V YEARS OF INTEGRAL

SFXT… again

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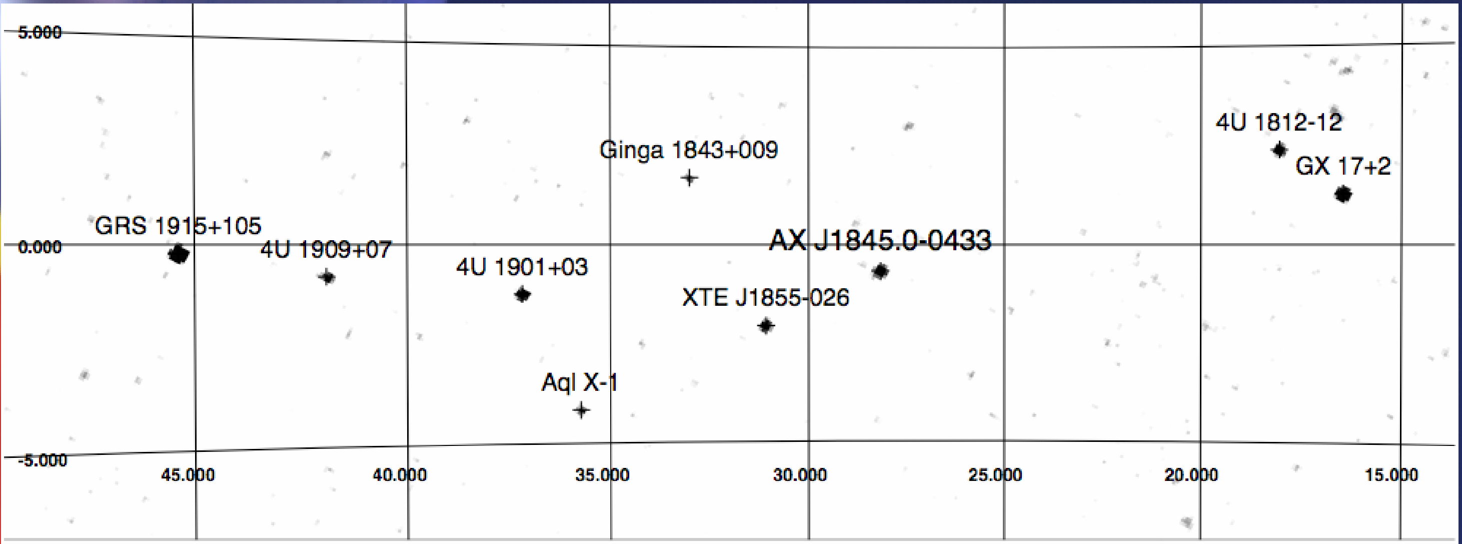
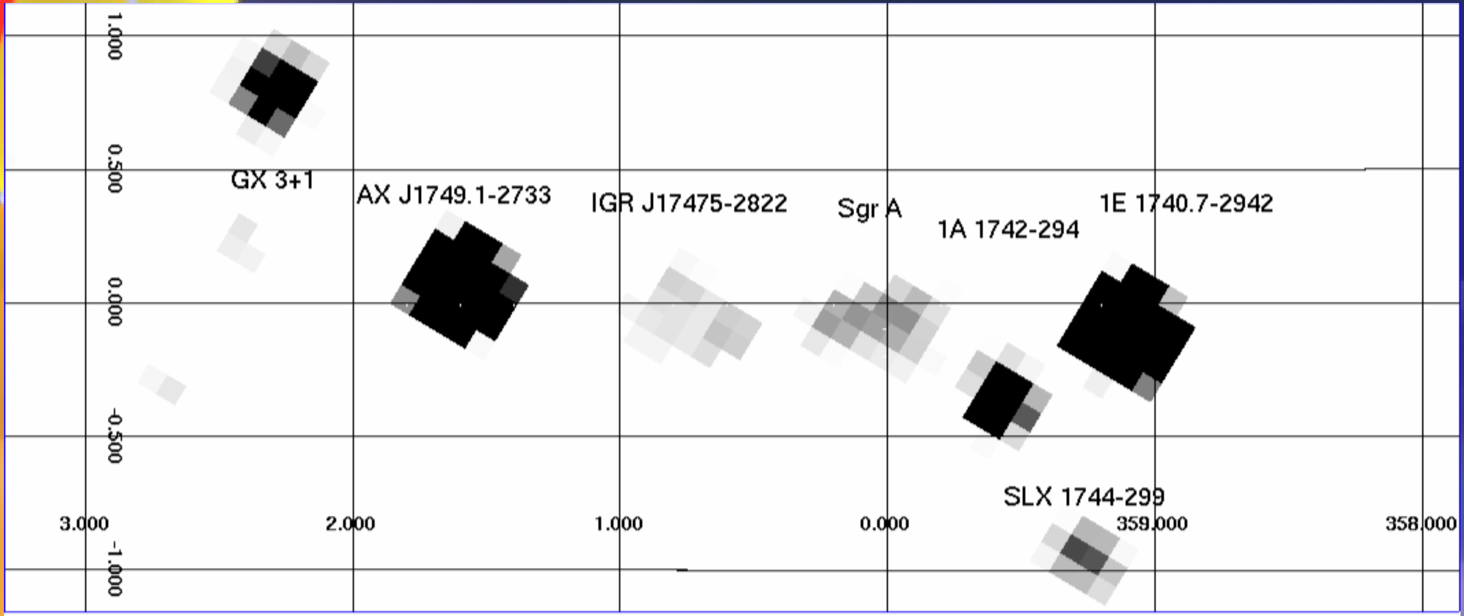
SFXT sample

