How to use the INTEGRAL Catalog

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Introduction

- 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

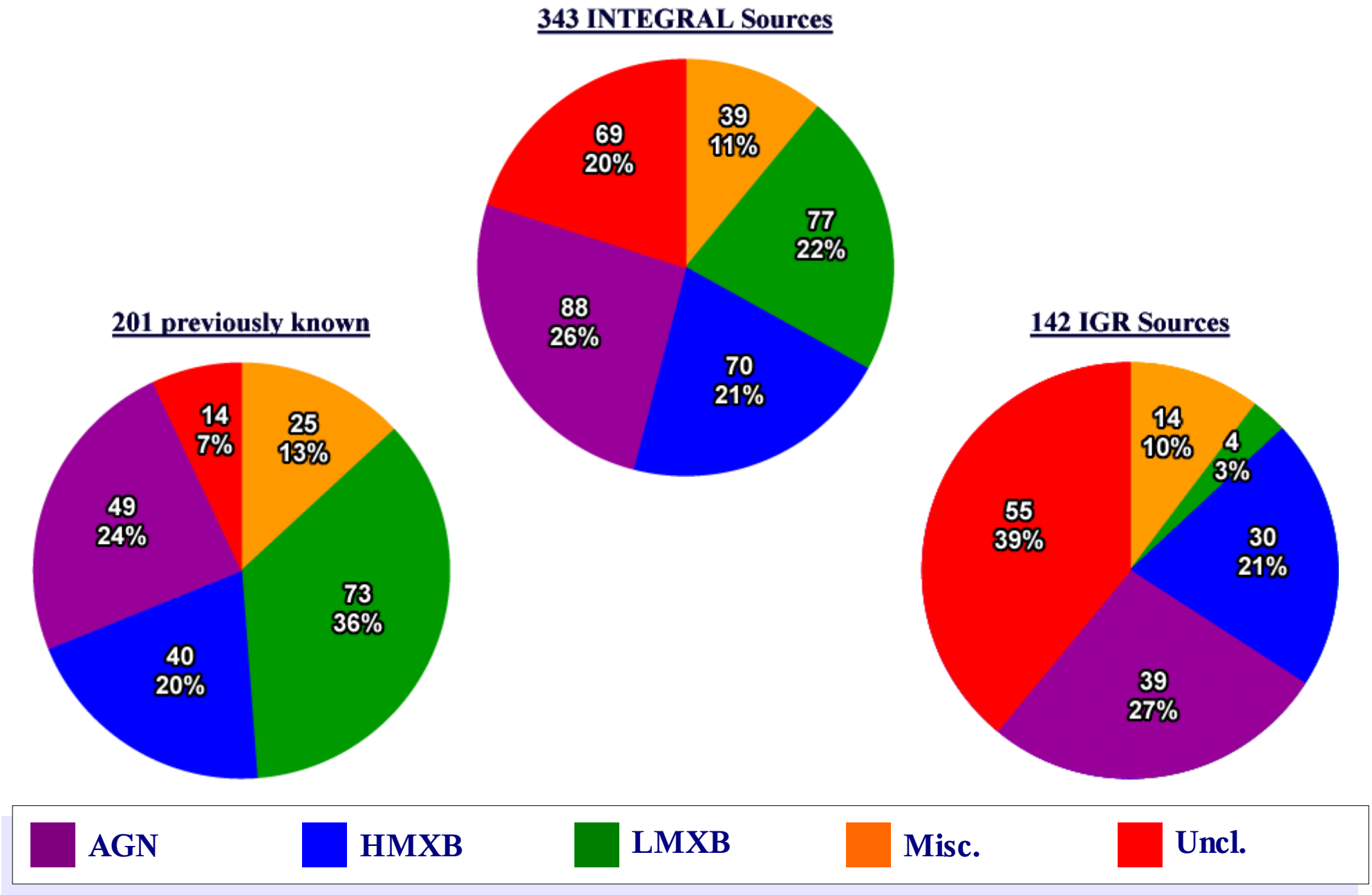
- In 3 years, INTEGRAL/ISGRI has detected 25% of them

  other 75%? transience, variability, sensitivity in peak spectral domain, etc.

