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INTEGRAL/IBIS 7-year All-Sky Hard X-Ray Survey

II. Catalog of sources⋆,⋆⋆

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ABSTRACT

This paper is the second in a series devoted to the hard X-ray (17−60 keV) whole sky survey performed by the INTEGRAL observatory over seven years. Here we present a catalog of detected sources that includes 521 objects, 449 of which exceed a 5σ detection threshold on the time-averaged map of the sky, and 53 were detected in various subsamples of exposures. Among the identified sources with known and suspected nature, 262 are Galactic (101 low-mass X-ray binaries, 94 high-mass X-ray binaries, 37 cataclysmic variables, and 30 of other types) and 221 are extragalactic, including 217 active galactic nuclei (AGNs) and 4 galaxy clusters. The extragalactic ($|b| > 5°$) and Galactic ($|b| < 5°$) persistently detected source samples have high identification completeness (respectively ∼96% and ∼93%) and are valuable for population studies.

Key words. surveys – X-rays: general – catalogs

1. Introduction

The INTEGRAL observatory (Winkler et al. 2003) has been successfully operating in orbit since its launch in 2002. The high sensitivity and relatively good angular resolution of its instruments, in particular the coded-mask telescope IBIS (Ubertini et al. 2003), makes surveying the sky in hard X-rays one of the primary goals of INTEGRAL. The main scientific results and source catalogs have been reported in many relevant papers: Revnivtsev et al. (2003d, 2006), Molkov et al. (2004), Krivonos et al. (2005b, 2007b), Bird et al. (2004, 2006, 2007, 2010), Bassani et al. (2006), Bazzano et al. (2006), Sazonov et al. (2007), Beckmann et al. (2009).

Recently, great progress in surveying the hard X-ray sky was achieved with the Burst Alert Telescope (BAT; Barthelmy et al. 2005) at the *Swift* observatory (Gehrels et al. 2004). As seen from the large sample of detected active galactic nuclei (AGN; Tueller et al. 2010; Cusumano et al. 2010), the results of the *Swift*/BAT all-sky survey are very valuable for extragalactic studies.

In contrast to *Swift*, with a nearly uniform survey, the INTEGRAL observatory provides the sky survey with exposure that is more concentrated in the Galactic plane (GP). This fact makes the *Swift*/BAT and INTEGRAL/IBIS surveys complementary to each other.

In our first paper in a series (Krivonos et al. 2010), we presented the hard X-ray survey based on the improved sky reconstruction method for the IBIS telescope. The sensitivity of the survey was significantly improved by suppressing the systematic noise. Here we present the catalog of the sources detected in the survey.

2. Survey

With the 7-year mission data (December 2002 – July 2009), we conducted the all-sky survey in the working energy band 17−60 keV. The full analyzed data set comprises ∼83 Ms of effective (dead time-corrected) exposure. The minimum sensitivity of the survey was 3.7×10^{-12} erg s^{-1} cm^{-2} (∼0.26 mCrab[1] in 17−60 keV) at a 5σ detection level. The survey covered 90% of the sky down to the flux limit of 6.2×10^{-11} erg s^{-1} cm^{-2} (∼4.32 mCrab) and 10% of the sky area down to the flux limit of 8.6×10^{-12} erg s^{-1} cm^{-2} (∼0.60 mCrab).

In the current survey we perform a census of hard X-ray sources detected on the all-time averaged sky frame. However, a number of sources was detected in various subsamples of exposures during periods of outburst activity. Apart from the catalog, we provided the light curves of detected sources averaged over each spacecraft orbit (3 days). However, we did not attempt to look for sources on time scales midway between one orbit and seven years. This issue was addressed in the recent catalog survey by Bird et al. (2010).

We divided all sources detected in the current survey into the two classes according to their detection condition. The *Long-term Detected (LtD) sources* were found on the 7-year, time-averaged map above 5σ detection threshold. We checked that

⋆ Based on observations with INTEGRAL, an ESA project with instruments and science data centre funded by ESA member states (especially the PI countries: Denmark, France, Germany, Italy, Switzerland, Spain), Czech Republic, and Poland, and with the participation of Russia and the USA.

⋆⋆ Table 2 is also available in electronic form at the CDS via anonymous ftp to cdsarc.u-strasbg.fr (130.79.128.5) or via http://cdsarc.u-strasbg.fr/viz-bin/qcat?J/A+A/523/A61

[1] A flux of 1 mCrab in the 17−60 keV energy band corresponds to 1.43×10^{-11} erg s^{-1} cm^{-2} for a source with a Crab-like spectrum.

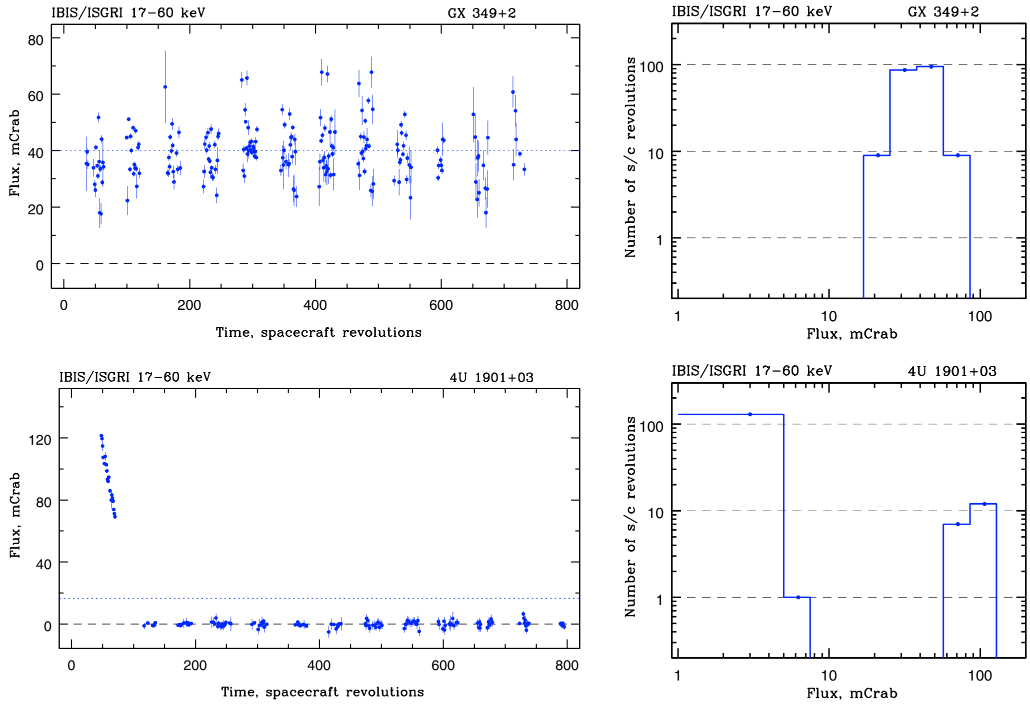

Fig. 1. The 17−60 keV light curves (*left*) and histograms of the corresponding flux distribution (*right*) of two sources in the catalog: persistently detected and highly variable LMXB GX 349+2, and HMXB transient 4U 1901+03. The blue dotted lines in the left hand figures represent the flux of the sources measured on a 7-year time-averaged map. The first flux bin in the right histograms contains counts from the range [−5, 5] mCrab, and the flux measurements with error >5 mCrab were dropped.

the measured flux was not dominated by a single event of strong outburst activity; however, the time-averaged flux may contain intrinsic source variability (Fig. 1). The list of *Short-term Detected (StD) sources* contains objects significantly detected on the time scales of spacecraft orbit (~3 days) or set of orbits (~weeks). During 7 years of the INTEGRAL survey, some sources demonstrated periods of strong outburst activity, while they were not detected over the remaining time span of observations (e.g. 4U 1901+03, Fig. 1). The source in outburst can be so bright that it may be detected on the all-time averaged sky map. Nevertheless we consider these sources as *StD*.

The above classification did not strictly follow the physical understanding of persistent and transient sources. Some objects (except one-time events) may move from *LtD* to *StD* and vice versa with the new observational data and other selection criteria. Exact classification of sources we leave to the interested reader. To do this, we provide light curves of detected sources and histograms of its flux distribution (Sect. 6). As a demonstration, we show two examples listed in the catalog, the *LtD* source LMXB GX 349+2 and HMXB transient 4U 1901+03 as *StD* source in outburst (Galloway et al. 2005).

With the new data sets obtained by the INTEGRAL since 2006, several faint sources with a known nature detected in our previous survey (Krivonos et al. 2007b, referred to as K07) fell below a 5σ detection threshold, probably owing to intrinsic variability. We included 19 known cataloged sources in the current survey with detection significance in the range $4.7{-}5.0\sigma$; however, we emphasize that for statistical studies only those *LtD* (persistent) sources should be used from the catalog that have a statistical significance higher than 5σ.

3. Detection of sources

We performed a search for sources on $25° \times 25°$ sky mosaics covering the whole sky. By analogy with K07, the sources were searched as excesses on ISGRI sky maps, convolved with a Gaussian representing the effective instrumental PSF.

The search was made on a minimum time scale of each spacecraft orbit (3 days) and over the whole time span of 7 years. Following K07, we adopted the corresponding detection thresholds of $(S/N)_{\rm lim} > 5.5\sigma$ and $(S/N)_{\rm lim} > 5\sigma$ to ensure that the final catalog contains fewer than 1−2 spurious sources.

By searching the final average map for the local maxima, we found 449 excesses above 5σ. The list of transiently detected sources contains 53 objects. The positions of newly detected sources were cross-correlated with SIMBAD and NED catalogues using a 4.2 arcmin search radius (90% confidence level for a source detected at 5−6 standard deviations, K07), and the recent *Swift* survey source cataloges reported in papers by Tueller et al. (2010) and Cusumano et al. (2010). Utilizing the whole available information for the sources with firm identification and sources with tentative but unconfirmed classification of a given type (later referred to as having "a suspected origin"), we have identified 221 extragalactic objects and 262 galactic sources. The total number of unidentified sources on the time averaged map above 5σ detection threshold is 38. Most of them (29) are located in the GP at latitudes $|b| < 5°$ (see Table 1 for source statistics).

4. Catalog of sources

The full list of sources is presented in Table 2, and its contents are described below.

Column (1) "Id" – source sequence number in the catalog.

Column (2) "Name" – source name. Their common names are given for sources whose nature was known before their detection by INTEGRAL. Sources discovered by INTEGRAL or

Table 1. Catalog source statistics and comparison with the previous survey K07.