Source	R.A. (J2000.0)	Dec. (J2000.0)	Unc.	Sp.T.	Other name
IGR J08408−4503	08 40 47.97	-45 03 29.8	5.4″ (XRT)	HD 74194 O8.5 Ib	
IGR J11215−5952	11 21 46.9	-59 51 42	5″ (XRT)	HD 306414, B1 Ia-type	
IGR J16195−4945	16 19 32.2	-49 44 30.7	0.6″ (Chandra)	sgOB	
IGR J16418−4532	16 41 51.22	-45 32 26.0	4″ (XMM)	OB	
IGR J16465−4507	16 46 35.38	-45 07 05.2	4″ (XMM)	B0.5I	
IGR J16479−4514	16 48 06.6	-45 12 08	4″ (XMM)	sgOB	
XTE J1739−302	17 39 11.58	-30 20 37.6	Chandra	O8Iab(f)	IGR J17319−3021
IGR J17407−2808	17 40 40.08	-28 08 24.0	1.7′ (ISGRI)	?	
XTE J1743−363	17 43 00.24	-36 22 51.6	0.8′ (ISGRI)	?	
AX J1749.1−2733	17 49 06.8	-27 32 30.6	6.3″ (SWIFT)	?	
IGR J17544−2619	17 54 25.28	-26 19 52.6	0.6″ (Chandra)	O9Ib	
SAX J1818.6−1703	18 18 37.89	-17 02 47.9	0.6″ (Chandra)	sgOB	
AX J1841.0−0536	18 41 0.54	-05 35 46.8	Chandra	sgB0-I	IGR J18410−0535
AX J1845.0−0433	18 45 01.4	-04 33 57.7	4″ (XMM)	O9.5I	IGR J18450−0435
XTE J1901+014	19 01 35.28	+01 26 20.4	0.6′ (ISGRI)	?	