- Around 10% of all known sources were discovered by INTEGRAL (≡ IGR sources)

  http://isdc.unige.ch/~rodrigue/html/igrsources.html (Rodriguez & Bodaghee)

INTEGRAL Taxonomy



How to use the INTEGRAL Catalog

- 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 ∀ rows ∋ 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]"
  ```

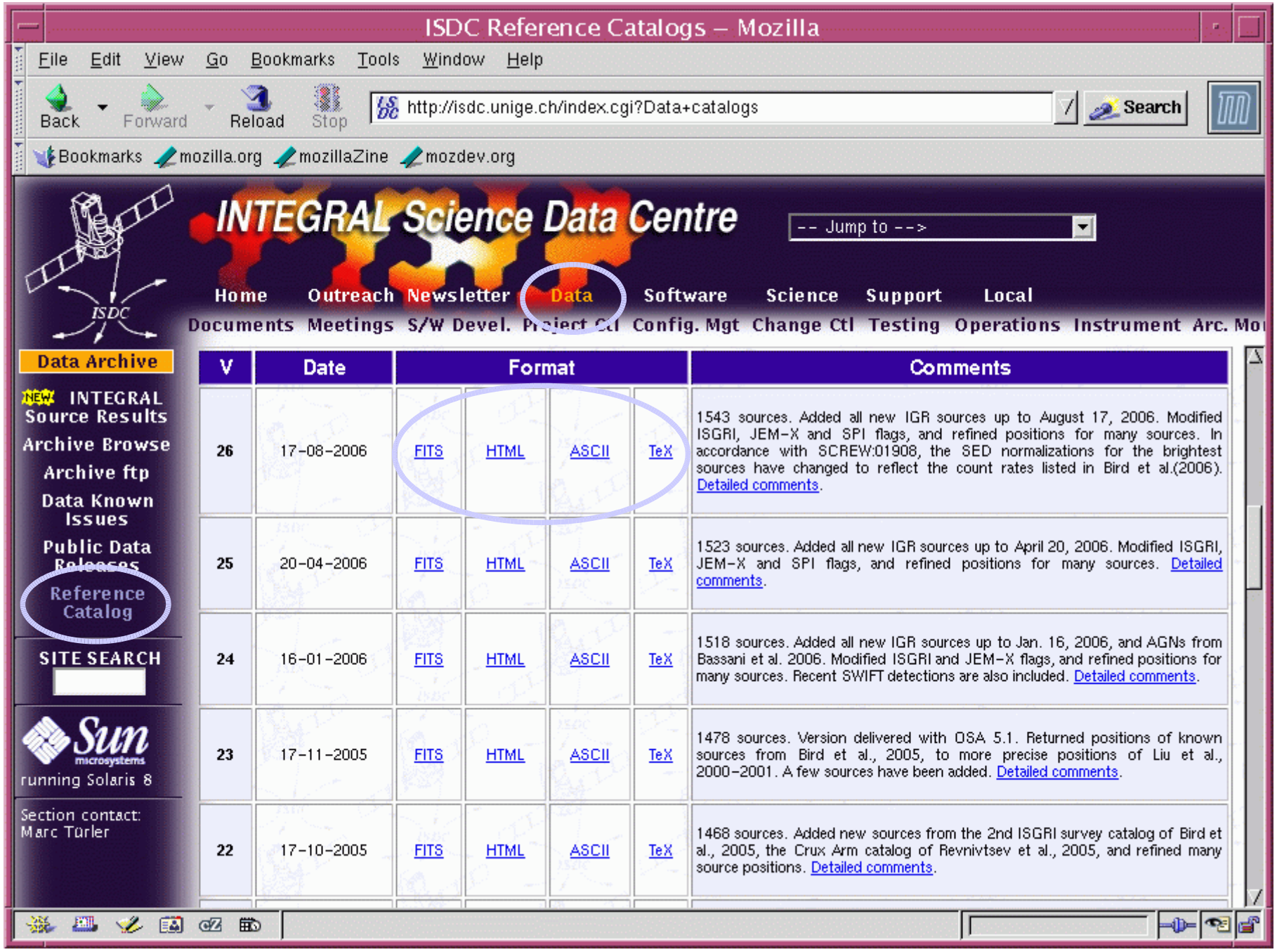
  ex. 2) select all sources detected by ISGRI and SPI

