

The nature of the HMXRB system 4U2206+54 from **INTEGRAL** and **VLA**

Pere Blay¹

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ESTEC - Thursday, 20 - 01 - 2005

Summary

- 1 4U2206+54
- 2 INTEGRAL observations
- 3 VLA observations
- 4 Conclusions and Future Work

The source 4U2206+54

HMXRBs Not Showing Pulsations

LMC X-1

LMC X-3

Cyg X-1

2E 0236.6+6101
(LS I +61 303)

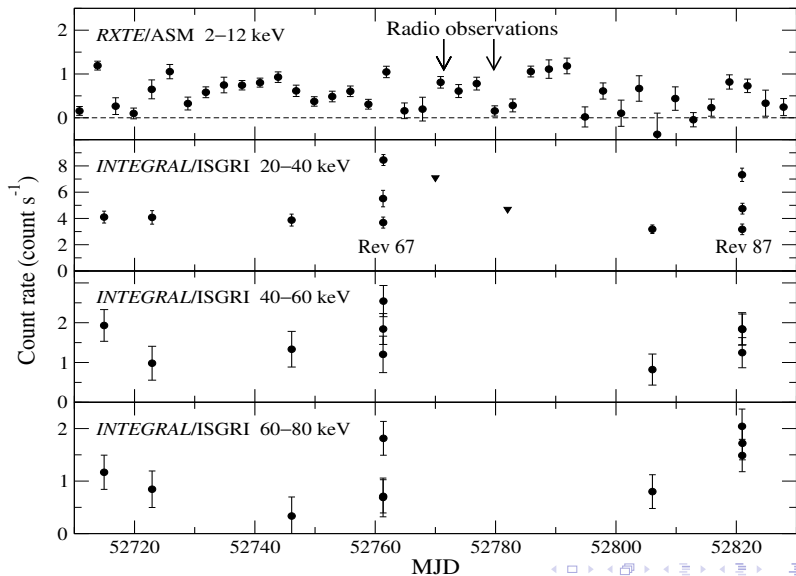
RX J1826.2-1450
(LS 5039)

4U 1700-37

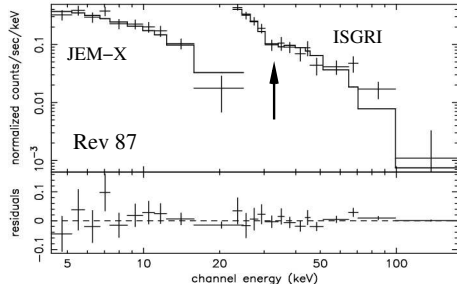
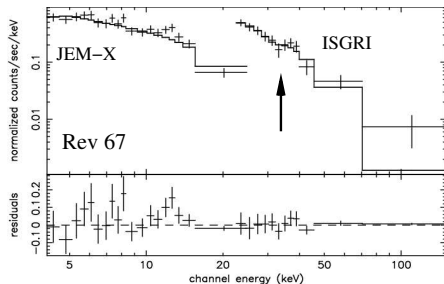
4U 2206+54

Black Holes

INTEGRAL/ISGRI Long Term Light curve



INTEGRAL/JEM-X & ISGRI Spectra



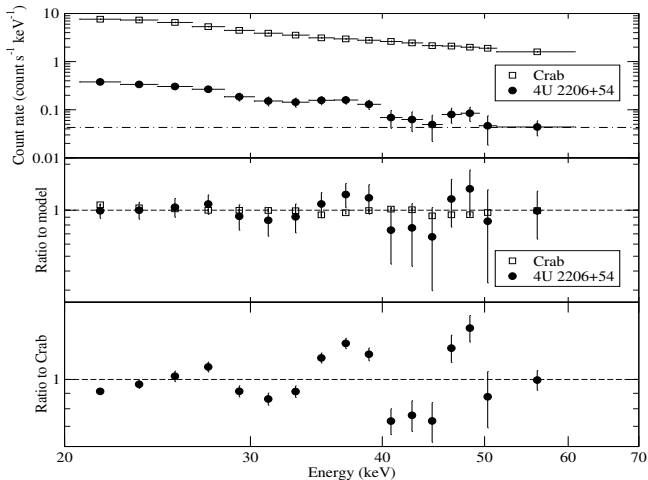
Ref. (Mission)	Γ	E_{cut} (keV)	E_{fold} (keV)	$N_{\text{H}} \times 10^{22}$ (atom cm^{-2})	χ^2_{Red} (DOF)	Flux $\times 10^{-10}$ (erg $\text{s}^{-1} \text{cm}^{-2}$)	Energy range (keV)	E_{cyclabs} (keV)
Rev 67	1.8 ± 0.7	13 ± 5	22 ± 6	1.0 (fixed)	1.2(154)	15.9	4–150	32 ± 5
Rev 87	$1.7^{+0.3}_{-0.4}$	11 ± 5	29^{+8}_{-7}	1.0 (fixed)	1.0(153)	8.3	4–150	32 ± 3

Previous CRSF Reports:

Torrejón et al., 2004, A&A, 423, 301 (RXTE & BeppoSAX)

Masetti et al., 2004, A&A, 423, 311 (BeppoSAX)

Normalisation to Crab Spectrum

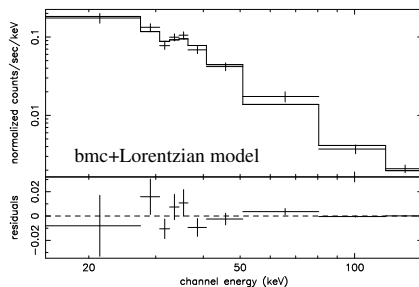
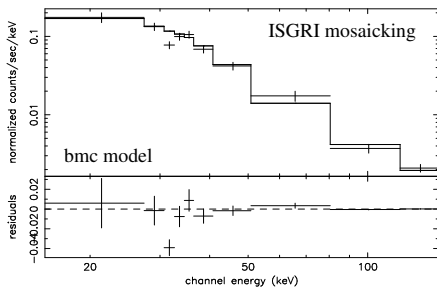