AX J1845.0-0433



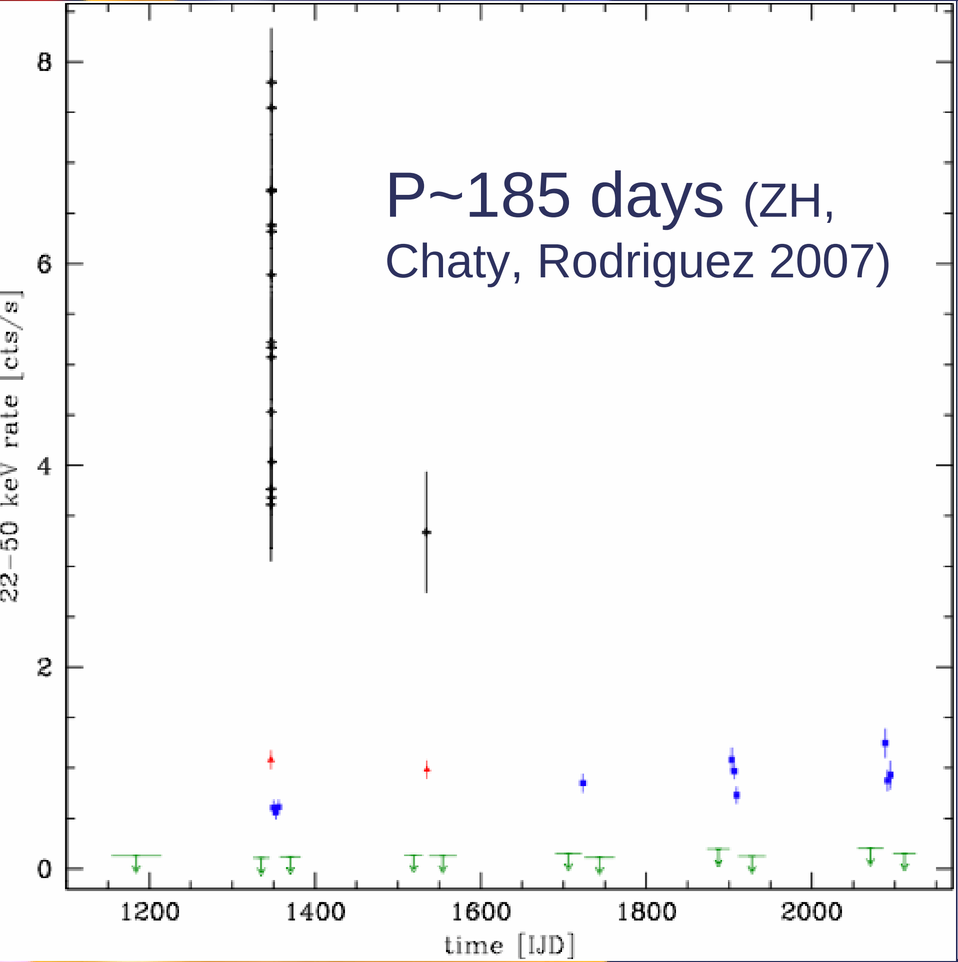
AX J1749.1-2733

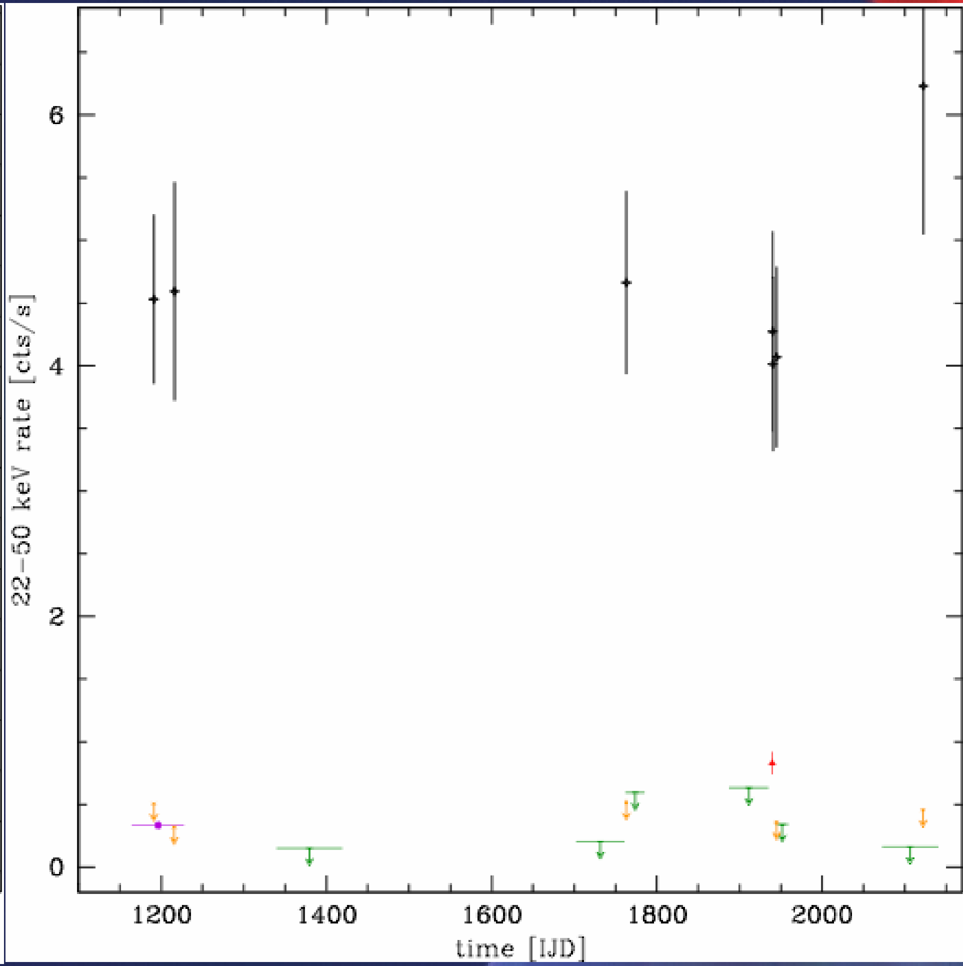


Long-term 22-50 keV lightcurves

AX J1749.1-2733

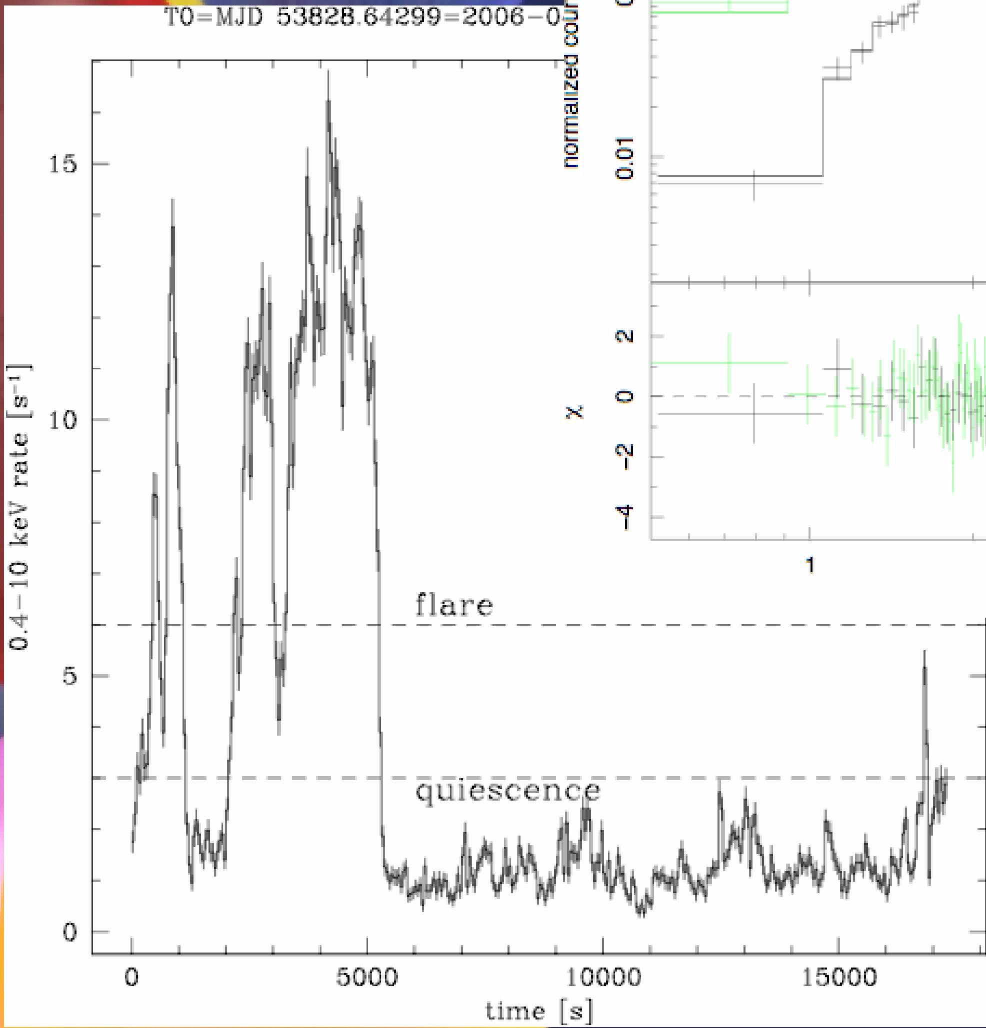
AX J1845.0-0433

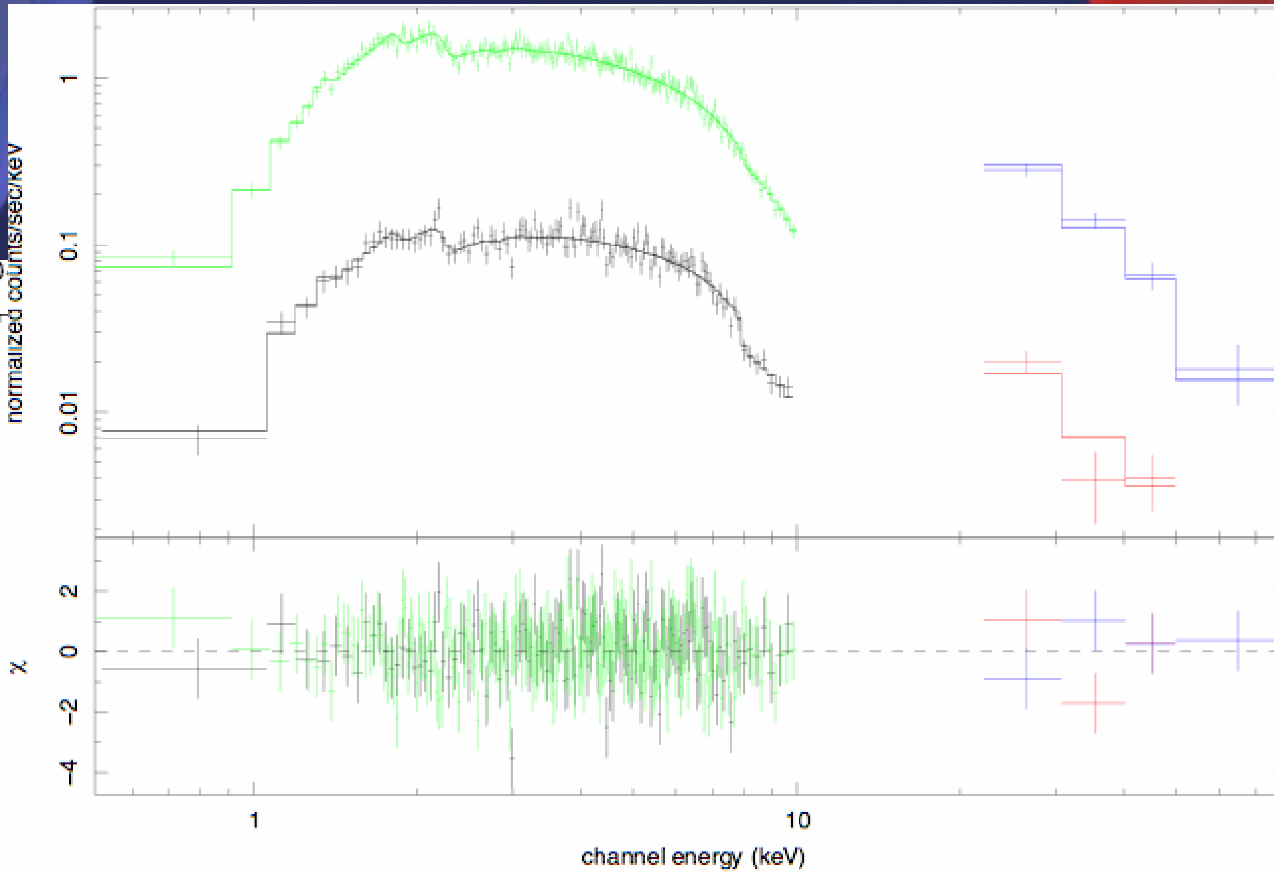