	AGN	LMXB	HMXB	CV	Other	NotID	Total
			Current work – over 7 years				
StD	$4^* + 1^s$	$16^* + 2^s$	$15^* + 1^s$	2^*	$1^* + 1^s$	$15(15^*) - 5^s$	53^*
LtD	$207(194^*) + 5^s$	$82^* + 1^s$	$71^* + 7^s$	$33(32^*) + 2^s$	32^*	$43(38^*) - 15^s$	$468(449^*)$
All	$211(198^*) + 6^s$	$98^* + 3^s$	$86^* + 8^s$	$35(34^*) + 2^s$	$33^* + 1^s$	$58(53^*) - 20^s$	$521(502^*)$
			Galactic latitude selection $\|b\| < 5°$				
StD	–	$14^* + 2^s$	$15^* + 1^s$	–	1^s	$11(11^*) - 4^s$	40^*
LtD	$32^* + 4^s$	$59^* + 1^s$	$65^* + 7^s$	$13^* + 2^s$	25^*	$32(29^*) - 14^s$	$226(223^*)$
All	$32^* + 4^s$	$73^* + 3^s$	$80^* + 8^s$	$13^* + 2^s$	$25^* + 1^s$	$43(40^*) - 18^s$	$266(263^*)$
			Galactic latitude selection $\|b\| > 5°$				
StD	$4^* + 1^s$	2^*	–	2^*	1^*	$4(4^*) - 1^s$	13^*
LtD	$175(162^*) + 1^s$	23^*	6^*	$20(19^*)$	7^*	$11(9^*) - 1^s$	$242(226^*)$
All	$179(166^*) + 2^s$	25^*	6^*	$22(21^*)$	8^*	$15(13^*) - 2^s$	$255(239^*)$
			K07 – over 4 years				
StD	$1+1^s$	$7^* + 1^s$	3^*	$2(1^*)$	$1^* + 1^s$	$14(14^*) - 3^s$	$28(26^*)$
LtD	$129(92^*) + 2^s$	$77(76^*) + 5^s$	$69(66^*) + 4^s$	$19(13^*)$	$29(26^*) + 4^s$	$52(43^*) - 15^s$	$375(316^*)$
All	$130(92^*) + 3^s$	$84(83^*) + 6^s$	$72(69^*) + 4^s$	$21(14^*)$	$30(27^*) + 5^s$	$66(57^*) - 18^s$	$403(342^*)$

Notes. Number of sources with detection threshold above 5σ. The number of sources with tentative classification is denoted with S index. Suspected identifications are distributed over the categories behind the + sign in addition to the secure ones, but counted among NotID. All sources with suspected nature are above 5σ detection threshold.

those whose nature was established thanks to INTEGRAL are named "IGR"

Columns (3, 4) "RA, Dec" – source equatorial (J2000) coordinates.

Column (5) "Flux, 17–60 *keV"* – time-averaged source flux in mCrab units.

Column (6) "Type" – general astrophysical type of the object: LMXB (HMXB) – low- (high-) mass X-ray binary, AGN – active galactic nucleus, SNR/PWN – supernova remnant, CV – cataclysmic variable, PSR – isolated pulsar or pulsar wind nebula, SGR – soft gamma repeater, RS CVn – coronally active binary star, SymbStar – symbiotic star, Cluster – cluster of galaxies. The question mark indicates that the specified type is not firmly determined, so it should be confirmed. The census of these sources is marked in Table 1 with S index.

Column (7) "Ref." – references. These are mainly provided for new sources and are related to their discovery and/or nature.

Column (8) "Notes" – additional notes such as type subclass, redshift information, alternative source names. Redshift of the extragalactic sources was obtained from the SIMBAD and NED database.

In Table 1 we present source statistics for types, detections in GP ($|b| < 5°$), high galactic latitude sky ($|b| > 5°$), and comparison with our previous 4-year survey K07.

Active galactic nuclei – the AGN sample was substantially increased by a factor of 2 with respect to the K07 due to increased extragalactic exposure. Most of the objects were detected on the 7-year time-averaged sky. About thirty AGNs were found in the GP. The statistically clear sample of 162 AGNs, which is confidently detected ($>5\sigma$) and selected in the extragalactic sky ($|b| > 5°$), is very valuable for the AGN population studies because of the high identification completeness of the survey, which is $(N_{\rm Tot} - N_{\rm NotID})/N_{\rm Tot} = 1 - 9/226 = 0.96$.

LMXB and HMXB – the low- and high- mass X-ray binaries, as before, dominate the Galactic sample of the survey. As seen in Table 1, the number of LMXBs and HMXBs was increased mainly by *StD* sources. With the new observational data, 13 HMXBs and 6 LMXBs persistently detected in K07 have now been moved now to the *StD*s[2] according to detection conditions described in Sect. 2.

Cataclysmic variables – similar to the AGNs sample, the number of CVs was increased by a factor of 2 thanks to the additional high galactic latitude observations. Most of the CVs were recorded as *LtD*, except for FO Aqr and V1062 Tau. The position of FO Aqr has very poor coverage by INTEGRAL observations and the source was significantly detected during only one spacecraft orbit. V1062 Tau is located in the region with a high systematic noise from the bright source Crab Nebula, which prevented its persistent detection. However, during the 215 ks observations of Crab in August 2003, the source V1062 Tau was detected with significance $\sim 7\sigma$.

Other types – the other populations of sources (clusters, SNR, PSR, symbiotic stars, etc.) were persistently detected on the 7-year maps and mainly in the GP. The total number has not substantially changed since K07. The number of clusters of galaxies was increased by detection of Triangulum A Cluster, in addition to Coma, Perseus, and Oph Cluster.

Unidentified sources – dominant in the GP and mainly *LtD*s, 29 unidentified objects detected above 5σ threshold at $|b| < 5°$, made the survey in the GP identified at a level of ~87%. If we take the suspected nature of 14 *LtD* sources into account, the identification completeness of the survey at $|b| < 5°$ becomes ~93%. Most of the unidentified, *transiently* detected sources (*StD*s) were found in the GP, which implicitly points to their Galactic and probably X-ray binary origin.

5. Extragalactic Log *N*–Log *S*

Under the assumption that AGNs are uniformly distributed over the sky, we can construct the number-flux function of hard X-ray emitting AGNs. Since INTEGRAL observations cover the sky inhomogeneously, we should consider the sensitivity map in

[2] *HMXB*: V 0332+53, A 0535+262, IGR J21343+4738, 4U 0115+63, IGR J16358-4726, GRO J1008-57, IGR J11215-5952, XTE J1543-568, IGR J16465-4507, KS 1716-389, A 1845-024, XTE J1858+034, 4U 1901+03; *LMXB:* IGR J00291+5934, XTE J1550-564, XTE J1720-318, SLX 1746-331, XTE J1807-294, XTE J1817-330.

constructing number-flux functions. This was done by dividing the source counts by the sky coverage at the 5σ level as a function of flux (see Fig. 12 in Krivonos et al. 2010). In Fig. 2 we show the cumulative $\log N - \log S$ distribution of 158 nonblazar AGNs derived over the whole sky, excluding the GP ($|b| < 5°$). The $\log N - \log S$ distribution can be fitted well by a power law: $N(>S) = AS^{-\alpha}$. Using a maximum-likelihood estimator (see e.g. Jauncey 1967; Crawford et al. 1970), we determined the best-fit values of the slope and normalization: $\alpha = 1.56 \pm 0.10$ and $A = (3.59 \pm 0.35) \times 10^{-3}$ deg^{-2} at $S = 2 \times 10^{-11}$ erg s^{-1} cm^{-2}. The observed $\log N - \log S$ slope is consistent with a homogeneous distribution of sources in space ($\alpha = 3/2$) and implies that AGNs with fluxes exceeding the survey detection threshold at the extragalactic coverage ($|b| > 5°$) account for ~1% of the intensity of the cosmic X-ray background in the 17–60 keV band.

We compared the obtained $\log N - \log S$ distribution with the one derived from the Swift/BAT AGN sample of 199 objects by Ajello et al. (2009). To make the correct flux conversion between 15–55 keV energy range used in Ajello et al. (2009) and 17–60 keV band of this work, we had to take different assumed Crab spectra into account. We assumed Crab spectrum $10.0 \times E_{\rm keV}^{-2.1}$ phot cm^{-2} s^{-1} keV^{-1}, while Ajello et al. (2009) used $10.14 \times E_{\rm keV}^{-2.15}$ phot cm^{-2} s^{-1} keV^{-1}. We converted $\log N - \log S$ by Ajello et al. (2009) to "our" 17–60 keV energy band, and overplotted it in Fig. 2. We also estimated the AGN surface density at flux 2×10^{-11}erg s^{-1} cm^{-2} using the $\log N - \log S$ by Ajello et al. (2009) and found it (2.86×10^{-3} deg^{-2}) in a 2σ confidence interval of the measured normalization A. Obviously, the AGN number-flux relation obtained with INTEGRAL and Swift/BAT are in good agreement. Recently, Cusumano et al. (2010) found full agreement between their AGN $\log N - \log S$ measured with Swift/BAT and INTEGRAL (K07).

6. Concluding remarks

We have presented the catalog of sources detected in the hard X-ray (17–60 keV) whole-sky survey performed at the INTEGRAL observatory over seven years (Krivonos et al. 2010). Our catalog contains 521 sources of different types. According to detection conditions, we divided all sources between *LtD* and *StD*. The statistically clear sample of 449 *LtD* sources was found on the averaged sky map above 5σ detection level, and 53 *StD* sources were detected in the different subsamples of exposures.

Among the Galactic sources with firmly known and suspected nature, we found 101 LMXBs, 94 HMXBs, 37 CVs, and 30 of other types. Among known and suspected extragalactic identifications, we found 217 AGNs and 4 galaxy clusters. We presented the detailed catalog source statistics in the Table 1.

We would like to stress that our survey has high identification completeness with respect to the confidently detected (>5σ) and persistent (*LtD*) sources. Considering detected objects with firm and tentative classification, the survey's completeness in GP ($|b| < 5°$) is ~93% and the extragalactic selection ($|b| > 5°$) is ~96%.

Our survey provides the highest sensitivity in the GP, reaching the limiting flux of ~0.26 mCrab or 3.7×10^{-12} erg s^{-1} cm^{-2} in the working energy band 17–60 keV. The faintest Galactic source is a type-I X-ray burster AX J1754.2-2754 (Chelovekov & Grebenev 2007a,b) detected on the time-averaged map at 6.4σ with a flux of 0.32 mCrab (4.6×10^{-12} erg s^{-1} cm^{-2}).

The Galactic sample of the new survey allows us to significantly extend the study of the faint end of the galactic X-ray binary population (Revnivtsev et al. 2008) with luminosities ~4×10^{34} *erg s*$^{-1}$ (at the distance of the Galactic center). Apart from the catalog of sources available online[3,4], we provide the scientific community with the light curves of detected sources averaged over each INTEGRAL orbit (3 days) and histograms of the corresponding flux distribution (see examples in Fig. 1).

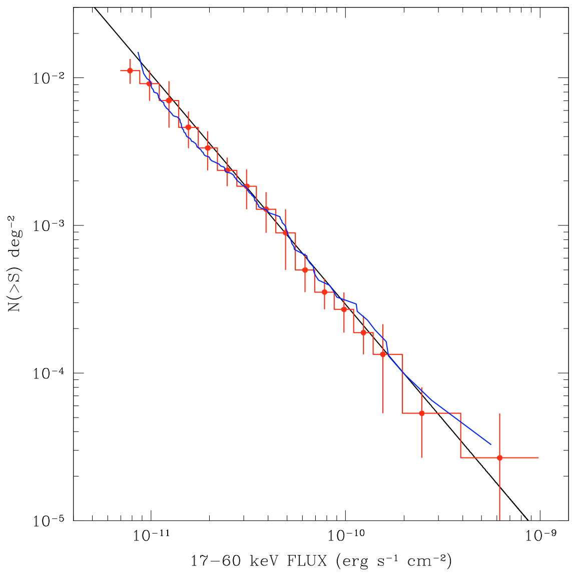

Fig. 2. Number flux relation of extragalactic objects at $|b| > 5°$ (red points) built from a nonblazar AGN sample containing 158 objects detected above 5σ. The best-fitting power law is shown by the black solid line. The blue curve represents AGN $\log N - \log S$ measured by Ajello et al. (2009) with Swift/BAT.

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Table 2. The catalog of sources[†] detected during the INTEGRAL/IBIS 7-year all-sky survey.

