

How to use the INTEGRAL Catalog



Arash Bodaghee

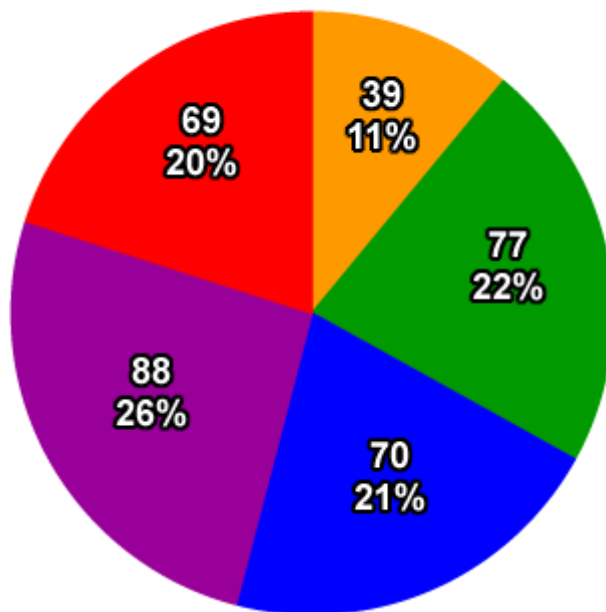
INTEGRAL Science Data Centre — Geneva Observatory

3rd INTEGRAL Workshop, October 18–20, 2006

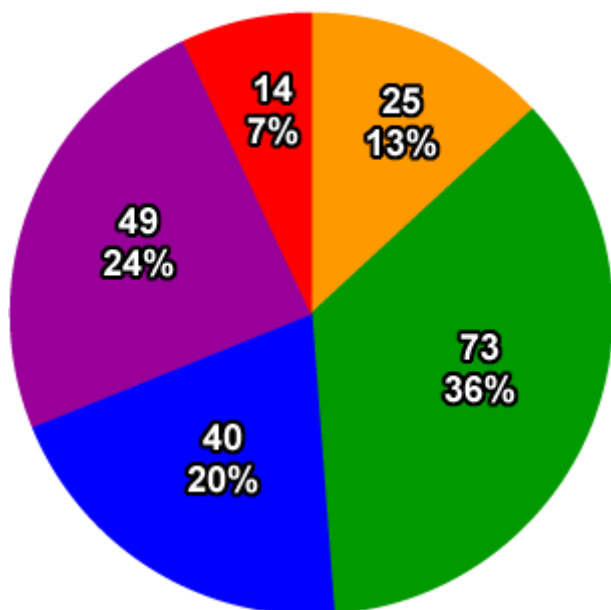


- INTEGRAL Catalog lists all sources known to emit ≥ 1 mCrab in 1 keV—10 MeV in last 30+ years
⇒ 1500 objects!
- Used by OSA, it is a valuable tool to find out more about a high-energy source in your analysis
positions, errors, classifications, typical SEDs, references, etc.
updated periodically (~3 months)
different formats available online <http://isdc.unige.ch/Data/cat>
- In 3 years, INTEGRAL/ISGRI has detected 25% of them
other 75%? transience, variability, sensitivity in peak spectral domain, etc.
- Around 10% of all known sources were discovered by INTEGRAL (\equiv IGR sources)
<http://isdc.unige.ch/~rodrigue/html/igrsources.html> (Rodriguez & Bodaghee)

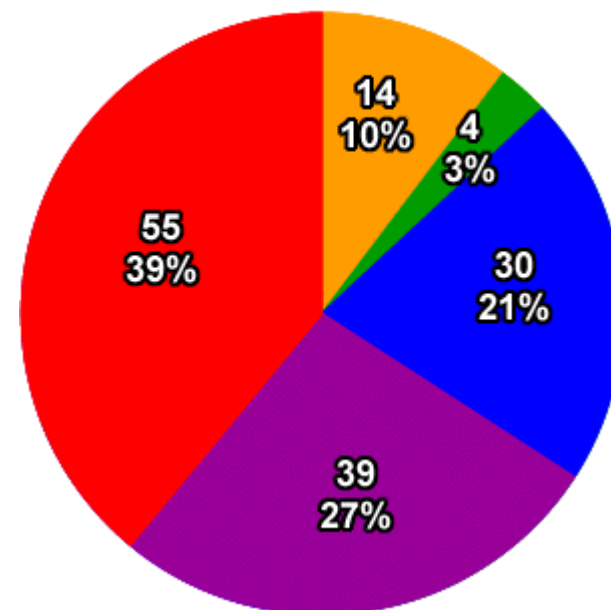
343 INTEGRAL Sources



201 previously known



142 IGR Sources



AGN

HMXB

LMXB

Misc.