  ```
  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



V	Date	Format				Comments
		FITS	HTML	ASCII	TeX	
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

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

File Edit Tools Help

Select All Invert

	SOURCE_ID	NAME	CLASS	RA_OBJ	DEC_OBJ	ERR_RAD	ISGRI_FLAG
	16A	20A	1I	1E	1E	1E	1B
				deg	deg	deg	
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

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

File Edit Tools Help

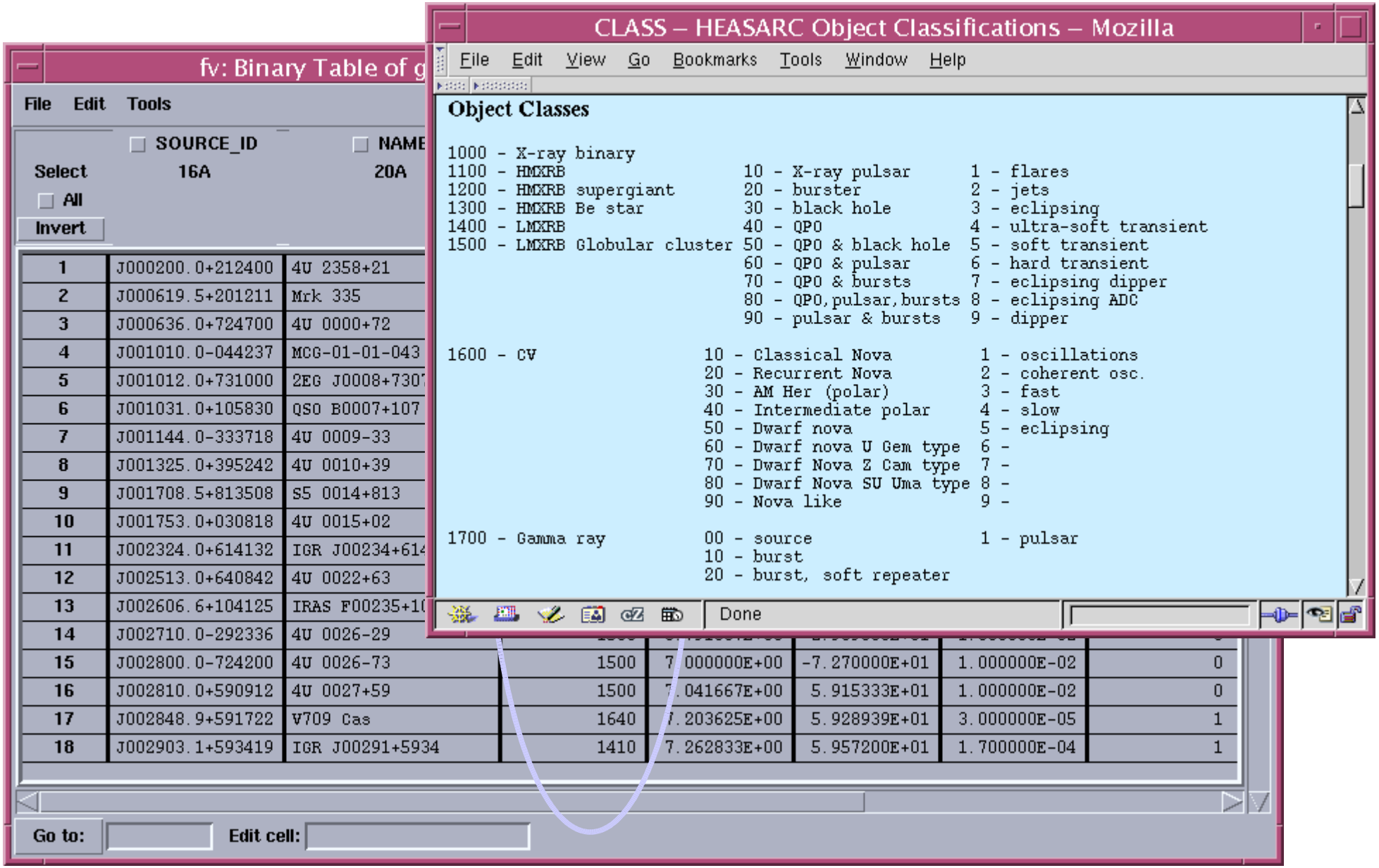
Select All Invert