Id	Name	RA[‡] (deg)	Dec[‡] (deg)	$F_{17-60\ \mathrm{keV}}$[⋆] erg cm^{-2}s^{-1}	Type	Ref.[⋆⋆]	Notes[⋆⋆⋆]
1	IGR J00040+7020	1.008	70.322	0.87 ± 0.13	AGN	153,116	Sy2 z=0.096;
2	IGR J00234+6141	5.723	61.700	0.79 ± 0.10	CV	43,50	
3	TYCHO SNR	6.334	64.150	0.92 ± 0.10	SNR		
4	SWIFT J0025.8+6818	6.387	68.362	1.01 ± 0.12	AGN		Sy2 z=0.012;
5	V709 Cas	7.205	59.300	5.85 ± 0.11	CV	36	
6	IGR J00291+5934	7.254	59.563	31.29 ± 0.32[R261:264]	LMXB		
7	IGR J00335+6126	8.397	61.448	0.67 ± 0.10	AGN	149,134	Sy1.5 z=0.105; =IGR J00333+6122
8	87GB003300.9+593328	8.977	59.827	1.40 ± 0.11	AGN	1	Blazar z = 0.086;
9	IGR J00370+6122	9.286	61.386	0.68 ± 0.10	HMXB	45	
10	MRK 348	12.181	31.947	9.69 ± 0.52	AGN		Sy2 z = 0.01514; NGC 262;
11	1WGA J0053.8-722	13.526	−72.468	2.88 ± 0.50	HMXB		
12	Gamma Cas	14.176	60.712	4.75 ± 0.11	Star		
13	SMC X-1	19.299	−73.449	43.96 ± 0.49	HMXB		
14	1A 0114+650	19.516	65.289	13.44 ± 0.12	HMXB		
15	4U0115+63	19.625	63.746	179.47 ± 0.52[R667:675] 377.17 ± 0.56[R238]	HMXB		
16	IGR J01363+6610	24.060	66.188	22.07 ± 2.69[R185]	HMXB	14,52	
17	ESO 297- G 018	24.639	−40.020	4.97 ± 0.71	AGN		Sy2 z = 0.0252;
18	4U 0142+61	26.630	61.738	2.86 ± 0.16	AXP		
19	RJ 0146.9+6121	26.744	61.351	1.71 ± 0.16	HMXB		
20	IGR J01528-0326	28.208	−3.450	1.71 ± 0.19	AGN	55	Sy2 z = 0.01668; MCG -01-05-047;
21	NGC 788	30.277	−6.819	5.17 ± 0.17	AGN		Sy2 z = 0.0136;
22	Mrk 1018	31.612	−0.297	1.15 ± 0.18	AGN		Sy1 z = 0.04264;
23	IGR J02086-1742	32.141	−17.659	1.33 ± 0.26	AGN	152,192,173	Sy1 z = 0.129;
24	IGR J02095+5226	32.392	52.458	2.64 ± 0.32	AGN		Sy1 z = 0.0492; LEDA 138501; 1ES 0206+522;
25	MRK 590	33.640	−0.767	1.12 ± 0.17	AGN		Sy1 z = 0.026542;
26	IGR J02164+5126	34.113	51.441	2.21 ± 0.36	AGN	134,135	Sy2 z = 0.422;
27	QSO B0212+73	34.494	73.802	1.78 ± 0.31	AGN		z = 2.367; SWIFTJ0218.0+7348;
28	MRK 1040	37.063	31.316	4.01 ± 0.54	AGN		Sy1 z = 0.016338; NGC 931
29	IGR J02343+3229	38.599	32.475	3.03 ± 0.43	AGN	144,139	Sy2 z = 0.016195; NGC 973;
30	NGC 0985	38.657	−8.788	1.84 ± 0.19	AGN		Sy1.8 z = 0.043143;
31	IGR J02403+6113	40.090	61.222	1.75 ± 0.24	HMXB		V* V615 Cas
32	NGC 1052	40.267	−8.236	1.73 ± 0.20	AGN		Sy2 z = 0.004930;
33	NGC 1068	40.687	−0.010	2.11 ± 0.21	AGN		Sy2 z = 0.003786;
34	IGR J02448+1442	41.220	14.710	3.02 ± 0.62			
35	4U 0241+61	41.262	62.464	3.72 ± 0.25	AGN		Sy1 z = 0.044557;
36	IGR J02466-4222	41.644	−42.360	2.88 ± 0.52[R446:452]	AGN	77,134	XBONG z = 0.0696; MCG -07-06-018;
37	IGR J02501+5440	42.547	54.678	2.02 ± 0.31	AGN	116	Sy2 z = 0.015; =IGR J02504+5443; LEDA 166445
38	IGR J02524-0829	43.115	−8.486	1.46 ± 0.24	AGN	113	Sy2 z = 0.016758; MCG-02-08-014;
39	NGC 1142	43.804	−0.186	5.16 ± 0.26	AGN		Sy2 z = 0.028847; NGC 1144;
40	V* XY Ari	44.038	19.441	2.89 ± 0.52	CV		DQ Her type;
41	NGC 1194	45.955	−1.104	1.57 ± 0.32	AGN		Sy1 z = 0.013333;
42	PERSEUS CLUSTER	49.973	41.509	3.77 ± 0.24	Cluster		Thermal emission dominates;
43	1H 0323+342	51.140	34.168	2.85 ± 0.46[R25:300]	AGN	28,59	NL Sy1 z = 0.0629; 2MASX J032441.19+341045.9;
44	IGR J03249+4041	51.225	40.698	1.28 ± 0.24	AGN	199	Sy2 z = 0.0476; interacting galaxies LEDA 097012 and 2MASX J03251221+4042021; =SWIFT J0324.9+4044; =PBC J0325.1+4042; =RX J0325.2+4042;
45	GK Per	52.777	43.880	2.51 ± 0.25	CV		
46	IGR J03334+3718	53.362	37.313	2.02 ± 0.23	AGN	60,77,144	Sy1 z = 0.05583;
47	NGC 1365	53.428	−36.170	3.74 ± 0.71	AGN		Sy1 z = 0.005559;
48	V0332+53	53.751	53.172	562.40 ± 0.49[R269:288]	HMXB		
49	NRAO 140	54.125	32.308	1.90 ± 0.25	AGN		z = 1.258497;
50	ESO 548-81	55.513	−21.241	3.43 ± 0.67	AGN		Sy1 z = 0.01448; =SWIFT J0342.0-2115
51	4U 0352+30	58.849	31.036	43.00 ± 0.27	HMXB		X Per;
52	SWIFTJ0407.3+0342	61.837	3.748	2.45 ± 0.39	AGN		Sy2 z = 0.089; 3C 105;
53	3C111	64.581	38.013	6.12 ± 0.26	AGN		Sy1 z = 0.0485;
54	IGR J04236+0408	65.923	4.136	1.98 ± 0.28	AGN		Sy2 z = 0.046149; 2MASX J04234080+0408017;
55	3C 120	68.319	5.350	5.51 ± 0.24	AGN		Sy1 z = 0.0331;
56	RX J0440.9+4431	70.270	44.530	1.36 ± 0.22	HMXB	141	
57	UGC03142	70.945	28.972	3.65 ± 0.31	AGN		Sy1 z = 0.021828; 1RXS J044350.8+285845
58	LEDA 168563	73.044	49.531	2.98 ± 0.24	AGN		Sy1 z = 0.029; 1RXS J045205.0+493248;
59	CGCG 420-015	73.362	4.062	1.63 ± 0.19	AGN		Sy2 z = 0.02939;

Table 2. continued.

Id	Name	RA‡ (deg)	Dec‡ (deg)	$F_{17-60\ \mathrm{keV}}$⋆ erg cm^{-2}s^{-1}	Type	Ref.⋆⋆	Notes⋆⋆⋆
60	ESO 033-G002	74.001	−75.538	1.50 ± 0.22	AGN		Sy2 z = 0.018426;
61	IGR J04571+4527	74.290	45.450	1.45 ± 0.22	CV	173	non-magnetic CV; 1RXS J045707.4+452751;
62	IGR J05007-7047	75.203	−70.775	1.46 ± 0.20	HMXB	2	IGR J05009-7044;
63	LEDA 075258	75.537	3.531	0.98 ± 0.17	AGN		Sy1 z = 0.01599;
64	V1062 Tau	75.617	24.732	5.64 ± 0.69[R102]	CV		
65	XSS J05054-2348	76.439	−23.840	4.75 ± 0.39	AGN		Sy2 z = 0.0350;
66	IRAS 05078+1626	77.705	16.513	6.25 ± 0.22	AGN		Sy1 z = 0.017879;
67	4U 0513-40	78.534	−40.069	3.37 ± 0.44	LMXB		
68	AKN 120	79.026	−0.140	4.26 ± 0.17	AGN		Sy1 z = 0.0323;
69	ESO 362-18	79.898	−32.658	3.60 ± 0.31	AGN		z = 0.012666; SWIFTJ0519.5-3140
70	PICTOR A	79.957	−45.779	3.53 ± 0.65	AGN		Sy1 z = 0.035058;
71	PKS0521-36	80.690	−36.470	1.69 ± 0.34	AGN		Blazar z = 0.05534; RBS 0644; QSO B0521-365
72	RX J0525.3+2413	81.390	24.220	1.20 ± 0.19	CV	142	
73	TV COL	82.356	−32.818	4.94 ± 0.29	CV		DQ Her type
74	IGR J05305-6559	82.636	−65.984	1.16 ± 0.19			C76;
75	PKS 0528+134	82.739	13.563	1.15 ± 0.22	AGN?		z = 2.07;
76	LMC X-4	83.210	−66.367	25.53 ± 0.19	HMXB		C74;
77	Crab	83.632	22.016	1430.00 ± 0.18	PSR		
78	A 0535+262	84.735	26.324	319.59 ± 16.47[R831] 718.84 ± 0.83[R352]	HMXB		
79	LMC X-1	84.912	−69.748	4.69 ± 0.19	HMXB		
80	QSO J0539-2839	84.976	−28.665	1.34 ± 0.27	AGN		z = 3.103997; SWIFTJ0539.9-2839;
81	PSR 0540-69	85.005	−69.338	2.33 ± 0.18	PSR		
82	BY Cam	85.713	60.868	3.50 ± 0.60	CV	36	
83	NGC 2110	88.047	−7.456	12.67 ± 0.32	AGN		Sy2 z = 0.007579;
84	MCG 8-11-11	88.801	46.437	8.87 ± 0.41	AGN		Sy1 z = 0.020484;
85	IRAS 05589+2828	90.601	28.461	3.79 ± 0.21	AGN		Sy1 z = 0.033; =SWIFT J0602.2+2829;
86	IGR J06058-2755	91.471	−27.931	1.54 ± 0.32	AGN	173	Sy 1.5 z = 0.090; 1RXS J060548.1-275439;
87	ESO 005- G 004	92.575	−86.554	3.99 ± 0.59[R99]	AGN		Sy2 z = 0.006384;
88	MRK 3	93.908	71.036	6.82 ± 0.29	AGN		Sy2 z = 0.013443;
89	4U 0614+091	94.282	9.139	27.93 ± 0.41	LMXB		
90	IGR J06233-6436	95.847	−64.605	1.22 ± 0.22	AGN		Sy1 z = 0.128889; PMN J0623-6436
91	IGR J06239-6052	95.936	−60.974	1.64 ± 0.28	AGN	111	Sy2 z = 0.04052; ESO 121-IG 028
92	ESO490-IG026	100.060	−25.890	2.89 ± 0.60	AGN		Sy1.2 z = 0.0248; =SWIFT J0640.4-2554
93	IGR J06415+3251	100.380	32.850	3.66 ± 0.41	AGN	143	Sy2 z = 0.017195; =Swift J0641.3+3257;
94	MRK 6	103.048	74.423	4.07 ± 0.26	AGN		Sy1 z = 0.018676;
95	2E 0655.8-0708	104.557	−7.218	4.65 ± 0.38	HMXB		
96	IGR J07264-3553	111.595	−35.900	2.31 ± 0.48	AGN		Sy2 z = 0.029624; LEDA 096373;
97	SWIFT J0732.5-1331	113.120	−13.490	2.08 ± 0.34	CV	115,133,129	DQ Her type
98	EXO 0748-676	117.146	−67.754	32.06 ± 0.33	LMXB		
99	IGR J07563-4137	119.055	−41.638	1.18 ± 0.17	AGN	44,2	Sy2 z = 0.021; =IGR J07565-4139;
100	IGR J07597-3842	119.934	−38.727	2.92 ± 0.19	AGN	13,8	Sy1.2 z = 0.04;
101	ESO 209-G012	120.496	−49.734	1.64 ± 0.16	AGN		Sy1 z = 0.039587;
102	Vela pulsar	128.835	−45.182	9.98 ± 0.11	PSR		
103	4U 0836-429	129.354	−42.894	21.50 ± 0.12	LMXB		
104	FAIRALL 1146	129.621	−35.983	1.68 ± 0.18	AGN		Sy1 z = 0.031789;
105	IGR J08390-4833	129.728	−48.556	0.92 ± 0.12	CV	118,157	
106	S5 0836+71	130.340	70.902	2.89 ± 0.22	AGN	1	z = 2.1720;
107	IGR J08557+6420	133.944	64.349	1.35 ± 0.27	AGN	173	Likely Sy2 z = 0.037; SWIFT J0855.6+6425;
108	Vela X-1	135.531	−40.555	307.11 ± 0.13	HMXB		
109	IGR J09026-4812	135.648	−48.221	1.91 ± 0.12	AGN	154	Sy1 z = 0.0391;
110	IRAS 09149-6206	139.043	−62.330	1.98 ± 0.21	AGN		Sy1 z = 0.05715;
111	X 0918-548	140.102	−55.196	4.22 ± 0.15	LMXB		
112	SWIFT J0920.8-0805	140.213	−8.086	2.80 ± 0.58	AGN		Sy2 z = 0.019827; MCG-01-24-012;
113	IGR J09251+5219	141.274	52.331	4.86 ± 1.01	AGN		Sy1 z = 0.035398; Mrk 110;
114	IGR J09253+6929	141.321	69.488	1.27 ± 0.23	AGN	127	Sy1.5 z = 0.039;
115	NGC 2992	146.431	−14.335	5.56 ± 0.39	AGN		Sy1 z = 0.00771;
116	MCG-5-23-16	146.916	−30.947	11.52 ± 0.39	AGN		Sy2 z = 0.008226; ESO 434-G040;
117	IGR J09522-6231	148.025	−62.523	1.20 ± 0.17	AGN	77,101,116	Sy1.9 z = 0.252; =IGR J09523-6231
118	NGC 3081	149.859	−22.816	4.45 ± 0.42	AGN		Sy2 z = 0.007956;
119	GRO J1008-57	152.447	−58.298	19.48 ± 0.31[R200:203] 43.28 ± 3.29[R372]	HMXB	184	
120	IGR J10095-4248	152.449	−42.800	2.03 ± 0.27	AGN		ESO 263-G013; Sy2 z = 0.032859;
121	IGR J10100-5655	152.529	−56.914	1.23 ± 0.14	HMXB	62,8	
122	IGR J10109-5746	152.753	−57.795	1.59 ± 0.14	CV	23,67	RXP J101103.0-574810; Symbiotic binary