Uncl.

- Where to find a copy
 - 1) delivered with the latest OSA and is already installed \$ISDC_REF_CAT
 - 2) download the latest FITS file <http://isdc.unige.ch/Data/cat>
- Instrument-detection flags can be used to create a more manageable subset of the catalog
 - 0 : undetected
 - 1 : detected
- FV select \forall rows \ni ISGRI_FLAG==0, delete them, and save
- OSA direct `ibis_science_analysis` to focus on relevant sources during `cat_extract`
 - ex. 1) select all sources detected by ISGRI
 `CAT_refCat="gnrl_refr_cat_0022.fits[1][ISGRI_FLAG==1]"`
 - ex. 2) select all sources detected by ISGRI and SPI
 `CAT_refCat="gnrl_refr_cat_0022.fits[1][ISGRI_FLAG==1 && SPI_FLAG==1]"`
 - ex. 3) select all sources detected by ISGRI or JEM-X
 `CAT_refCat="gnrl_refr_cat_0022.fits[1][ISGRI_FLAG==1 || JEMX_FLAG==1]"`

Versions & Formats — isdc.unige.ch/Data/cat

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ISDC Reference Catalogs – Mozilla

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INTEGRAL Science Data Centre -- Jump to -->

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Public Data Releases

Reference Catalog

SITE SEARCH

Sun microsystems
running Solaris 8

Section contact:
Marc Türler

V	Date	Format				Comments
26	17-08-2006	FITS	HTML	ASCII	TeX	1543 sources. Added all new IGR sources up to August 17, 2006. Modified ISGRI, JEM-X and SPI flags, and refined positions for many sources. In accordance with SCREW:01908, the SED normalizations for the brightest sources have changed to reflect the count rates listed in Bird et al.(2006). Detailed comments.
25	20-04-2006	FITS	HTML	ASCII	TeX	1523 sources. Added all new IGR sources up to April 20, 2006. Modified ISGRI, JEM-X and SPI flags, and refined positions for many sources. Detailed comments.
24	16-01-2006	FITS	HTML	ASCII	TeX	1518 sources. Added all new IGR sources up to Jan. 16, 2006, and AGNs from Bassani et al. 2006. Modified ISGRI and JEM-X flags, and refined positions for many sources. Recent SWIFT detections are also included. Detailed comments.
23	17-11-2005	FITS	HTML	ASCII	TeX	1478 sources. Version delivered with OSA 5.1. Returned positions of known sources from Bird et al., 2005, to more precise positions of Liu et al., 2000-2001. A few sources have been added. Detailed comments.
22	17-10-2005	FITS	HTML	ASCII	TeX	1468 sources. Added new sources from the 2nd ISGRI survey catalog of Bird et al., 2005, the Crux Arm catalog of Revnivtsev et al., 2005, and refined many source positions. Detailed comments.

Versions & Formats — FITS

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fv: Binary Table of gnrl_refr_cat_0026.fits.gz[1] in /home/isdc/bodaghee/