	SOURCE_ID 16A	NAME 20A	CLASS 1I	RA_OBJ 1E deg	DEC_OBJ 1E deg	ERR_RAD 1E deg	ISGRI_FLAG 1B
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	4.235292E+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	6.404167E+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



http://heasarc.gsfc.nasa.gov/W3Browse/catalog/class.html

Catalog formats — HTML

INTEGRAL Reference Catalog – Mozilla

File Edit View Go Bookmarks Tools Window Help

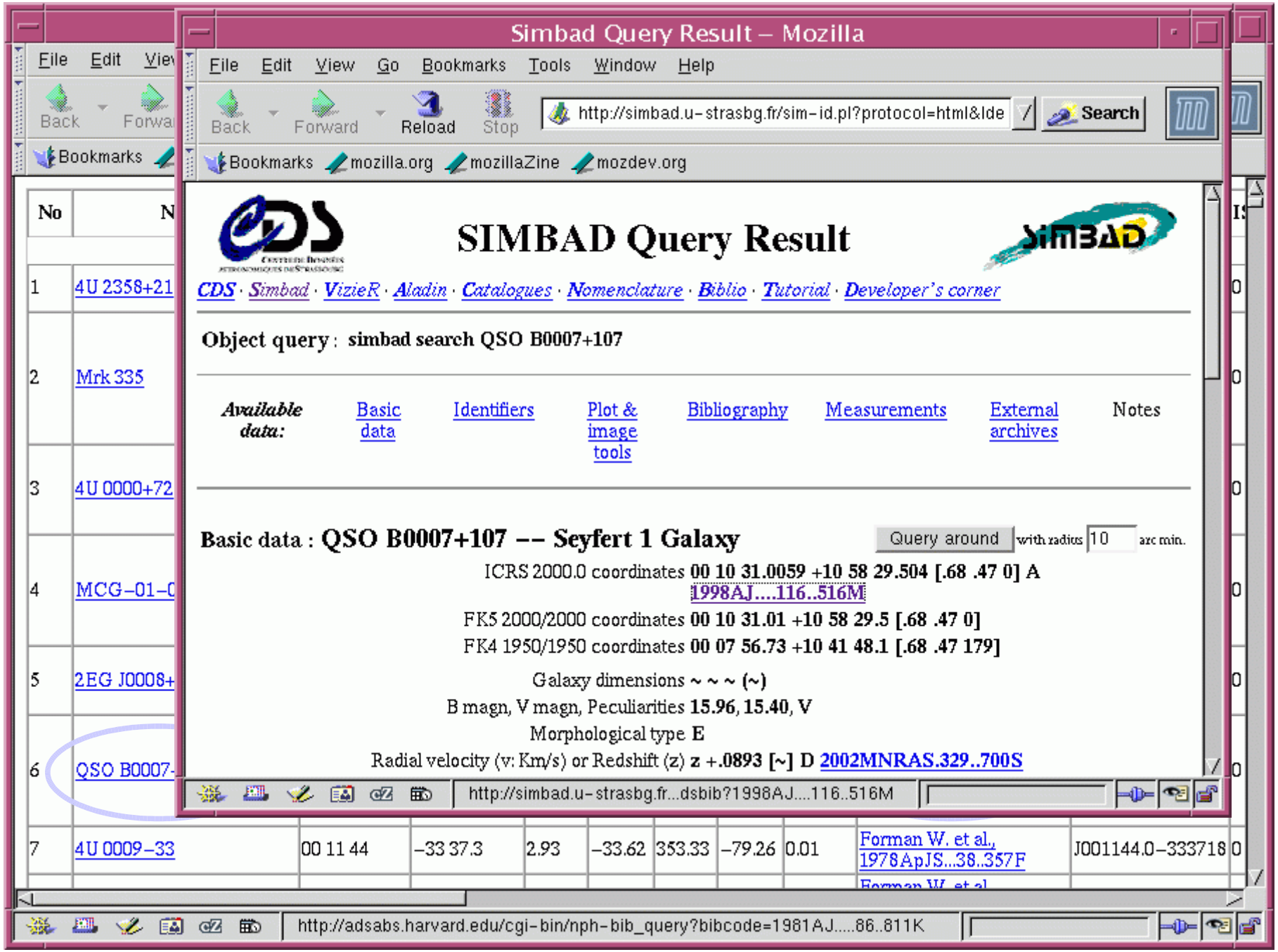
Back Forward Reload Stop http://isdc.unige.ch/Data/cat/26/catalog.html Search