Table 2. continued.

Id Name	RA‡ (deg)	Dec‡ (deg)	$F_{17-60\ \mathrm{keV}}$★ erg cm^{-2}s^{-1}	Type	Ref.★★	Notes★★★
123 NGC 3227	155.876	19.867	8.30 ± 0.69	AGN		Sy1 $z = 0.00365$;
124 NGC 3281	157.935	−34.855	4.65 ± 0.47	AGN		Sy2 $z = 0.011475$;
125 3U 1022-55	159.401	−56.801	12.38 ± 0.58[R529:530]	HMXB		
126 IGR J10386-4947	159.676	−49.789	1.29 ± 0.20	AGN	20	SWIFT J1038.8-4942; Sy1 $z = 0.060$;
127 IGR J10404-4625	160.124	−46.391	2.29 ± 0.27	AGN	44,4	LEDA 93974; Sy2 $z = 0.024027$;
128 eta Car	161.189	−59.719	0.87 ± 0.13	Star		
129 IGR J10447-6027	161.196	−60.454	0.88 ± 0.13		128,196	2MASSJ10445192-6025115;
130 Mrk 421	166.114	38.209	28.12 ± 0.22	AGN		Blazar $z = 0.03$;
131 NGC 3516	166.698	72.569	4.28 ± 0.30	AGN		Sy1 $z = 0.008816$;
132 IGR J11187-5438	169.580	−54.660	0.74 ± 0.14	XRB	139	
133 IGR J11203+4531	170.090	45.530	5.27 ± 0.75[R74:76]			
134 Cen X-3	170.306	−60.628	68.04 ± 0.13	HMXB		
135 IGR J11215-5952	170.429	−59.869	4.86 ± 0.40[R197:198] 15.07 ± 0.82[R88] 79.95 ± 4.16[R308]	HMXB	12,56,165	SFXT
136 IGR J11305-6256	172.779	−62.945	3.69 ± 0.13	HMXB	34,4,120	
137 IGR J11321-5311	173.047	−53.200	49.33 ± 3.80[R330]		58	
138 IGR J11361-6003	174.030	−60.060	0.72 ± 0.13	AGN	116	LINER Sy2 $z = 0.014$; =IGR J11366-6002;
139 NGC 3783	174.739	−37.766	11.71 ± 1.44	AGN		Sy1 $z = 0.009647$;
140 IGR J11395-6520	174.858	−65.406	9.16 ± 0.93[R88:90]	RS CVn?		HD 101379;
141 IGR J11435-6109	176.031	−61.106	4.04 ± 0.13	HMXB	14,18,120,179	
142 IGR J11459-6955	176.478	−69.924	1.13 ± 0.20	AGN	173	Sy 1.2, $z = 0.244$; SWIFT J1145.6-6956; 2MASS J11455362-6954017;
143 A 1145.1-6141	176.870	−61.956	27.16 ± 0.13	HMXB		C144;
144 4U 1145-619	177.000	−62.207	3.28 ± 0.13	HMXB		C143;
145 IGR J12009+0648	180.240	6.810	1.55 ± 0.24	AGN		Sy2 $z = 0.035948$; 2MASX J12005792+0648226;
146 IGR J12026-5349	180.686	−53.823	3.15 ± 0.17	AGN	23,2,158	WKK0560; Sy2 $z = 0.028368$;
147 NGC 4051	180.781	44.525	2.67 ± 0.21	AGN		Sy1 $z = 0.00216$;
148 NGC 4138	182.352	43.672	1.76 ± 0.20	AGN		Sy1 $z = 0.002955$;
149 NGC 4151	182.634	39.408	30.52 ± 0.18	AGN		Sy1 $z = 0.003262$;
150 IGR J12107+3822	182.681	38.381	1.14 ± 0.18	AGN	137,173	Sy1.5 $z = 0.0229$; SWIFT J1210.7+3819;
151 1ES 1210-646	183.269	−64.917	1.19 ± 0.14	HMXB	168	
152 IGR J12134-6015	183.374	−60.265	0.63 ± 0.13			1RXS J121324.5-601458;
153 NGC 4235	184.291	7.191	0.95 ± 0.19	AGN		Sy1 $z = 0.007772$;
154 NGC 4253	184.592	29.825	1.47 ± 0.23	AGN		Sy1 $z = 0.012662$; =QSO B1215+300;
155 NGC 4258	184.747	47.309	1.31 ± 0.26	AGN		LINER Sy1.9 $z = 0.001541$; =M 106;
156 PKS 1219+04	185.588	4.230	1.35 ± 0.17	AGN		$z = 0.965001$;
157 MRK 50	185.860	2.676	1.31 ± 0.16	AGN		Sy1 $z = 0.023196$;
158 NGC 4388	186.444	12.664	17.76 ± 0.24	AGN		Sy2 $z = 0.008426$;
159 NGC 4395	186.462	33.565	1.33 ± 0.19	AGN		Sy1 $z = 0.00101$;
160 GX 301-2	186.651	−62.772	259.13 ± 0.13	HMXB		
161 XSS J12270-4859	186.978	−48.907	1.95 ± 0.23	CV	63	
162 3C273	187.271	2.050	18.52 ± 0.15	AGN		$z = 0.15834$;
163 IGR J12349-6434	188.724	−64.565	4.44 ± 0.14	SymbStr	17,68	V* RT Cru;
164 NGC 4507	188.908	−39.905	11.52 ± 0.34	AGN		Sy2 $z = 0.011771$;
165 ESO 506-G027	189.727	−27.308	4.02 ± 0.71	AGN		Sy2 $z = 0.025208$;
166 IGR J12391-1612	189.792	−16.186	3.03 ± 0.31	AGN	23,2	LEDA 170194; Sy2 $z = 0.0367$; XSS 12389-1614;
167 NGC 4593	189.910	−5.347	5.51 ± 0.16	AGN		Sy1 $z = 0.0090$;
168 WKK 1263	190.356	−57.841	1.79 ± 0.14	AGN		Sy1.5 $z = 0.024$; =IGR J12415-5750
169 IGR J12480-5829	192.020	−58.497	0.84 ± 0.14	AGN	152,161,173	Sy1.9 $z = 0.028$; =IGR J1248.2-5828;
170 4U 1246-588	192.386	−59.090	4.29 ± 0.14	LMXB	40,110	
171 NGC 4748	193.052	−13.415	1.25 ± 0.25	AGN		Sy1 $z = 0.013753$;
172 3C279	194.030	−5.779	1.24 ± 0.18	AGN		$z = 0.53620$;
173 2S 1254-690	194.392	−69.296	2.87 ± 0.17	LMXB	41	
174 Coma	194.865	27.938	2.22 ± 0.20	Cluster		
175 4U 1258-61	195.322	−61.602	1.97 ± 0.13	HMXB		V* V850 Cen
176 1RXP J130159.6-635806	195.495	−63.969	2.55 ± 0.13	HMXB	51	C177;
177 PSR B1259-63	195.699	−63.836	1.17 ± 0.13	HMXB		C176;
178 IGR J13042-0534	196.054	−5.574	0.96 ± 0.20	AGN		Sy2 $z = 0.003696$; NGC 4941; 1RXS J130413.2-053304;
179 NGC 4939	196.095	−10.336	1.59 ± 0.24	AGN		Sy2 $z = 0.010374$;
180 NGC 4945	196.364	−49.470	18.43 ± 0.19	AGN		Sy2 $z = 0.001908$;
181 ESO 323-G077	196.607	−40.423	2.26 ± 0.22	AGN		Sy2 $z = 0.014904$;

Table 2. continued.