File Edit Tools Help

SOURCE_ID NAME CLASS RA_OBJ DEC_OBJ ERR_RAD ISGRI_FLAG

Select 16A 20A 11 1E 1E 1E 1B

All

Invert

ID	RA	NAME	CLASS	RA_OBJ	DEC_OBJ	ERR_RAD	ISGRI_FLAG
1	J000200.0+212400	4U 2358+21	1500	5.000000E-01	2.140000E+01	1.000000E-02	0
2	J000619.5+201211	Mrk 335	7100	1.581333E+00	2.020292E+01	2.800000E-04	0
3	J000636.0+724700	4U 0000+72	1500	1.650000E+00	7.278333E+01	1.000000E-02	0
4	J001010.0-044237	MCG-01-01-043	7106	2.541667E+00	-4.710278E+00	2.800000E-04	0
5	J001012.0+731000	2EG J0008+7307	1700	2.550000E+00	7.316666E+01	1.000000E-01	0
6	J001031.0+105830	QSO B0007+107	7104	2.629208E+00	1.097486E+01	2.800000E-04	0
7	J001144.0-333718	4U 0009-33	5000	2.933333E+00	-3.362167E+01	1.000000E-02	0
8	J001325.0+395242	4U 0010+39	1500	3.354167E+00	3.987833E+01	1.000000E-02	0
9	J001708.5+813508	S5 0014+813	7200	4.285292E+00	8.158559E+01	2.800000E-04	0
10	J001753.0+030818	4U 0015+02	1500	4.470833E+00	3.138333E+00	1.000000E-02	0
11	J002324.0+614132	IGR J00234+6141	1640	5.850000E+00	6.169222E+01	5.000000E-02	1
12	J002513.0+640842	4U 0022+63	1500	6.304167E+00	6.414500E+01	1.000000E-02	0
13	J002606.6+104125	IRAS F00235+1024	7600	6.527500E+00	1.069028E+01	2.800000E-04	0
14	J002710.0-292336	4U 0026-29	1500	6.791667E+00	-2.939333E+01	1.000000E-02	0
15	J002800.0-724200	4U 0026-73	1500	7.000000E+00	-7.270000E+01	1.000000E-02	0
16	J002810.0+590912	4U 0027+59	1500	7.041667E+00	5.915333E+01	1.000000E-02	0
17	J002848.9+591722	V709 Cas	1640	7.203625E+00	5.928939E+01	3.000000E-05	1
18	J002903.1+593419	IGR J00291+5934	1410	7.262833E+00	5.957200E+01	1.700000E-04	1

Go to: Edit cell:

SOURCE_ID ≡ unique identifier that never changes for a source even if the name, position, etc., do

Versions & Formats — FITS

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fv: Binary Table of gnrl_refr_cat_0026.fits.gz[1] in /home/isdc/bodaghee/

File Edit Tools Help

SOURCE_ID NAME CLASS RA_OBJ DEC_OBJ ERR_RAD ISGRI_FLAG

Select 16A 20A 11 1E 1E 1E 1B

All

Invert

	SOURCE_ID	NAME	CLASS	RA_OBJ	DEC_OBJ	ERR_RAD	ISGRI_FLAG
1	J000200.0+212400	4U 2358+21	1500	5.000000E-01	2.140000E+01	1.000000E-02	0
2	J000619.5+201211	Mrk 335	7100	1.581333E+00	2.020292E+01	2.800000E-04	0
3	J000636.0+724700	4U 0000+72	1500	1.350000E+00	7.278333E+01	1.000000E-02	0
4	J001010.0-044237	MCG-01-01-043	7106	2.541667E+00	-4.710278E+00	2.800000E-04	0
5	J001012.0+731000	2EG J0008+7307	1700	2.550000E+00	7.316666E+01	1.000000E-01	0
6	J001031.0+105830	QSO B0007+107	7104	2.629208E+00	1.097486E+01	2.800000E-04	0
7	J001144.0-333718	4U 0009-33	5000	2.933333E+00	-3.362167E+01	1.000000E-02	0
8	J001325.0+395242	4U 0010+39	1500	3.354167E+00	3.987833E+01	1.000000E-02	0
9	J001708.5+813508	S5 0014+813	7200	4.235292E+00	8.158559E+01	2.800000E-04	0
10	J001753.0+030818	4U 0015+02	1500	4.470833E+00	3.138333E+00	1.000000E-02	0
11	J002324.0+614132	IGR J00234+6141	1640	5.850000E+00	6.169222E+01	5.000000E-02	1
12	J002513.0+640842	4U 0022+63	1500	6.304167E+00	6.414500E+01	1.000000E-02	0
13	J002606.6+104125	IRAS F00235+1024	7600	6.527500E+00	1.069028E+01	2.800000E-04	0
14	J002710.0-292336	4U 0026-29	1500	6.791667E+00	-2.939333E+01	1.000000E-02	0
15	J002800.0-724200	4U 0026-73	1500	7.000000E+00	-7.270000E+01	1.000000E-02	0
16	J002810.0+590912	4U 0027+59	1500	7.041667E+00	5.915333E+01	1.000000E-02	0
17	J002848.9+591722	V709 Cas	1640	7.203625E+00	5.928939E+01	3.000000E-05	1
18	J002903.1+593419	IGR J00291+5934	1410	7.262833E+00	5.957200E+01	1.700000E-04	1

Go to: Edit cell:

CLASS ≡ 4-digit classification of a source according to the HEASARC naming convention

Versions & Formats — FITS

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The screenshot displays the HEASARC Object Classifications interface. The main window shows a table of object data with columns for object ID, name, and various parameters. A pop-up window titled "CLASS - HEASARC Object Classifications - Mozilla" is overlaid on the table, listing various object classes and their sub-types.