Bookmarks mozilla.org mozillaZine mozdev.org

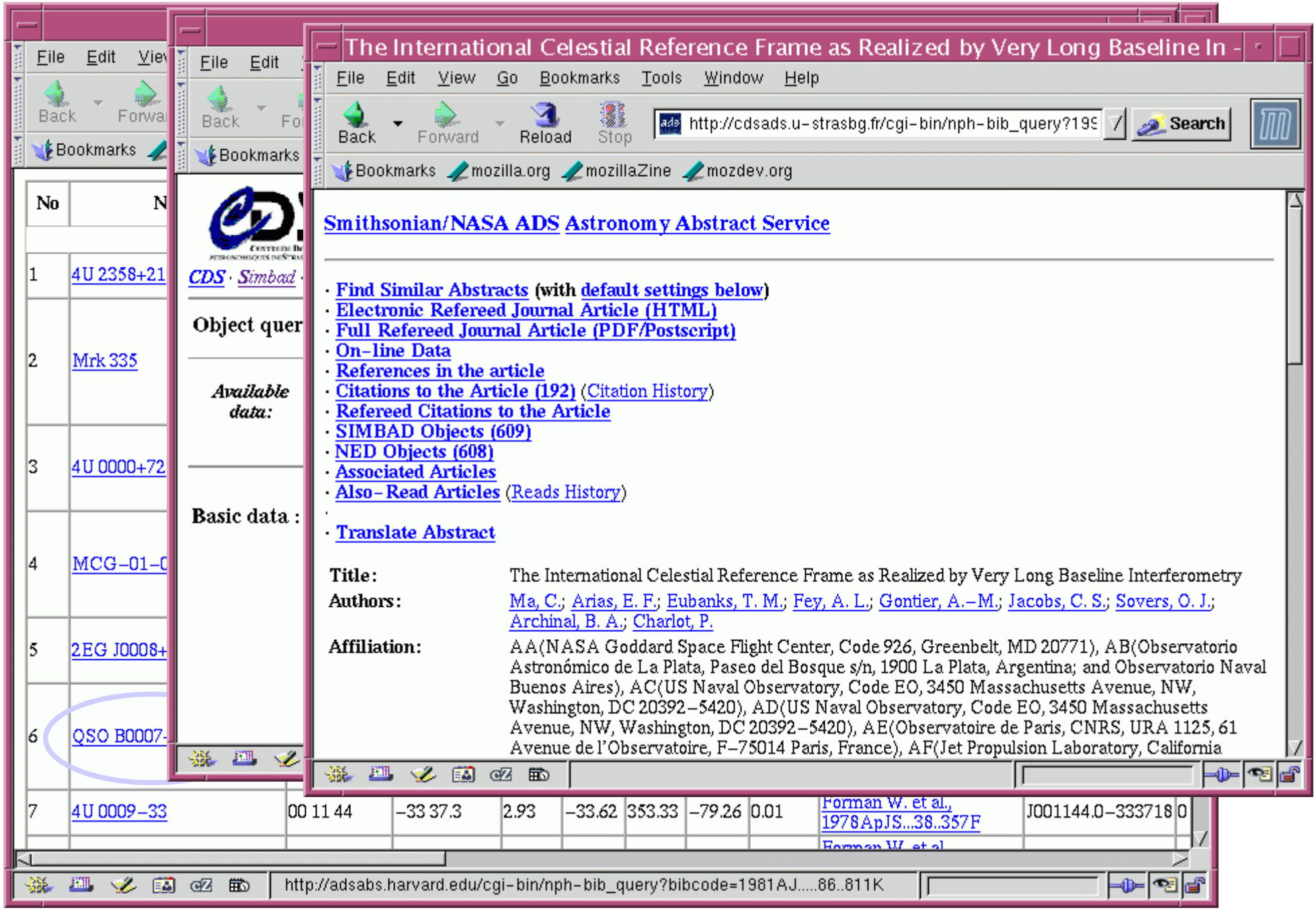
No	Name	RA (J2000)	DEC (J2000)	RA (degs)	DEC (degs)	l	b	Error (degs)	Position reference	SOURCE_ID	I
1	4U 2358+21	00 02	+21.4	0.50	21.40	107.85	−40.02	0.01	Forman W. et al., 1978ApJS...38..357F	J000200.0+212400	0
2	Mrk 335	00 06 19.52	+20 12 10.5	1.58	20.20	108.76	−41.42	0.00028	Clements E.D., 1981MNRAS.197..829C	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	Kojoian 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	0.00023	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