Id Name	RA‡ (deg)	Dec‡ (deg)	$F_{17-60\ \mathrm{keV}}$⋆ erg cm^{-2}s^{-1}	Type	Ref.⋆⋆	Notes⋆⋆⋆
182 IGR J13091+1137	197.270	11.619	2.98 ± 0.27	AGN	23,2	NGC 4992; Sy2 z = 0.025201;
183 IGR J13109-5552	197.689	−55.865	1.84 ± 0.15	AGN	23,116	PMN J1310-5552; Sy1 z = 0.104;
184 IGR J13149+4422	198.743	44.389	1.53 ± 0.29	AGN	164,139	Mrk 248; Sy2 z = 0.036698;
185 IGR J13168-7157	199.210	−71.951	0.84 ± 0.17	AGN	172,173	Sy1.5 z = 0.0705; SWIFT J1316.9-7155l; 1RXS J131651.8-715537;
186 IGR J13186-6257	199.650	−62.947	1.15 ± 0.13	HMXB?	131,136	
187 MCG-03-34-064	200.602	−16.728	2.50 ± 0.47	AGN		Sy2 z = 0.017092;
188 Cen A	201.363	−43.019	63.63 ± 0.19	AGN		Sy2 z = 0.001830;
189 4U 1323-619	201.643	−62.136	12.38 ± 0.13	LMXB		
190 IGR J13290-6323	202.268	−63.392	3.23 ± 0.50^{R92}			
191 ESO 383-G018	203.332	−34.030	1.58 ± 0.21	AGN		Sy2 z = 0.013;
192 MCG-6-30-15	203.990	−34.288	3.87 ± 0.21	AGN		ESO 383-G035; Sy1 z = 0.007892;
193 NGC 5252	204.564	4.528	6.66 ± 0.22	AGN		Sy2 z = 0.022219;
194 MRK 268	205.420	30.395	1.72 ± 0.28	AGN		Sy2 z = 0.040408;
195 IGR J13466+1921	206.670	19.360	1.60 ± 0.30			1RXS J134628.5+192310
196 4U 1344-60	206.894	−60.615	5.85 ± 0.13	AGN		Sy1.5 z = 0.013;
197 IC 4329A	207.333	−30.309	17.95 ± 0.25	AGN		Sy1 z = 0.016024; =ESO 445-50
198 LEDA 49418	208.567	−37.779	0.90 ± 0.18	AGN		Sy2 z = 0.051602;
199 IGR J14003-6326	210.204	−63.414	1.19 ± 0.13	PWN	57,136,194	ms pulsar
200 Circinus galaxy	213.290	−65.342	16.80 ± 0.14	AGN		Sy2 z = 0.001421;
201 NGC 5506	213.312	−3.220	14.68 ± 0.32	AGN		Sy2 z = 0.006068;
202 IGR J14175-4641	214.296	−46.671	1.13 ± 0.16	AGN	23,8	Sy2 z = 0.076;
203 NGC 5548	214.541	25.155	2.75 ± 0.46	AGN		Sy1 z = 0.01668;
204 ESO 511-G030	214.885	−26.633	2.46 ± 0.30	AGN		Sy1 z = 0.022242;
205 4U 1416-62	215.303	−62.698	1.11 ± 0.13	HMXB		
206 H 1426+428	217.070	42.660	2.18 ± 0.34	AGN		Blazar z = 0.129; 1ES1426+428
207 IGR J14298-6715	217.388	−67.251	1.17 ± 0.15	LMXB	57,116	
208 NGC 5643	218.169	−44.174	1.02 ± 0.15	AGN		Sy2 z = 0.003943;
209 IGR J14331-6112	218.273	−61.221	0.92 ± 0.13	HMXB	57,116	
210 NGC 5728	220.599	−17.253	4.40 ± 0.51	AGN		Sy2 z = 0.009467;
211 IGR J14471-6414	221.528	−64.284	0.88 ± 0.14	AGN	57,116	Sy1.2 z = 0.053;
212 IGR J14471-6319	221.834	−63.289	0.78 ± 0.13	AGN	23,8	Sy2 z = 0.038;
213 IGR J14488-4009	222.201	−40.152	0.85 ± 0.16			
214 IGR J14493-5534	222.311	−55.589	1.47 ± 0.14	AGN	101	2MASX J14491283-5536194;
215 IGR J14515-5542	222.887	−55.691	1.62 ± 0.14	AGN	62,8	WKK 4374; Sy2 z = 0.018;
216 IGR J14536-5522	223.421	−55.363	1.26 ± 0.14	CV	62,63,156	Polar
217 IGR J14552-5133	223.846	−51.571	1.28 ± 0.15	AGN	23,8	WKK 4438; Sy1 z = 0.016;
218 IGR J14561-3738	224.055	−37.632	1.14 ± 0.16	AGN	101	ESO 386- G 034; Sy2 z = 0.024;
219 IC 4518A	224.427	−43.125	2.11 ± 0.15	AGN		Sy2 z = 0.016261;
220 Mrk 841	226.005	10.438	3.07 ± 0.44	AGN		Sy1 z = 0.03642;
221 IGR J15094-6649	227.382	−66.816	1.71 ± 0.16	CV	23,63	
222 PSR 1509-58	228.480	−59.145	12.67 ± 0.14	PSR		
223 SWIFT J1513.8-8125	228.567	−81.415	1.42 ± 0.29	AGN	132,173	Sy1.2 z = 0.0684; 2MASX J15144217-8123377;
224 4U 1516-569	230.167	−57.168	7.72 ± 0.13	LMXB		
225 IGR J15360-5750	234.014	−57.806	1.36 ± 0.14	AGN?	23,195	=IGR J15359-5750;
226 IGR J15414-5030	235.350	−50.512	0.87 ± 0.13	CV?	136	Galactic source; =IGR J15415-5029;
227 4U 1538-522	235.600	−52.385	23.42 ± 0.13	HMXB		
228 XTE J1543-568	236.011	−56.748	14.97 ± 1.12^{R468} 16.12 ± 0.82$^{R37:38}$	HMXB		
229 4U 1543-624	236.964	−62.578	3.15 ± 0.16	LMXB		
230 NY Lup	237.052	−45.472	6.04 ± 0.14	CV		1RXS J154814.5-452845
231 NGC 5995	237.104	−13.758	3.12 ± 0.24	AGN		Sy2 z = 0.025091;
232 XTE J1550-564	237.751	−56.474	328.23 ± 0.46$^{R54:60}$	LMXB		
233 IGR J15529-5029	238.233	−50.490	0.61 ± 0.12	CV?	136	Galactic source
234 IGR J15539-6142	238.468	−61.676	0.78 ± 0.16	AGN	57,102	ESO 136-6; Sy2 z = 0.014997;
235 ESO 389- G 002	238.693	−37.604	1.00 ± 0.19	AGN	173	Sy2 z = 0.0194; =IGR J15549-3740;
236 4U 1556-605	240.363	−60.716	1.18 ± 0.16	LMXB		
237 IGR J16058-7253	241.470	−72.900	1.71 ± 0.23			SWIFT J1605.9-7250?; IRAS F15596-7245?;
238 WKK 6092	242.981	−60.637	1.68 ± 0.16	AGN		Sy1 z = 0.016; =IGR J16119-6036
239 4U 1608-522	243.177	−52.425	21.69 ± 0.12	LMXB		
240 IGR J16167-4957	244.162	−49.975	2.10 ± 0.12	CV	86,36	1RXS J161637.2-495847;
241 IGR J16175-5059	244.357	−50.972	0.59 ± 0.12	PSR		PSR J1617-5055
242 IGR J16185-5928	244.635	−59.468	1.25 ± 0.15	AGN	23,8	WKK 6471; Sy1 z = 0.035;
243 IGR J16195-2807	244.871	−28.151	3.23 ± 0.28	LMXB	44,108,197	SyXB; =IGR J16194-2810; 1RXS J161933.6-280736;

Table 2. continued.

Id Name	RA‡ (deg)	Dec‡ (deg)	$F_{17-60\ \mathrm{keV}}$⋆ erg $\mathrm{cm^{-2}s^{-1}}$	Type	Ref.⋆⋆	Notes⋆⋆⋆
244 IGR J16195-4945	244.893	−49.755	2.38 ± 0.12	HMXB	86,83	AX J161929-4945;
245 Sco X-1	244.981	−15.637	1142.08 ± 0.20	LMXB		
246 IGR J16207-5129	245.194	−51.505	3.92 ± 0.12	HMXB	86,83	
247 SWIFT J1626.6-5156	246.659	−51.938	17.47 ± 1.33$^{R398:407}$	LMXB	78	
248 4U 1624-49	247.002	−49.209	5.10 ± 0.12	LMXB		
249 IGR J16283-4838	247.034	−48.652	1.08 ± 0.12	HMXB	125,105	
250 IGR J16287-5021	247.175	−50.343	0.86 ± 0.12	LMXB	124,173	
251 IGR J16293-4603	247.311	−46.076	0.59 ± 0.12	LMXB	197	SyXB?
252 IGR J16318-4848	247.953	−48.819	35.22 ± 0.12	HMXB	84,85	
253 IGR J16320-4751	248.013	−47.876	20.35 ± 0.12	HMXB	87,25	AX J1631.9-4752
254 4U 1626-67	248.076	−67.466	20.63 ± 0.24	LMXB		
255 IGR J16336-4733	248.396	−47.559	10.08 ± 0.12			C256;
256 4U 1630-47	248.503	−47.391	31.58 ± 0.12	LMXB		C255,258;
257 ESO 137-G34	248.790	−58.088	1.40 ± 0.15	AGN		Sy2 z = 0.009113;
258 IGR J16358-4726	248.992	−47.407	19.58 ± 0.83$^{R54:57}$	HMXB	88,89,193	C256;
			63.25 ± 7.87^{R185}			
259 Triangulum A	249.567	−64.347	1.55 ± 0.22	Cluster		z = 0.051;
260 IGR J16385-2057	249.630	−20.920	1.15 ± 0.19	AGN		1RXSJ163830.9-205520; Sy1 z = 0.0269;
261 AX J163904-4642	249.768	−46.707	5.53 ± 0.12	HMXB	90	
262 4U 1636-536	250.230	−53.751	38.49 ± 0.13	LMXB		
263 IGR J16418-4532	250.465	−45.534	5.23 ± 0.12	HMXB	91,37	
264 GX 340+0	251.449	−45.616	41.27 ± 0.12	LMXB		
265 IGR J16465-4507	251.648	−45.118	6.64 ± 0.48$^{R222:224}$	HMXB	11,93	C266;
			13.63 ± 0.75$^{R232:233}$			
266 IGR J16479-4514	252.015	−45.207	5.17 ± 0.12	HMXB	92,93,197	2MASS J16480656-4512068;
267 IGR J16482-3036	252.058	−30.591	3.12 ± 0.14	AGN	44,4	2MASX J16481523-3035037; Sy1 z = 0.031;
268 IGR J16493-4348	252.362	−43.819	2.58 ± 0.12	HMXB	106,117	2MASS J16492695-4349090;
269 IGR J16500-3307	252.493	−33.113	1.76 ± 0.13	CV	44,116,197	IP; 1RXS J164955.1-330713;
270 NGC 6221	253.120	−59.215	1.59 ± 0.18	AGN		Sy2 z = 0.004750; May contain flux from ESO 138-G1;
271 NGC 6240	253.305	2.429	4.19 ± 0.31	AGN		LIRG z = 0.024323;
272 MKN 501	253.464	39.751	6.47 ± 0.32	AGN		BL Lac z = 0.033640;
273 GRO J1655-40	253.499	−39.844	15.55 ± 0.13	LMXB		
274 IGR J16547-1916	253.682	−19.275	1.07 ± 0.17	CV	173,198	IP; RXS J165443.5-191620;
275 IGR J16558-5203	254.032	−52.078	2.41 ± 0.13	AGN	86,8	Sy1.2 z = 0.054;
276 IGR J16562-3301	254.073	−33.045	2.16 ± 0.12	AGN	112	BL Lac; SWIFT J1656.3-3302;
277 Her X-1	254.455	35.343	118.05 ± 0.29	LMXB		
278 AX J1700.2-4220	255.082	−42.335	1.98 ± 0.12	HMXB	63	
279 OAO 1657-415	255.199	−41.656	93.57 ± 0.12	HMXB		
280 XTE J1701-462	255.232	−46.197	5.81 ± 0.13	LMXB		outburst activity rev.400-550
281 IGR J17009+3559	255.250	35.990	1.65 ± 0.29	AGN	140,173	XBONG z = 0.113;
282 GX 339-4	255.705	−48.792	69.48 ± 0.13	LMXB		
283 IGR J17036+3734	255.910	37.570	1.56 ± 0.30			
284 4U 1700-377	255.984	−37.842	299.44 ± 0.11	HMXB		
285 GX 349+2	256.431	−36.421	60.56 ± 0.11	LMXB		
286 IGR J17062-6143	256.556	−61.715	1.72 ± 0.23		151	=SWIFT J1706.6-6146
287 4U 1702-429	256.566	−43.037	22.65 ± 0.13	LMXB		
288 1RXS J170849.0-400910	257.214	−40.142	1.55 ± 0.12	AXP		
289 4U 1705-32	257.223	−32.322	2.72 ± 0.10	LMXB		
290 4U 1705-440	257.234	−44.102	27.83 ± 0.13	LMXB		
291 IGR J17091-3624	257.308	−36.408	6.20 ± 0.11	LMXB	94,24	C293;
292 XTE J1709-267	257.386	−26.658	19.10 ± 0.72$^{R171:172}$	LMXB		
293 IGR J17098-3628	257.438	−36.460	27.64 ± 0.42$^{R298:305}$		103,185	C291;
294 XTE J1710-281	257.549	−28.128	3.56 ± 0.10	LMXB		
295 RX J1713.7-3946	257.991	−39.862	0.57 ± 0.12	SNR		G347.3-0.5;
296 Oph cluster	258.114	−23.347	5.29 ± 0.11	Cluster		
297 4U 1708-40	258.120	−40.858	1.06 ± 0.12	LMXB		
298 V2400 Oph	258.149	−24.244	3.59 ± 0.10	CV		
299 SAX J1712.6-3739	258.153	−37.645	5.90 ± 0.11	LMXB		
300 KS 1716-389	259.003	−38.879	2.16 ± 0.38$^{R36:63}$	HMXB	48,49,197	XTE J1716-389;
301 NGC 6300	259.244	−62.830	5.12 ± 0.26	AGN		Sy2 z = 0.003706;
302 IGR J17195-4100	259.911	−41.023	2.82 ± 0.12	CV	86,36	1RXS J171935.6-410054;
303 IGR J17197-3010	259.930	−30.180	0.50 ± 0.09			
304 XTE J1720-318	259.993	−31.753	33.49 ± 0.49$^{R56:63}$	LMXB		
305 IGR J17200-3116	260.022	−31.294	2.39 ± 0.09	HMXB	86,8	1RXS J172006.1-311702;

Table 2. continued.