Object Classes

- 1000 - X-ray binary
- 1100 - HMXRB
- 1200 - HMXRB supergiant
- 1300 - HMXRB Be star
- 1400 - LMXRB
- 1500 - LMXRB Globular cluster
- 1600 - CV
 - 10 - Classical Nova
 - 20 - Recurrent Nova
 - 30 - AM Her (polar)
 - 40 - Intermediate polar
 - 50 - Dwarf nova
 - 60 - Dwarf nova U Gem type
 - 70 - Dwarf Nova Z Cam type
 - 80 - Dwarf Nova SU Uma type
 - 90 - Nova like
- 1700 - Gamma ray
 - 00 - source
 - 10 - burst
 - 20 - burst, soft repeater
- 10 - X-ray pulsar
- 20 - burster
- 30 - black hole
- 40 - QPO
- 50 - QPO & black hole
- 60 - QPO & pulsar
- 70 - QPO & bursts
- 80 - QPO, pulsar, bursts
- 90 - pulsar & bursts
- 1 - flares
- 2 - jets
- 3 - eclipsing
- 4 - ultra-soft transient
- 5 - soft transient
- 6 - hard transient
- 7 - eclipsing dipper
- 8 - eclipsing ADC
- 9 - dipper
- 1 - oscillations
- 2 - coherent osc.
- 3 - fast
- 4 - slow
- 5 - eclipsing
- 6 -
- 7 -
- 8 -
- 9 -
- 1 - pulsar

The main table shows the following data for rows 1 through 18:

Object ID	Name	Class	RA	Dec	RA Error	Dec Error	Count
1	J000200.0+212400	4U 2358+21					
2	J000619.5+201211	Mrk 335					
3	J000636.0+724700	4U 0000+72					
4	J001010.0-044237	MCG-01-01-043					
5	J001012.0+731000	2EG J0008+730					
6	J001031.0+105830	QSO B0007+107					
7	J001144.0-333718	4U 0009-33					
8	J001325.0+395242	4U 0010+39					
9	J001708.5+813508	S5 0014+813					
10	J001753.0+030818	4U 0015+02					
11	J002324.0+614132	IGR J00234+614					
12	J002513.0+640842	4U 0022+63					
13	J002606.6+104125	IRAS F00235+104					
14	J002710.0-292336	4U 0026-29					
15	J002800.0-724200	4U 0026-73	1500	7.000000E+00	-7.270000E+01	1.000000E-02	0
16	J002810.0+590912	4U 0027+59	1500	7.041667E+00	5.915333E+01	1.000000E-02	0
17	J002848.9+591722	V709 Cas	1640	7.203625E+00	5.928939E+01	3.000000E-05	1
18	J002903.1+593419	IGR J00291+5934	1410	7.262833E+00	5.957200E+01	1.700000E-04	1

Catalog formats — HTML

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INTEGRAL Reference Catalog – Mozilla

File Edit View Go Bookmarks Tools Window Help

Back Forward Reload Stop <http://isdc.unige.ch/Data/cat/26/catalog.html> Search

Bookmarks mozilla.org mozillaZine mozdev.org

No	Name	RA (J2000)	DEC (J2000)	RA (degs)	DEC (degs)	l	b	Error (degs)	Position reference	SOURCE_ID	IS
1	4U 2358+21	00 02	+21.4	0.50	21.40	107.85	-40.02	0.01	Forman W. et al., 1978ApJS...38..357F	J000200.0+212400	0
2	Mrk 335	00 06 19.52	+20 12 10.5	1.58	20.20	108.76	-41.42	0.00028	Clements E.D., 1981MNRAS.197..829C	J000619.5+201211	0
3	4U 0000+72	00 06.6	+72 47	1.65	72.78	119.58	10.20	0.01	Forman W. et al., 1978ApJS...38..357F	J000636.0+724700	0
4	MCG-01-01-043	00 10 10.0	-04 42 37	2.54	-4.71	97.42	-65.52	0.00028	Kojanian G. et al., 1981AJ.....86..811K	J001010.0-044237	0
5	2EG J0008+7307	00 10.2	+73 10	2.55	73.17	119.91	10.54	0.1	Hartman R.C. et al., 1999ApJS..123...79H	J001012.0+731000	0
6	QSO B0007+107	00 10 31.01	+10 58 29.5	2.63	10.97	106.98	-50.63	0.00028	Ma C. et al., 1998AJ...116..516M	J001031.0+105830	0
7	4U 0009-33	00 11 44	-33 37.3	2.93	-33.62	353.33	-79.26	0.01	Forman W. et al., 1978ApJS...38..357F	J001144.0-333718	0

