in the continuum except the total emitted flux (see Fig. 2 *right*). The absorption is constant along the pulse phase.

The observed features of IGR J17252−3616 clearly indicate that it is the hard X-ray counterpart of EXO 1722−363 even if the positions are not compatible.

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