Id	Name	RA‡ (deg)	Dec‡ (deg)	$F_{17-60\ \mathrm{keV}}$⋆ erg cm^{-2}s^{-1}	Type	Ref.⋆⋆	Notes⋆⋆⋆
306	IGR J17204-3554	260.087	−35.900	0.82 ± 0.10	AGN	44,27	
307	IGR J17233-2837	260.850	−28.620	0.82 ± 0.08			
308	EXO 1722-363	261.295	−36.282	11.04 ± 0.09	HMXB		
309	IGR J17254-3257	261.354	−32.953	2.17 ± 0.08	LMXB	86,70	1RXS J172525.5-325717;
310	IGR J17269-4737	261.681	−47.647	17.95 ± 2.01^{R364}	XRB	73	XTE J1726-476;
311	4U 1724-30	261.888	−30.804	27.16 ± 0.08	LMXB		Terzan 2;
312	IGR J17285-2922	262.163	−29.370	$5.07 \pm 0.51^{R119:122}$	LMXB?	86,35	XTE J1728-295;
313	IGR J17303-0601	262.579	−5.971	4.24 ± 0.21	CV	86,72	1RXS J173021.5-055933;
314	GX 9+9	262.934	−16.952	15.64 ± 0.13	LMXB		
315	GX 354-0	262.988	−33.833	62.19 ± 0.08	LMXB		
316	IGR J17320-1914	263.001	−19.195	1.23 ± 0.11	CV	36	V2487 Oph;
317	GX 1+4	263.011	−24.747	80.62 ± 0.08	LMXB		
318	IGR J17331-2406	263.291	−24.142	0.58 ± 0.08		64,195	
319	RapidBurster	263.349	−33.387	5.01 ± 0.08	LMXB		
320	IGR J17350-2045	263.740	−20.754	0.92 ± 0.10			
321	IGR J17353-3539	263.830	−35.663	1.10 ± 0.09	HMXB?	124	Galactic source
322	IGR J17353-3257	263.848	−32.934	1.45 ± 0.08	HMXB?	22,136	=IGR J17354-3255;
323	GRS 1734-292	264.371	−29.139	7.36 ± 0.08	AGN	29	Sy1 $z = 0.021400$;
324	IGR J17379-3747	264.465	−37.774	11.13 ± 1.36^{R165}		178	Burster;
325	SLX 1735-269	264.571	−26.991	15.45 ± 0.08	LMXB		
326	4U 1735-444	264.748	−44.453	32.73 ± 0.15	LMXB		
327	IGR J17391-3021	264.812	−30.355	1.34 ± 0.08	HMXB	6,15	XTE J1739-302;
328	GRS 1736-297	264.899	−29.736	$4.79 \pm 0.43^{R479:484}$ $6.35 \pm 0.51^{R408:409}$	LMXB	29	
329	XTE J1739-285	264.975	−28.496	2.15 ± 0.07	LMXB	5	C331;
330	IGR J17402-3656	265.087	−36.936	1.00 ± 0.09	HMXB?	136	=IGR J17404-3655;
331	SLX 1737-282	265.168	−28.313	5.59 ± 0.07	LMXB		C329,47,334;
332	IGR J17407-2808	265.175	−28.133	2.11 ± 0.07	HMXB	16,10	C331; 2RXP J174040.9-280852;
333	2E 1739.1-1210	265.484	−12.188	2.25 ± 0.16	AGN		IGR J17418-1212; Sy1 $z = 0.037$;
334	IGR J17419-2802	265.485	−28.031	$6.37 \pm 0.45^{R425:426}$ $9.41 \pm 0.58^{R361:362}$ 10.56 ± 0.67^{R409}		61	C331,332;
335	IGR J17427-3018	265.696	−30.301	0.39 ± 0.08			AX J1742.6-3022
336	XTE J1743-363	265.753	−36.377	3.01 ± 0.09	HMXB	10,182,197	SFXT?
337	1E 1740.7-294	265.976	−29.748	44.53 ± 0.07	LMXB		C340,344;
338	IGR J17445-2747	266.082	−27.772	$3.85 \pm 0.33^{R165:173}$		44	
339	IGR J17448-3231	266.190	−32.528	0.56 ± 0.08	SNR	136	C345;
340	KS 1741-293	266.242	−29.337	6.02 ± 0.07	LMXB		C337;
341	GRS 1741.9-2853	266.250	−28.917	4.35 ± 0.07	LMXB	186	C342,343,346,347;
342	IGR J17456-2901	266.401	−29.026	8.16 ± 0.07	NucStrCl	79,76	C340,341,343,346,347; =AX J1745.6-2901; Nuclear stellar cluster;
343	1E 1742.8-2853	266.500	−28.914	8.36 ± 0.07	LMXB		C341,342,346,347;
344	A 1742-294	266.517	−29.508	19.00 ± 0.07	LMXB		C337;
345	IGR J17464-3213	266.564	−32.237	22.46 ± 0.08	LMXB	95	H1743-322/XTE J1746-322;
346	1E 1743.1-2843	266.580	−28.735	6.82 ± 0.07	LMXB		C347,343;
347	SAX J1747.0-2853	266.761	−28.883	4.75 ± 0.07	LMXB		C341,342,343,346;
348	IGR J17464-2811	266.817	−28.180	2.25 ± 0.07	LMXB	148,147	C351; Neutron star LMXB
349	SLX 1744-299/300	266.834	−30.010	10.37 ± 0.07	LMXB		C344;
350	IGR J17473-2721	266.841	−27.352	$91.27 \pm 0.57^{R667:725}$	LMXB	74,123	
351	IGR J17475-2822	266.864	−28.364	3.22 ± 0.07	MolCld	21	C348; SgrB2;
352	IGR J17475-2253	266.901	−22.862	1.33 ± 0.08	AGN	137	Sy1 $z = 0.0463$;
353	GX 3+1	266.983	−26.563	15.84 ± 0.07	LMXB		C359;
354	A 1744-361	267.052	−36.133	$16.99 \pm 0.60^{R181:185}$	LMXB	181	
355	4U 1745-203	267.217	−20.359	15.26 ± 0.68^{R120}	LMXB		
356	IGR J17488-3253	267.223	−32.907	1.52 ± 0.08	AGN	86,8	Sy1 $z = 0.020$;
357	AX J1749.1-2733	267.275	−27.550	1.70 ± 0.07	HMXB	114,183	C358;
358	AX J1749.2-2725	267.292	−27.421	1.43 ± 0.07	HMXB	188	C357;
359	GRO J1750-27	267.300	−26.647	1.76 ± 0.07	HMXB		C353;
360	IGR J17497-2821	267.415	−28.360	3.81 ± 0.07	LMXB	121,169	
361	SLX 1746-331	267.477	−33.201	$9.14 \pm 0.27^{R106:112}$	LMXB		BH X-ray transient
362	4U 1746-37	267.548	−37.046	3.14 ± 0.09	LMXB		
363	SAX J1750.8-2900	267.600	−29.038	$50.96 \pm 1.11^{R670:674}$	LMXB	160	C365;
364	IGR J17505-2644	267.636	−26.744	0.81 ± 0.07			
365	IGR J17507-2856	267.677	−28.909	$3.53 \pm 0.48^{R236:237}$		104	C363;
366	GRS 1747-313	267.689	−31.284	1.73 ± 0.08	LMXB	29	Terzan 6;

Table 2. continued.