http://adsabs.harvard.edu/cgi-bin/nph-bib_query?bibcode=1981AJ.....86..811K

Catalog formats — HTML

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SIMBAD Query Result

Object query : simbad search QSO B0007+107

Available data: [Basic data](#) [Identifiers](#) [Plot & image tools](#) [Bibliography](#) [Measurements](#) [External archives](#) [Notes](#)

Basic data : QSO B0007+107 -- Seyfert 1 Galaxy Query around with radius arc min.

ICRS 2000.0 coordinates **00 10 31.0059 +10 58 29.504** [.68 .47 0] A
[1998AJ....116..516M](#)

FK5 2000/2000 coordinates **00 10 31.01 +10 58 29.5** [.68 .47 0]
 FK4 1950/1950 coordinates **00 07 56.73 +10 41 48.1** [.68 .47 179]

Galaxy dimensions ~ ~ ~ (~)
 B magn, V magn, Peculiarities **15.96, 15.40, V**
 Morphological type E

Radial velocity (v: Km/s) or Redshift (z) **z +.0893** [~] D [2002MNRAS.329..700S](#)

No	Identifier	RA	DEC	Distance	Other	Reference	Other
1	4U 2358+21						
2	Mrk 335						
3	4U 0000+72						
4	MCG-01-0						
5	2EG J0008+						
6	QSO B0007-						
7	4U 0009-33	00 11 44	-33 37.3	2.93	-33.62 353.33 -79.26 0.01	Forman W. et al, 1978ApJS...38..357F	J001144.0-333718 0

Catalog formats — HTML

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Title: The International Celestial Reference Frame as Realized by Very Long Baseline Interferometry

Authors: [Ma, C.](#); [Arias, E. F.](#); [Eubanks, T. M.](#); [Fey, A. L.](#); [Gontier, A.-M.](#); [Jacobs, C. S.](#); [Sovers, O. J.](#); [Archinal, B. A.](#); [Charlot, P.](#)

Affiliation: AA(NASA Goddard Space Flight Center, Code 926, Greenbelt, MD 20771), AB(Observatorio Astronómico de La Plata, Paseo del Bosque s/n, 1900 La Plata, Argentina; and Observatorio Naval Buenos Aires), AC(US Naval Observatory, Code EO, 3450 Massachusetts Avenue, NW, Washington, DC 20392-5420), AD(US Naval Observatory, Code EO, 3450 Massachusetts Avenue, NW, Washington, DC 20392-5420), AE(Observatoire de Paris, CNRS, URA 1125, 61 Avenue de l'Observatoire, F-75014 Paris, France), AF(Jet Propulsion Laboratory, California

No	N												
1	4U 2358+21												
2	Mrk 335												
3	4U 0000+72												
4	MCG-01-0												
5	2EG J0008+												
6	QSO B0007-												
7	4U 0009-33	00 11 44	-33 37.3	2.93	-33.62	353.33	-79.26	0.01		Forman W. et al., 1978ApJS...38..357F	J001144.0-333718 0		