Crab: Rev 102

4U 2206+54: Rev 67

Off-axis Angle: 2.2°

ISGRI data *Mosaicking*



Parameter	kT	E_{cyclabs}	Line Width	$E_{\text{Lorentzian}}$	FWHM	χ^2_{Red} (DOF)
Model	(keV)	(keV)	(keV)	(keV)	(keV)	
BMC	7.7 ± 0.7					1.7 (6)
BMC+CYCLABS	7.7 ± 0.7	32 ± 2	1.0 (fixed)			1.3 (5)
BMC+LORENTZIAN	7.7 ± 0.7			31.5 ± 0.5	0.015 ± 0.005	1.1 (5)

Flux density $S_X \leftrightarrow S_{radio}$ Relationship

$$S_{radio} = (223 \pm 156) \times (S_X)^{+0.7}$$

Gallo et al., 2003, MNRAS, 344, 60

S_{radio} → Expected Radio flux density (4.9–15 GHz) scaled to 1 kpc

S_X → X-ray flux scaled to 1 kpc

	Rev. 67	Rev. 87
Flux (2–11 keV) $\times 10^{-10}$ erg s $^{-1}$ cm $^{-2}$	7.2	4.0
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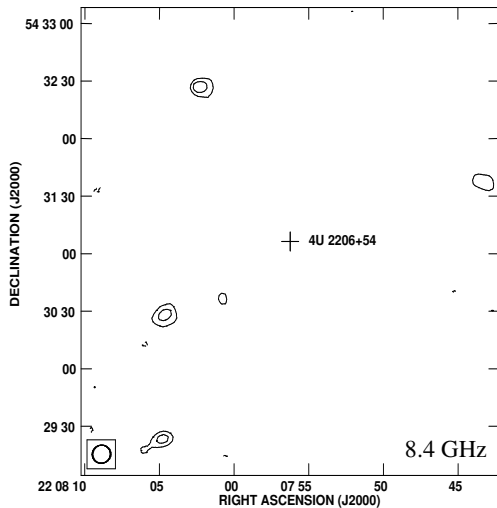
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Flux (2–11 keV) $\times 10^{-10} \text{ erg s}^{-1} \text{ cm}^{-2}$	7.2	4.0
S_{radio}	3.8–21.4 mJ	2.5–14.2 mJy

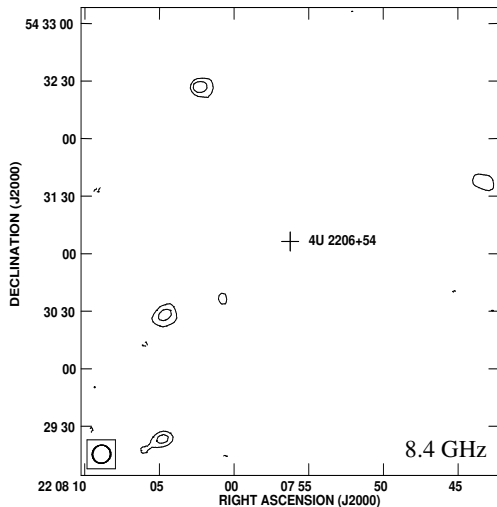
(assuming a distance to the source of 3 kpc,
see Negueruela & Reig, 2001, A&A, 371, 1056)

VLA Observations



2003 May 12 and 20
 3σ upper limit \rightarrow 0.039 mJy

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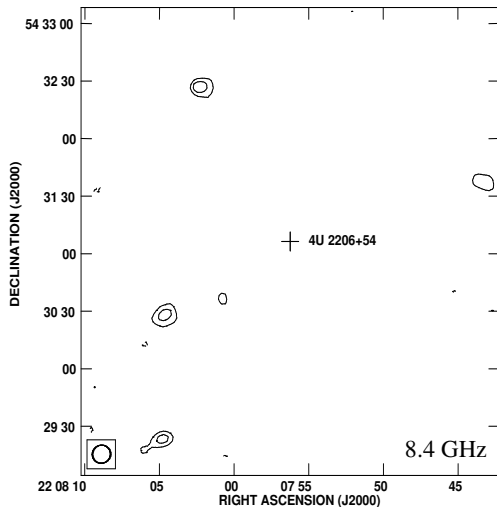


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Rev. 67 \rightarrow Lower limit: 3.8 mJy

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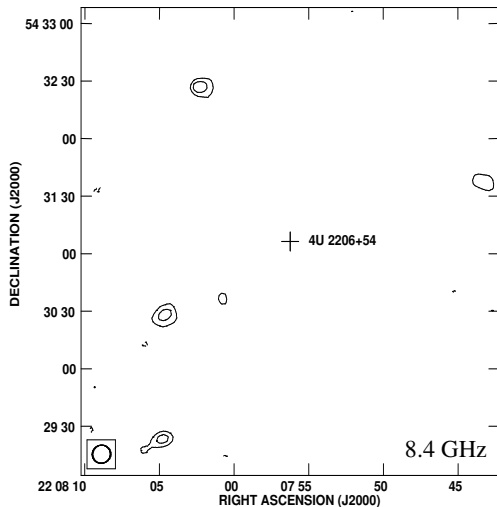
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 \sim 60 times greater

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 - ▶ Geometric effect
 - ▶ Like 2S 0114+650 → slow 2.8 hours pulsations (to be checked also with the AO3 observation)

The End

Thank You!