Id	Name	RA‡ (deg)	Dec‡ (deg)	$F_{17-60\ \mathrm{keV}}$⋆ erg cm^{-2}s^{-1}	Type	Ref.⋆⋆	Notes⋆⋆⋆
367	XTE J1751-305	267.816	−30.616	10.56 ± 0.79^{R299} 21.98 ± 0.92^{R546}	LMXB	189	ms-pulsar
368	IGR J17513-2011	267.820	−20.184	1.36 ± 0.09	AGN	44,8	Sy1.9 z = 0.047;
369	SWIFT J1753.5-0127	268.361	−1.452	87.62 ± 0.17	LMXB	155	
370	AX J1754.2-2754	268.495	−28.026	0.45 ± 0.07	LMXB	176,177	
371	IGR J17544-2619	268.619	−26.325	0.97 ± 0.08	HMXB	54,31	
372	IGR J17585-3057	269.636	−30.956	0.80 ± 0.08			
373	IGR J17586-2129	269.658	−21.327	1.35 ± 0.09	HMXB?	136	
374	IGR J17597-2201	269.946	−22.026	5.65 ± 0.09	LMXB	96,97,175,197	XTE J1759-220;
375	V2301 OPH	270.170	8.190	1.33 ± 0.28	CV		AM Herculis
376	GX 5-1	270.283	−25.075	69.29 ± 0.08	LMXB		
377	GRS 1758-258	270.302	−25.743	81.48 ± 0.08	LMXB		
378	GX 9+1	270.385	−20.527	22.84 ± 0.09	LMXB		C379;
379	IGR J18027-2016	270.666	−20.283	6.03 ± 0.10	HMXB	98,99,163	C378; IGR/SAX J18027-2017;
380	IGR J18027-1455	270.692	−14.910	2.39 ± 0.12	AGN	86,31	RXS J180245.2-145432; Sy1 z = 0.0350;
381	IGR J18048-1455	271.180	−14.925	0.95 ± 0.12	LMXB	44,116	
382	XTE J1807-294	271.770	−29.430	$9.09 \pm 0.40^{R50:63}$	LMXB		
383	SGR 1806-20	272.162	−20.404	3.74 ± 0.10	SGR		
384	XTE J1810-189	272.585	−19.070	$43.76 \pm 1.00^{R660:674}$	LMXB	190	Burster;
385	V4722 Sgr	272.685	−26.150	$35.89 \pm 0.33^{R594:606}$	LMXB		
386	PSR J1811-1925	272.862	−19.423	1.07 ± 0.10	PSR/PWN		SNR G11.2-0.3;
387	IGR J18134-1636	273.370	−16.650	0.89 ± 0.12			
388	IGR J18135-1751	273.397	−17.858	1.51 ± 0.11	SNR/PWN	46,171	HESS J1813-178;
389	GX 13+1	273.629	−17.155	16.12 ± 0.11	LMXB		
390	M 1812-12	273.780	−12.094	38.10 ± 0.13	LMXB		
391	IGR J18151-1052	273.790	−10.880	0.65 ± 0.13	HMXB	140,166	
392	GX 17+2	274.006	−14.035	77.26 ± 0.13	LMXB		
393	IGR J18162+4953	274.060	49.890	7.53 ± 1.18	CV		V* AM Her;
394	IGR J18170-2511	274.295	−25.142	1.14 ± 0.09	CV	134	IP; (=IGR J18173-2509);
395	IGR J18175-1530	274.400	−15.470	0.59 ± 0.12			
396	XTE J1817-330	274.431	−33.020	$48.27 \pm 0.25^{R406:426}$	LMXB		
397	XTE J1818-245	274.597	−24.546	3.88 ± 0.09	LMXB?		
398	SAX J1818.6-1703	274.699	−17.033	1.87 ± 0.12	HMXB	33,116,180	
399	AX J1820.5-1434	275.112	−14.564	1.84 ± 0.13	HMXB		
400	IGR J18214-1318	275.340	−13.299	2.03 ± 0.13	HMXB	44,150	
401	IGR J18218+6421	275.466	64.363	1.33 ± 0.25	AGN		Sy1 z = 0.297; 7C 1821+6419;
402	IGR J18219-1347	275.500	−13.790	0.71 ± 0.13			
403	4U 1820-303	275.921	−30.362	46.74 ± 0.10	LMXB		
404	IC 4709	276.081	−56.369	3.58 ± 0.31	AGN		IGR J18244-5622; z = 0.016905;
405	XTE J1824-141	276.110	−14.440	0.98 ± 0.13	HMXB?	162	X-Ray Pulsar; =IGR J18246-1425;
406	IGR J18249-3243	276.206	−32.738	0.94 ± 0.10	AGN	9,134	Sy1 z = 0.355; PKS 1821-327?;
407	4U 1822-000	276.312	0.007	2.13 ± 0.15	LMXB		
408	IGR J18256-1035	276.434	−10.585	0.83 ± 0.13			
409	4U 1822-371	276.447	−37.106	36.95 ± 0.12	LMXB		
410	IGR J18257-0707	276.480	−7.145	1.13 ± 0.14	AGN	44,120	Sy1 z = 0.037; =IGRJ18259-0706;
411	LS 5039	276.554	−14.861	0.91 ± 0.13	HMXB		
412	IGR J18293-1213	277.340	−12.220	0.74 ± 0.13			
413	GS 1826-24	277.367	−23.798	112.29 ± 0.11	LMXB		
414	AX J183039-1002	277.660	−10.049	0.98 ± 0.13	AGN?	126	
415	IGR J18308-1232	277.700	−12.530	1.14 ± 0.13	CV	136	
416	IGR J18325-0756	278.112	−7.938	$9.15 \pm 0.38^{R62:66}$ $11.42 \pm 0.38^{R429:432}$		100	
417	SNR 021.5-00.9	278.394	−10.572	4.16 ± 0.13	SNR		
418	PKS 1830-211	278.421	−21.068	3.20 ± 0.12	AGN		z = 2.507;
419	IGR J18354-2417	278.850	−24.290	0.58 ± 0.12			1WGA J1835.4-2418
420	RX J1832-33	278.933	−32.990	13.24 ± 0.12	LMXB		
421	AX J1838.0-0655	279.503	−6.911	2.78 ± 0.14	SNR/PWN	47	HESS J1837-069;
422	ESO 103-G035	279.632	−65.422	6.82 ± 0.38	AGN		Sy2 z = 0.013249;
423	Ser X-1	279.991	5.041	15.16 ± 0.13	LMXB		
424	IGR J18410-0535	280.262	−5.577	1.34 ± 0.13	HMXB	19	AX J1841.0-0536;
425	1E 1841-045	280.329	−4.938	3.78 ± 0.13	PSR/PWN		
426	3C390.3	280.578	79.763	5.09 ± 0.31	AGN		Sy1 z = 0.056159;
427	ESO 140-43	281.225	−62.365	3.06 ± 0.33	AGN		Sy1 z = 0.014113;
428	AX J1845.0-0433	281.253	−4.574	2.08 ± 0.13	HMXB	40	

Table 2. continued.

Id Name	RA[‡] (deg)	Dec[‡] (deg)	$F_{17-60\ \mathrm{keV}}$[⋆] erg cm^{-2}s^{-1}	Type	Ref.[⋆⋆]	Notes[⋆⋆⋆]
429 GS 1843+00	281.404	0.868	4.62 ± 0.12	HMXB		
430 IGR J18462-0223	281.567	−2.387	34.17 ± 2.91[R610]	HMXB?	119,191	
431 PSR J1846-0258	281.613	−2.983	2.32 ± 0.12	PSR/PWN	170	AXP?
432 IGR J18470-7831	281.757	−78.533	1.42 ± 0.28	AGN		$z = 0.0743$;
433 A 1845-024	282.048	−2.426	13.82 ± 1.31[R229:233]	HMXB		
434 IGR J18483-0311	282.071	−3.172	5.87 ± 0.12	HMXB	71,109,163	SFXT
435 IGR J18486-0047	282.104	−0.787	1.35 ± 0.12	AGN?	136	strong radio source, high X-ray abs.;
436 IGR J18490-0000	282.258	−0.013	1.63 ± 0.12	PWN	38,139,174,197	
437 4U 1850-087	283.265	−8.702	7.55 ± 0.14	LMXB		
438 IGR J18539+0727	283.500	7.488	25.14 ± 0.86[R62]	LMXB?	30,24	
439 ESO 25-2	283.759	−78.877	1.66 ± 0.28	AGN		Sy1 $z = 0.028743$;
440 4U 1849-31	283.761	−31.155	9.23 ± 0.18	CV		V1223 Sgr;
441 XTE J1855-026	283.870	−2.601	14.78 ± 0.12	HMXB		
442 IGR J18559+1535	283.987	15.629	1.97 ± 0.14	AGN	32,8	2E 1853.7+1534; Sy1 $z = 0.084$;
443 2E 1849.2-7832	284.346	−78.491	2.53 ± 0.29	AGN		$z = 0.042$;
444 IGR J18578-3405	284.469	−34.096	5.89 ± 0.80[R408]	AGN?		
445 XTE J1858+034	284.673	3.437	75.34 ± 0.32[R186:193]	HMXB		
446 HETE J19001-2455	285.039	−24.917	24.38 ± 0.19	LMXB		
447 XTE J1901+014	285.415	1.447	3.25 ± 0.11	HMXB?	69	
448 4U 1901+03	285.917	3.207	115.17 ± 0.24[R48:70]	HMXB		
449 IGR J19072-2046	286.820	−20.770	1.14 ± 0.20	CV		V1082 Sgr
450 SGR 1900+14	286.839	9.322	1.31 ± 0.10	SGR		
451 IGR J19077-3925	286.890	−39.380	1.14 ± 0.20	AGN	173	Sy1.9 $z = 0.073$;
452 XTE J1908+094	287.219	9.374	0.94 ± 0.10	LMXB		
453 4U 1907+097	287.406	9.833	19.10 ± 0.11	HMXB		
454 IGR J19108+0917	287.641	9.312	0.50 ± 0.10			
455 X 1908+075	287.701	7.595	18.14 ± 0.10	HMXB		
456 Aql X-1	287.814	0.584	12.57 ± 0.11	LMXB	187	
457 SS 433	287.957	4.979	11.61 ± 0.10	HMXB		
458 IGR J19140+0951	288.526	9.885	12.76 ± 0.11	HMXB	53,42,163	=IGR J19140+098;
459 GRS 1915+105	288.801	10.947	388.69 ± 0.11	LMXB		
460 4U 1916-053	289.686	−5.247	11.90 ± 0.15	LMXB		
461 IGR J19193+0754	289.820	7.908	0.51 ± 0.10			high systematic noise from GRS 1915+105;
462 IGR J19194-2956	289.860	−29.950	1.38 ± 0.22	AGN	173	Sy 1.5/1.8 $z = 0.166822$; PKS 1916-300; 1RXS J191928.5-295808
463 ESO141-G055	290.309	−58.671	3.59 ± 0.38	AGN		Sy1 $z = 0.036649$;
464 SWIFT J1922.7-1716	290.615	−17.300	6.83 ± 0.82[R371]		65	
465 IGR J19267+1325	291.613	13.368	0.62 ± 0.12	CV	138	1RXS J192626.8+132153
466 IGR J19302+3411	292.550	34.190	1.30 ± 0.22	AGN	144	Sy1 $z = 0.06326$; =SWIFTJ1930.5+3414
467 1H 1934-063	294.422	−6.240	1.43 ± 0.19	AGN		Sy1 $z = 0.010254$;
468 RX J1940.2-1025	295.050	−10.446	3.65 ± 0.22	CV	36	V1432 Aql;
469 IGR J19405-3016	295.062	−30.264	1.49 ± 0.26	AGN	116	$z = 0.052$;
470 NGC 6814	295.685	−10.331	4.53 ± 0.22	AGN		Sy1 $z = 0.005214$;
471 IGR J19443+2117	296.000	21.310	1.07 ± 0.17	AGN?	167,136	=RX J1943.9+2118; =SWIFT J194353.0+212119;
472 XSS J19459+4508	296.887	44.883	1.53 ± 0.21	AGN	23,2	=IGR J19473+4452; Sy2 $z = 0.0539$; 2MASX J19471938+4449425;
473 KS 1947+300	297.397	30.211	7.95 ± 0.18	HMXB		
474 3C403	298.024	2.445	0.88 ± 0.19	AGN		Sy2 $z = 0.059$;
475 4U 1954+319	298.933	32.094	14.49 ± 0.17	HMXB		
476 Cyg X-1	299.588	35.202	1209.26 ± 0.16	HMXB		
477 IGR J19583+1941	299.600	19.690	0.94 ± 0.20			
478 Cygnus A	299.863	40.736	6.13 ± 0.16	AGN		Sy2 $z = 0.056146$; =3C 405.0;
479 SWIFT J2000.6+3210	300.101	32.166	3.07 ± 0.17	HMXB	65,66	IGR J20006+3210;
480 ESO 399-IG 020	301.738	−34.548	1.25 ± 0.25	AGN		Sy1 $z = 0.024951$;
481 NGC 6860	302.192	−61.099	3.10 ± 0.64	AGN		Sy1 $z = 0.014884$;
482 IGR J20159+3713	303.980	37.230	1.23 ± 0.14	SNR		SNR G074.9+01.2; SWIFT J2015.9+3715
483 IGR J20187+4041	304.647	40.706	1.84 ± 0.13	AGN	26,39	IGR J2018+4043; Sy2 $z = 0.0144$; 2MASX J20183871+4041003;
484 IGR J20216+4359	305.409	43.996	1.04 ± 0.14	AGN	146	Sy2 $z = 0.017$;
485 IGR J20286+2544	307.140	25.746	3.55 ± 0.24	AGN	9,7	MCG +04-48-002; Sy2 $z = 0.014206$;
486 EXO 2030+375	308.062	37.638	126.68 ± 0.13	HMXB		
487 Cyg X-3	308.108	40.959	189.07 ± 0.12	HMXB		
488 SWIFT J2037.2+4151	309.300	41.850	0.75 ± 0.12			
489 4C +74.26	310.576	75.141	3.49 ± 0.48	AGN		Sy1 $z = 0.103999$;

Table 2. continued.