http://adsabs.harvard.edu/cgi-bin/nph-bib_query?bibcode=1981AJ....86..811K

Catalog formats — LaTeX

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No.	Name	R.A. Source Type Position Reference Comments	Dec.	<i>l</i> Model	<i>b</i>	Error	Source ID Parameters	I Flag F _{3–10}	J Flag F _{10–30}	S Flag F _{20–60}	P Flag F _{60–200}
1	4U 2358+21	00 02 X-ray source Forman W. et al., 1978ApJS...38..357F —	+21.4	107.85 wabs*cutoff	-40.02	0.01	J000200.0+212400 1.0 1.7 10 2.10839e-03	0 0.01	0 0.00	0 0.01	0 0.00
2	Mrk 335	00 06 19.52 Sey-1 Clements E.D., 1981MNRAS.197..829C QSO B0003+199, 1AXG J000622+2012, 1H 0003+200, 1RXS J000618.9+201215, 4U 0005+20, IRAS F00037+1955	+20 12 10.5	108.76 wabs*cutoff	-41.42	0.00028	J000619.5+201211 1.00 2.10 100 3.880e-03	0 0.02	0 0.01	0 0.05	0 0.00
3	4U 0000+72	00 06.6 SNR Forman W. et al., 1978ApJS...38..357F SNR 119.5+10.2, 1H 0007+731, 2E 0004.4+7245, 3A 0004+725	+72 47	119.58 wabs*cutoff	10.20	0.01	J000636.0+724700 1.0 1.7 10 1.81190e-03	0 0.01	0 0.00	0 0.01	0 0.00
4	MCG-01-01-043	00 10 10.0 Sey-1 Kojoian G. et al., 1981AJ....86..811K Mrk 937, 1AXG J001011-0443, RX J0010.1-0442, 1RXS J001010.2-044225, IRAS F00076-0459	-04 42 37	97.42 wabs*cutoff	-65.52	0.00028	J001010.0-044237 0.05 1.90 100 7.200e-04	0 0.01	0 0.00	0 0.02	0 0.00
5	2EG J0008+7307	00 10.2 Gamma-ray source Hartman R.C. et al., 1999ApJS..123..79H CTA 1?, GRO J0004+73, 3EG J0010+7309	+73 10	119.91 wabs*bknpower	10.54	0.1	J001012.0+731000 100.0 -1.5 10000 2.1 2.23286e-15	0 0.00	0 0.00	0 0.00	0 0.00
6	QSO B0007+107	00 10 31.01 Sey-1 Ma C. et al., 1998AJ....116..516M 1H 0014+111, 1RXS J001031.3+105832, 2E 0007.9+1041, ZW III 2, RX J0010.5+1058, H 0008+105, Mrk 1501	+10 58 29.5	106.98 wabs*cutoff	-50.63	0.00028	J001031.0+105830 0.18 1.80 100 2.720e-03	0 0.02	0 0.01	0 0.10	0 0.01
7	4U 0009-33	00 11 44 X-ray source Forman W. et al., 1978ApJS...38..357F —	-33 37.3	353.33 wabs*cutoff	-79.26	0.01	J001144.0-333718 1.0 1.7 100 1.67915e-03	0 0.02	0 0.01	0 0.09	0 0.01
8	4U 0010+39	00 13 25 X-ray source Forman W. et al., 1978ApJS...38..357F 1M 0001-310, 1RXS 00108+396	+39 52.7	115.05 wabs*cutoff	-22.41	0.01	J001325.0+395242 1.0 1.7 10 3.21749e-03	0 0.02	0 0.01	0 0.01	0 0.00
9	S5 0014+813	00 17 08.47 Quasar Ma C. et al., 1998AJ....116..516M [VV96] J001708.1+813507, 1AXG J001720+8135, 1RXS J001710.2+813507, QSO J0017+8135	+81 35 08.1	121.61 wabs*cutoff	18.80	0.00028	J001708.5+813508 0.36 1.65 100 5.400e-04	0 0.01	0 0.00	0 0.04	0 0.00
10	4U 0015+02	00 17 53 X-ray source Forman W. et al., 1978ApJS...38..357F 1RXS 00153+028	+03 08.3	106.66 wabs*cutoff	-58.67	0.01	J001753.0+030818 1.0 1.7 10 2.69039e-03	0 0.01	0 0.00	0 0.01	0 0.00
11	IGR J00234+6141	00 23 24 X-ray source	+61 41 32	119.61 wabs*power	-1.00	0.05	J002324.0+614132 1.0 2.0 0	1 0.00	0 0.00	0 0.00	0 0.00

Conclusions

- Upcoming v. 27 Catalog contains ~1500 sources and provides positions, errors, classifications, typical SEDs, detection-flags, references, etc.
soon to come: N_{H} , P_s , P_o , z /distances for the ~350 sources detected by ISGRI

- Various versions and formats are available online

[http://isdc.unige.ch/Data/cat \(/latest\)](http://isdc.unige.ch/Data/cat (/latest))

FITS

necessary for OSA, but not always user-friendly

HTML

lists the most important parameters only

links to relevant pages in ADS and SIMBAD

LaTeX

easy-to-compile hard copies of the catalog

*tools that enable
more detailed
studies to be made
for sources in
your analysis*

- To report bugs, please contact

arash.bodaghee@obs.unige.ch

- For more information, please read

Ebisawa et al., 2003, A&A, 411, 59

Bodaghee et al., 2006, in prep.