Rate(quiescent)=0.25±0.03 cts/s

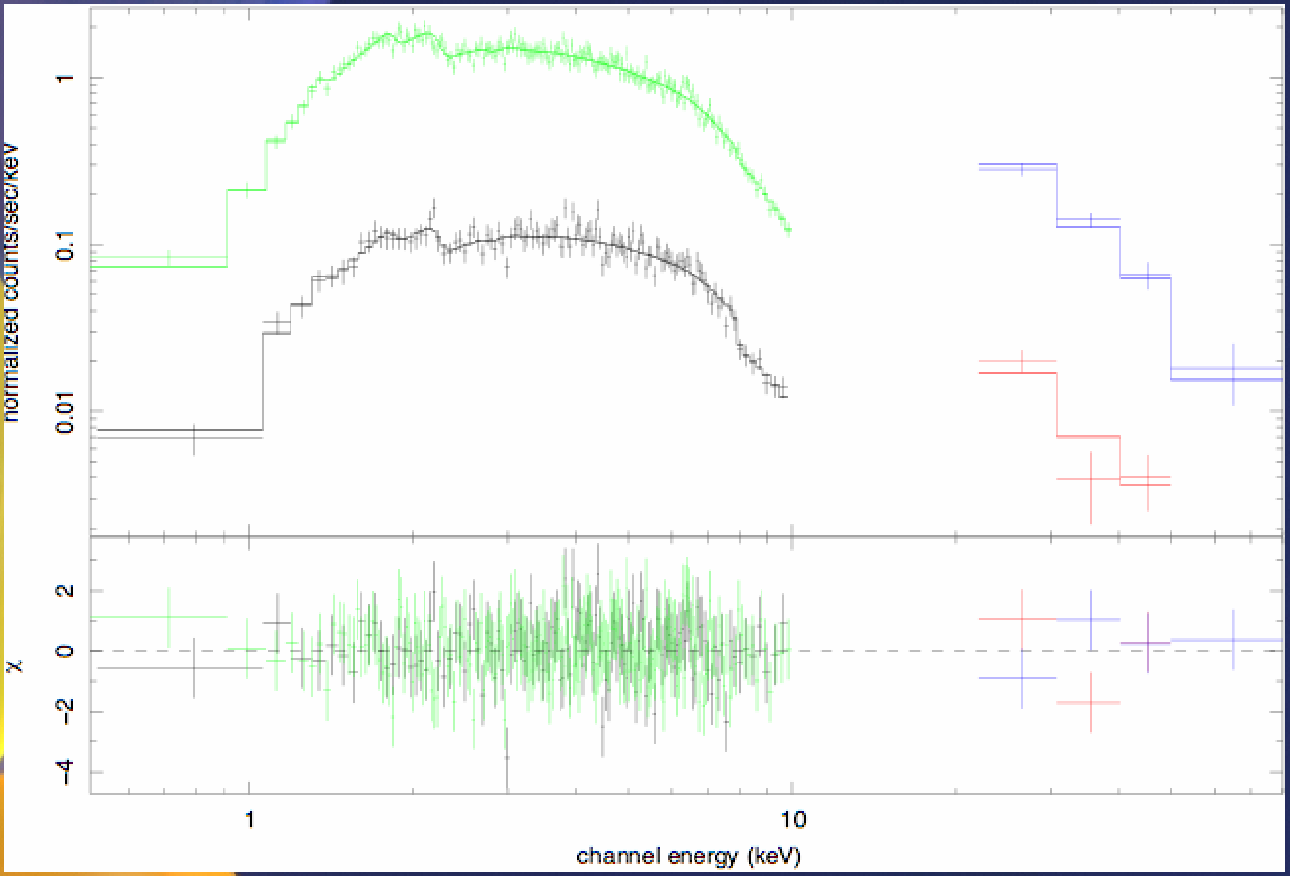
AX J1845.0-0433





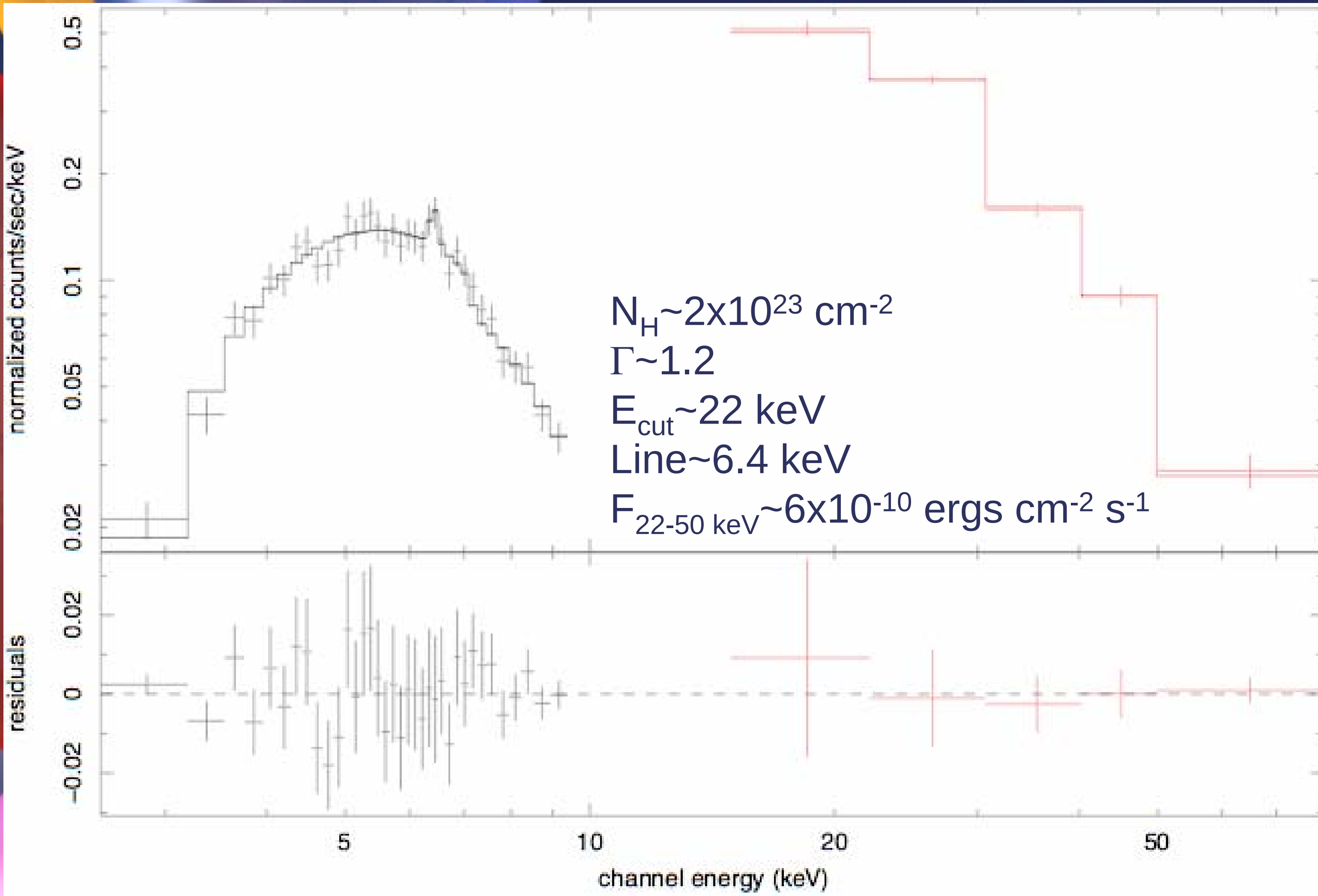
ZH, Walter, et al., soon subm

AX J1845.0-0433 spectrum



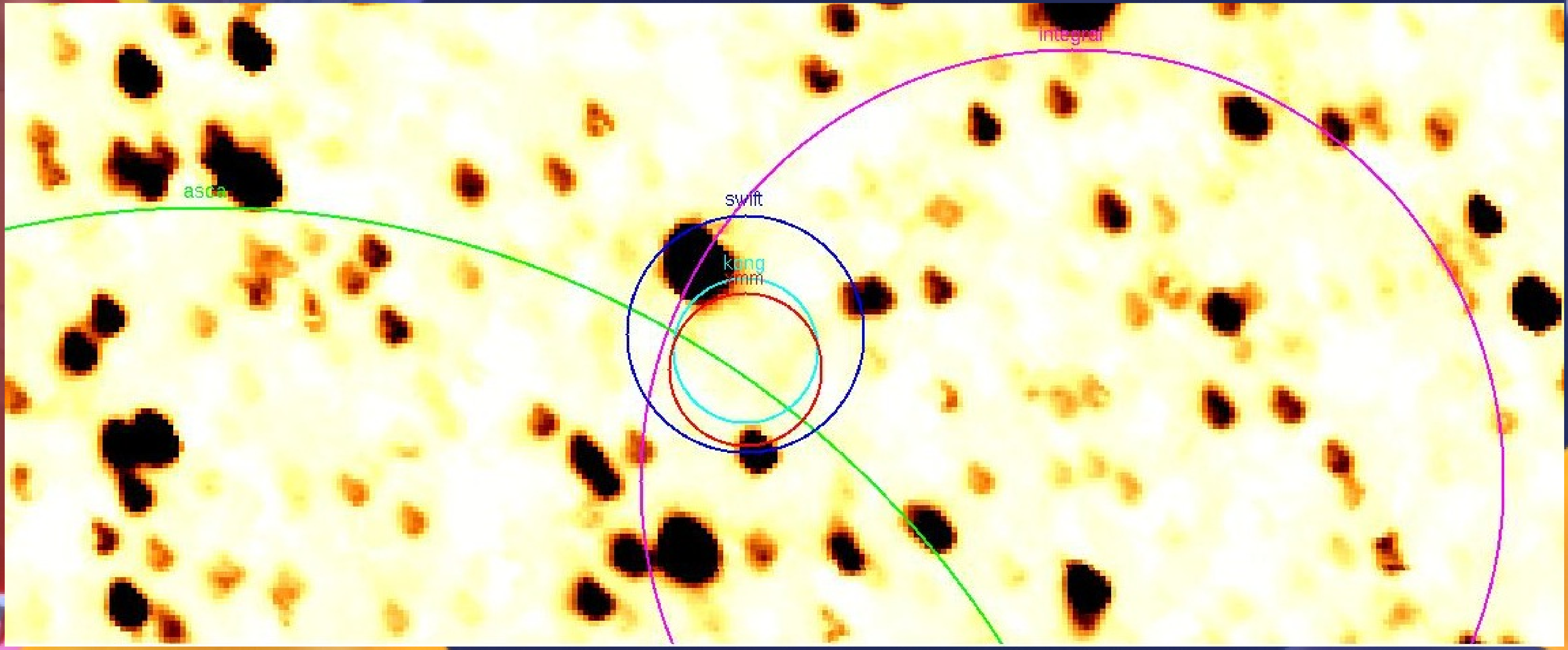