Id	Name	RA[‡] (deg)	Dec[‡] (deg)	$F_{17-60\ \mathrm{keV}}$[⋆] erg cm^{-2}s^{-1}	Type	Ref.[⋆⋆]	Notes[⋆⋆⋆]
490	MRK 509	311.036	−10.727	5.90 ± 0.43	AGN		Sy1 z = 0.034397; =QSO B2041-1054;
491	SWIFT J2044.0+2832	311.042	28.510	2.02 ± 0.23	AGN	132	Sy1 z = 0.05; RX J2044.0+2833;
492	IGR J20569+4940	314.215	49.679	1.00 ± 0.14		161	3A 2056+493; Blazar or microQSO;
493	SAX J2103.5+4545	315.901	45.753	13.15 ± 0.13	HMXB		
494	S5 2116+81	318.736	82.045	2.84 ± 0.53	AGN		Sy1 z = 0.086;
495	IGR J21178+5139	319.441	51.650	1.45 ± 0.14	AGN	9	2MASX J21175311+5139034;
496	IGR J21196+3333	319.910	33.560	1.43 ± 0.21	AGN	173	Sy1.5 z = 0.051; 1RXS J211928.4+333259;
497	IGR J21237+4218	320.960	42.316	1.40 ± 0.15	CV		V2069 Cyg;
498	IGR J21247+5058	321.161	50.973	10.75 ± 0.14	AGN	86,3	Sy1 z = 0.02;
499	IGR J21277+5656	321.930	56.943	3.21 ± 0.16	AGN	32	Sy1 z = 0.014;
500	4U 2127+119	322.502	12.172	6.73 ± 0.71	LMXB		
501	IGR J21335+5105	323.449	51.122	3.58 ± 0.14	CV	36	
502	IGR J21343+4738	323.625	47.614	2.01 ± 0.28$^{\mathrm{R25:200}}$	HMXB	146	USNO-B1.0 1376-0511904; 1RXS J213419.6+473810;
503	IGR J21358+4729	323.970	47.490	1.42 ± 0.15	AGN		Sy1 z = 0.02523; 1RXS J213555.0+472823;
504	SS Cyg	325.711	43.574	4.39 ± 0.17	CV		
505	Cyg X-2	326.170	38.319	33.49 ± 0.22	LMXB		
506	NGC 7172	330.490	−31.864	6.19 ± 0.45	AGN		Sy2 z = 0.008616;
507	BL Lac	330.645	42.267	1.63 ± 0.22	AGN	1	Blazar z = 0.0688;
508	4U 2206+543	331.992	54.513	12.28 ± 0.15	HMXB		
509	FO Aqr	334.402	−8.301	3.53 ± 0.63$^{\mathrm{R25}}$	CV		
510	IGR J22292+6646	337.316	66.774	1.07 ± 0.16	AGN	150,173	Sy1.5 z = 0.113; =IGR J22292+6647;
511	NGC 7314	338.890	−26.021	2.73 ± 0.43	AGN		Sy1 z = 0.004790;
512	IGR J22367-1231	339.176	−12.539	2.13 ± 0.38	AGN		Sy1 z = 0.024043; MRK 915;
513	IGR J22517+2218	342.939	22.316	2.70 ± 0.47$^{\mathrm{R316:337}}$	AGN	109	z = 3.668; =MG3 J225155+2217;
514	MR 2251-178	343.465	−17.616	5.28 ± 0.31	AGN		Sy1 0.063980;
515	3C 454.3	343.490	16.143	10.27 ± 0.36	AGN	1	z = 0.859001;
516	NGC 7465	345.505	15.965	2.46 ± 0.36	AGN		Sy2 z = 0.006565;
517	NGC 7469	345.825	8.879	4.55 ± 0.52	AGN		Sy1 z = 0.01588;
518	MRK 926	346.166	−8.689	3.62 ± 0.41	AGN		Sy1 z = 0.047156;
519	IGR J23206+6431	350.152	64.513	0.89 ± 0.11	AGN	146	Sy1 z = 0.07173;
520	Cas A	350.846	58.813	5.19 ± 0.11	SNR		
521	IGR J23523+5844	358.079	58.745	0.84 ± 0.10	AGN	146	Sy2 z = 0.162;

Notes. [†] For the column descriptions see Sect. 4. [‡] The positional accuracy of sources detected by IBIS/ISGRI depends on the source significance (Gros et al. 2003). The estimated 68% confidence intervals for sources detected at 5–6, 10, and > 20σ are 2.1′, 1.5′, and <0.8′, respectively (K07). [⋆] Source flux was measured on the 7-year time-averaged map or over the indicated spacecraft revolution interval RXXX:XXX. Flux is expressed in units of 10^{-11}erg cm^{-2}s^{-1}. [⋆⋆] (1) Donato et al. (2005); (2) Sazonov et al. (2005); (3) Masetti et al. (2004); (4) Masetti et al. (2006a); (5) Brandt et al. (2005); (6) Sunyaev et al. (2003a); (7) Masetti et al. (2006b); (8) Masetti et al. (2006c); (9) Bassani et al. (2006); (10) Sguera et al. (2006); (11) Lutovinov et al. (2004b); (12) Lubinski et al. (2005); (13) den Hartog et al. (2004a); (14) Grebenev et al. (2004b); (15) Smith & Hartigan (2006); (16) Kretschmar et al. (2004); (17) Chernyakova et al. (2005a); (18) in 't Zand & Heise (2004); (19) Rodriguez et al. (2004); (20) Morelli et al. (2006); (21) Revnivtsev et al. (2004a); (22) Kuulkers et al. (2006); (23) Revnivtsev et al. (2006); (24) Lutovinov & Revnivtsev (2003); (25) Lutovinov et al. (2005b); (26) Bykov et al. (2004); (27) Bassani et al. (2005); (28) Zhou et al. (2007); (29) Pavlinskii et al. (1992); (30) Lutovinov et al. (2003a); (31) in 't Zand (2005); (32) Bikmaev et al. (2006a); (33) Negueruela & Smith (2006); (34) Produit et al. (2004); (35) Barlow et al. (2005); (36) Barlow et al. (2006); (37) Walter et al. (2006); (38) Molkov et al. (2004); (39) Bykov et al. (2006); (40) Liu et al. (2000); (41) Liu et al. (2001); (42) Rodriguez et al. (2005); (43) Den Hartog et al. (2005); (44) Bird et al. (2006); (45) den Hartog et al. (2004b); (46) Ubertini et al. (2005); (47) Malizia et al. (2005); (48) Aleksandrovich et al. (1995); (49) Cornelisse et al. (2006); (50) Bikmaev et al. (2006b); (51) Chernyakova et al. (2005b); (52) Reig et al. (2005); (53) Hannikainen et al. (2003); (54) Sunyaev et al. (2003b); (55) Burenin et al. (2006b); (56) Negueruela et al. (2005); (57) Keek et al. (2006); (58) Krivonos et al. (2005a); (59) Abdo et al. (2009); (60) Burenin et al. (2006a); (61) Grebenev et al. (2005e); (62) Kuiper et al. (2006a); (63) Masetti et al. (2006e); (64) Lutovinov et al. (2004a); (65) Tueller et al. (2005b); (66) Halpern (2006); (67) Masetti et al. (2006d); (68) Masetti et al. (2005); (69) Karasev et al. (2007b); (70) Brandt et al. (2006a); (71) Chernyakova et al. (2003); (72) Gänsicke et al. (2005); (73) Turler et al. (2005a); (74) Grebenev et al. (2005d); (75) Gotz et al. (2006); (76) Krivonos et al. (2007a); (77) Sazonov et al. (2007); (78) Rea et al. (2006); (79) Bélanger et al. (2006); (80) Palmer et al. (2005); (81) Torres et al. (2005); (82) Sguera et al. (2007); (83) Tomsick et al. (2006); (84) Revnivtsev et al. (2003b); (85) Courvoisier et al. (2003); (86) Walter et al. (2004); (87) Tomsick et al. (2003); (88) Revnivtsev et al. (2003c); (89) Patel et al. (2004); (90) Bodaghee et al. (2006); (91) Tomsick et al. (2004); (92) Molkov et al. (2003a); (93) Lutovinov et al. (2005c); (94) Kuulkers et al. (2003); (95) Revnivtsev et al. (2003a); (96) Lutovinov et al. (2003c); (97) Lutovinov et al. (2005a); (98) Revnivtsev et al. (2004b); (99) Augello et al. (2003); (100) Lutovinov et al. (2003b); (101) Sazonov et al. (2008); (102) Masetti et al. (2007b); (103) Grebenev et al. (2005a); (104) Grebenev & Sunyaev (2004b); (105) Beckmann et al. (2005); (106) Grebenev et al. (2005c); (107) Kuiper et al. (2005); (108) Masetti et al. (2007a); (109) Bassani et al. (2007); (110) Bassa et al. (2006); (111) Revnivtsev et al. (2007); (112) Burenin et al. (2007); (113) Bikmaev et al. (2008b); (114) Karasev et al. (2007a); (115) Landi et al. (2007); (116) Masetti et al. (2008a); (117) Nespoli et al. (2008); (118) Kniazev et al. (2008); (119) Grebenev et al. (2007a); (120) Tomsick et al. (2008b); (121) Soldi et al. (2006); (122) Masetti et al. (2008b); (123) Altamirano et al. (2008); (124) Rodriguez et al. (2009); (125) Soldi et al. (2005); (126) Bassani et al. (2009); (127) Parisi et al. (2008); (128) Leyder et al. (2008); (129) Brunschweiger et al. (2009); (130) Tomsick et al. (2008a); (131) Landi et al. (2008); (132) Tueller et al. (2010); (133) Butters et al. (2007); (134) Masetti et al. (2009); (135) Watson et al. (2009); (136) Tomsick et al. (2009); (137) Mescheryakov et al. (2009); (138) Steeghs et al. (2008); (139) Rodriguez et al. (2008); (140) Krivonos et al. (2009); (141) Reig & Roche (1999); (142) Torres et al. (2007); (143) Winter et al. (2008); (144) Burenin et al. (2008); (145) Im et al. (2007); (146) Bikmaev et al. (2008a); (147) Wijnands (2006); (148) Brandt et al. (2006b); (149) Kuiper et al. (2006b); (150) Butler et al. (2009); (151) Cackett et al. (2006); (152) Bird et al. (2010); (153) Masetti et al. (2006f); (154) Zurita Heras et al. (2009); (155) Cadolle Bel et al. (2007); (156) Potter et al. (2010); (157) Revnivtsev et al. (2009); (158) Fisher et al. (1995); (159) Enya et al. (2002); (160) Markwardt & Swank (2008); (161) Landi et al. (2010); (162) Markwardt (2008); (163) Torrejón et al. (2010); (164) Krivonos et al. (2007b); (165) Sidoli et al. (2006); (166) Burenin et al. (2009); (167) Landi et al. (2009); (168) Masetti et al. (2010a); (169) Paizis et al. (2007); (170) Kuiper & Hermsen (2009); (171) Dean & Hill (2008); (172) Kniazev et al. (2010); (173) Masetti et al. (2010b);(174) Terrier et al. (2008); (175) Brandt et al. (2007); (176) Chelovekov & Grebenev (2007a); (177) Chelovekov & Grebenev (2007b); (178) Chelovekov et al. (2007); (179) Grebenev et al. (2004c); (180) Grebenev & Sunyaev (2005); (181) Grebenev et al. (2004a); (182) Grebenev & Sunyaev (2004a); (183) Grebenev & Sunyaev (2007); (184) Grebenev et al. (2005g); (185) Grebenev et al. (2007b); (186) Sunyaev et al. (1991); (187) Molkov et al. (2003b); (188) Karasev et al. (2009); (189) Grebenev et al. (2005b); (190) Chelovekov & Grebenev (2010); (191) Grebenev et al. (2010); (192) Rodriguez et al. (2010); (193) Chaty et al. (2008); (194) Renaud et al. (2010); (195) Malizia et al. (2010); (196) Fiocchi et al. (2010); (197) Ratti et al. (2010); (198) Lutovinov et al. (2010a); (199) Lutovinov et al. (2010b). [⋆⋆⋆] The spatial confusion with the source XXX is indicated as CXXX. The measured flux of sources being in spatial confusion should be taken with the caution.