Catalog formats — HTML



Catalog formats — LaTeX

No.	Name	R.A. Dec. / Source Type / Position Reference / Comments	l b / Model	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 +21.4 X-ray source Forman W. et al., 1978ApJS...38..357F —	107.85 −40.02 wabs*cutoff	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 +20 12 10.5 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	108.76 −41.42 wabs*cutoff	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 +72 47 SNR Forman W. et al., 1978ApJS...38..357F SNR 119.5+10.2, 1H 0007+731, 2E 0004.4+7245, 3A 0004+725	119.58 10.20 wabs*cutoff	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 −04 42 37 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	97.42 −65.52 wabs*cutoff	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 +73 10 Gamma-ray source Hartman R.C. et al., 1999ApJS..123...79H CTA 1?, GRO J0004+73, 3EG J0010+7309	119.91 10.54 wabs*bknpower	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 +10 58 29.5 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	106.98 −50.63 wabs*cutoff	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 −33 37.3 X-ray source Forman W. et al., 1978ApJS...38..357F —	353.33 −79.26 wabs*cutoff	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 +39 52.7 X-ray source Forman W. et al., 1978ApJS...38..357F 1M 0001−310, 1XRS 00108+396	115.05 −22.41 wabs*cutoff	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 +81 35 08.1 Quasar Ma C. et al., 1998AJ....116..516M [VV96] J001708.1+813507, 1AXG J001720+8135, 1RXS J001710.2+813507, QSO J0017+8135	121.61 18.80 wabs*cutoff	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 +03 08.3 X-ray source Forman W. et al., 1978ApJS...38..357F 1XRS 00153+028	106.66 −58.67 wabs*cutoff	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 +61 41 32 X-ray source	119.61 −1.00 wabs*power	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)

  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.