	N_H 10^{22} H cm^{-2}	edge E keV	edge τ	KT keV	Γ	E_{cut} keV	C_{ISGRI}	χ^2_ν (dof)	0.2–100 keV Flux ergs cm^{-2} s^{-1}
flare	$2.4^{+0.3}_{-0.2}$	7.9 fixed	$0.2^{+0.3}_{-0.1}$	0.11±0.03	0.9±0.1	16^{+5}_{-4}	$2.2^{+0.7}_{-0.5}$	0.92 (324)	$9.5\ 10^{-10}$
quiescence	$2.6^{+0.5}_{-0.4}$	7.9±0.1	0.4±0.1	0.12±0.03	$0.68^{+0.08}_{-0.16}$	16 fixed	$1.0^{+0.5}_{-0.3}$		$6.8\ 10^{-11}$

AX J1749.1-2733



ZH, Chaty, et al., in prep

AX J1749.1-2733: Opt/NIR counterpart?



ZH, Chaty, et al., in prep

Summary

- AX J1845.0-0433:
  Persistent source
  Faint quiescence emission
  Similar to other known sgHMXB
  but slightly higher variability factor (~25)

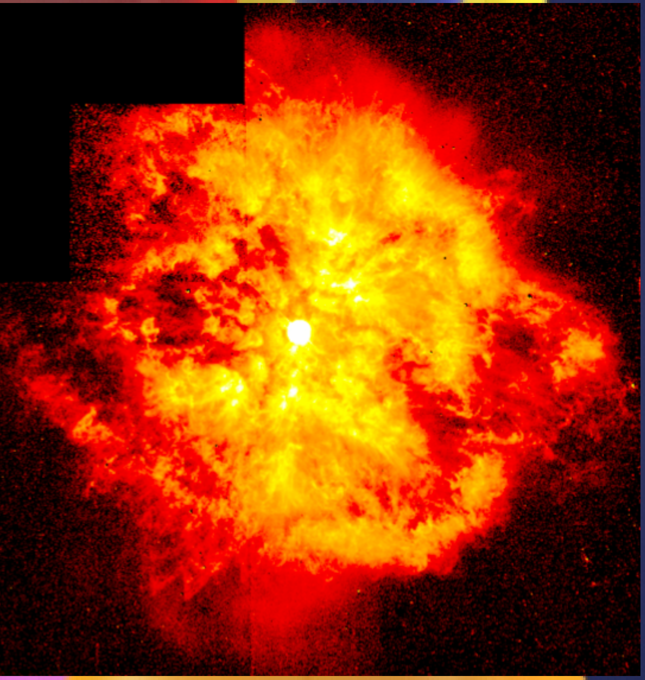
- AX J1749.1-2733:
  No counterpart identified
  HMXB spectrum
  Long period (185 days or less)
  Likely a Be system?

Clumpy winds (I)

Source	Spectral Type	Distance kpc	F_q ct/s	F_{fl} ct/s	N_{fl} short+long	t_{fl} [short] ksec	t_{fl} [long] ksec	T_{obs} days
SFXT systems								
IGR J08408−4503	O8.5 Ib[1]	2.8[1]	< 0.1	2.1-3.9	2+0	3.6		52.0
IGR J17544−2619	O9 Ib[2]	2-4[2]	0.06	4.2–24	8+0	2.5 (2–4.3)		127.0
XTE J1739−302	O8.5 Iab(f)[3]	1.8-2.9[3]	0.08	3.0–28	12+1	4.2 (2–8)	50	126.4
SAX J1818.6−1703	O9-B1 I[4]		0.18	5.2–45	11+0	2.9 (2–6)		76.9
IGR J16479−4514	OB I[5]		0.2	2.5–19	27+11	3.6 (2–14)	(16–35) + 84	67.0
AX J1841.0−0536	B0 I[6]		< 0.1	3.7–15	4+0	5.8 (2–13.1)		51.9
AX J1820.5−1434	B[4]		< 0.1	3.4–5.3	4+0	3.9 (2–9.6)		59.4
Intermediate systems								
IGR J16465−4507	B0.5 I[7]		0.1	2.5–6.9	0+3		19, 25, 45	66.7
AX J1845.0−0433	O9 Ia[8]	3.6[8]	0.2	4.0–6.2	6+0	4.0 (2–14.3)		55.2
IGR J16195−4945	OB I[9]	7[9]	0.2	2.8–4.8	6+0	2.2 (2–3.3)		71.8
IGR J16207−5129	B0 I[4]	4[4]	0.4	2.8–9.2	9+2	4.3 (2–11)	18, 25	73.7
XTE J1743−363			0.5	4.1–9.2	16+3	2.5 (2–6.6)	21, 45, 61	122.9

Ref.: [1]Leyder et al. (2007), [2]Pellizza et al. (2006), [3]Negueruela et al. (2006a), [4]Negueruela & Schurch (2007), [5]Chaty & al. (2007), [6]Nespoli et al. (2007), [7]Negueruela et al. (2005), [8]Coe et al. (1996), [9]Sidoli et al. (2005).

Clumpy winds (II)



Methods. Hard X-ray flares and quiescent emission of SFXT systems have been characterized and used to derive wind clump parameters.

Results. A large fraction of the hard X-ray emission is emitted in the form of flares with a typical duration of 3 ks, frequency of 7 days and luminosity of 10^{36} erg/s. Such flares are most probably emitted by the interaction of a compact object orbiting at 10 R_* with wind clumps (10^{22} g) representing a large fraction of the stellar mass-loss rate. The density ratio between the clumps and the inter-clump medium is 10^{2-4} in SFXT systems.

Conclusions. The parameters of the clump and of the inter-clump medium, derived from the SFXT flaring behavior, are in good agreement with macro-clumping scenario and line driven instability simulations. SFXT have probably a larger orbital radius than classical sgHMXB.

Probing clumpy stellar winds with a neutron star

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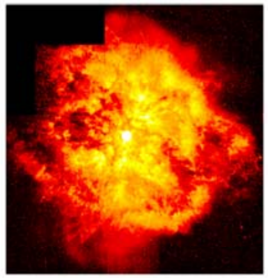
1. Choose a MASSIVE star

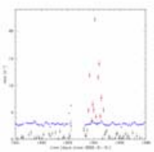


Credit: WR 124, by the Hubble Space Telescope

2. Shoot a neutron star

Credit: Isaac Newton, 1680, in *A Treatise of the System of the World*

3. Look with Integral



4. Yoo-hoo wind and clumps

Results. A large fraction of the hard X-ray emission is emitted in the form of flares with a typical duration of 3 ks, frequency of 7 days and luminosity of 10^{36} erg/s. Such flares are most probably emitted by the interaction of a compact object orbiting at $\sim 10\ R_*$ with wind clumps (10^{22-23} g) representing a large fraction of the stellar mass-loss rate. The density ratio between the clumps and the inter-clump medium is 10^{2-4} in SFXT systems.

Conclusions. The parameters of the clump and of the inter-clump medium, derived from the SFXT flaring behavior, are in good agreement with macro-clumping scenario and line driven instability simulations. SFXT have probably a larger orbital radius than classical sgHMXB.

5. Book a trip to Sardinia, happy birthday

Look for the poster and catch the paper (Walter & ZH, 2007, AA accepted)

Happy birthday…