

「あかり」全天サーベイのカタログ・ アーカイブ・サーバ (AKARI-CAS) 公開

山内 千里，稲田久里子，片野雅之，藤島幸美，山村一誠 (ISAS/JAXA)
石原大助 (名古屋大学)



AKARI-CAS 概要

- ISAS/JAXA の宇宙科学データ公開サービス「DARTS」(<http://darts.jaxa.jp/>) にて公開する Web サービス
- 「あかり」 FIS 4 バンド, IRC 2 バンドの全天カタログ
 - 天体数: FIS 42 万, IRC 87 万
- 今回は「あかり」による画像データの提供は無し
- 原則として, すべての Web API を公開
 - 共同研究者へのメールに URL を貼り付けたり
 - 自分用スクリプトの中で利用したり
- オープンソース (PostgreSQL8 + PHP5) で実装
 - 必要な方には, コードと資料を提供します
 - 簡単に自分専用 DB を構築可能

AKARI-CAS ツール概要

- **RDB を利用した検索ツール**

Radial Search … ある座標の視野内の天体の検索

Rectangular Search … 矩形領域内の天体の検索

Cross Identifications … ユーザの座標リストとマッチング

SQL Search … ユーザが用意した SQL 文で検索

ローカル端末用の検索ツール `sqlcl_akari.py`

- **ビジュアルツール**

Explore Tool … 天体データ閲覧ツール

Image List Tool … 天体画像リスト作成ツール

- SDSS, DSS2, 2MASS, IRIS の QL 画像の表示に対応

- 外部サイト (SIMBAD, NED, ADS 等) への動的なリンク生成

座標系は, J2000, B1950, 銀河座標, 黄道座標をサポート

Radial Search

This page provides an easy interface to search FIS or IRC objects within a radius(arcmins) of a point. The point (lon,lat) can be set by J2000, B1950, Ecliptic or Galactic coordinates.

Coordinate conditions:

☒ Coordinate	J2000	longitude* [deg or `hh:mm:ss.ss']	180
		latitude* [deg or `[±]dd:mm:ss.s']	1.5
☒ Object Name	Name to identify by SIMBAD(e.g., M101, NGC4900, etc.)		
Radius		100	arcmins

* `[±]12:34.56', `[±]12 34 56.78' and `[±]12 34.56' styles are also allowed.

Instruments and Quality:

	Enable?	Min		Max
☐ FIS	☐	3	fQual_65	3
	☐	3	fQual_90	3
	☐	3	fQual_140	3
	☐	3	fQual_160	3
☒ IRC				

Note: Qualities are connected by 'AND'.

Database: EDR2 (Fis:b2.0 Irc:b1.0.2)	Columns: ☒ all ☐ digest	Rows: ☐ all ☒ max 10
Format: ☒ HTML ☐ TEXT delimiter: , newline: LF		reset submit

Your SQL command was:

```

SELECT o.*, n.distance
FROM fGetNearbyObjCel('lrc', 'j2000', fLonStr2Deg('180'), fLatStr2Deg('1.5'), 100) n, lrcObj o
WHERE n.objID = o.objID
ORDER BY n.distance
LIMIT 10

```

Click number of objid column to open the Explore Tool.

objid	objname	ra	dec	flux_09	flux_18	fqual_09	fqual_18	flags_09
100228302	1159239+014935	179.8497622	1.826553400000076	2.50369	0.583297	0	0	0
100228003	1158338+005219	179.6412039999999	0.8721490000000136	0.0811478		0	0	0
100227869	1158129+005208	179.55393525	0.8690515000000126	0.628377	0.218134	0	0	0
100229524	1202423+015837	180.676404750014	1.977069750000651	0.240531	0.322294	0	0	0
100228169	1159033+003150	179.7637689999999	0.5306503333334387	2.81983	1.27555	0	0	0
100229216	1201464+003155	180.4434253333333	0.5321310000000486	0.298772		0	0	0
100229396	1202212+003348	180.5886704	0.5635828000000045	1.30054	0.367151	0	0	0
100227040	1156037+005842	179.0155220000001	0.9783350000000669	0.0953927		0	0	0
100227387	1156582+022443	179.2426224999999	2.412058250000055	0.401005		0	0	0
100226791	1155238+010545	178.8494805555556	1.095909777777899	0.214879		0	0	0

Back Forward Reload Stop  <http://133.74.198.4/astro/akari/cas/tools/explore/obj.php?objid=100229524&scale=2&grid=true> Search Print 

AKARI-IRC-b1.0.2 J1202423+015837

Shrink Enlarge

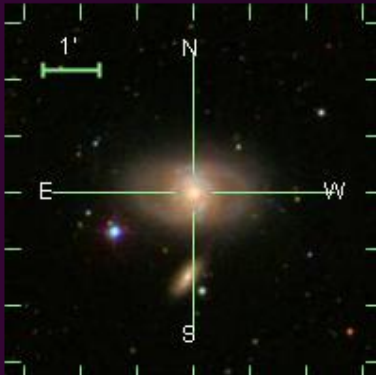
Database=EDR2, Instrument=IRC, objID=100229524 Get all data

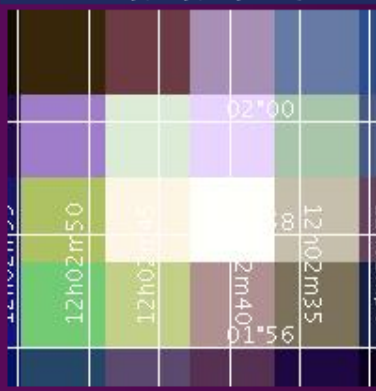
ra	180.67640475 [12:02:42.34]	dec	1.97706975 [+01:58:37.5]
ra1950	180.03581805 [12:00:08.60]	dec1950	2.25545864 [+02:15:19.7]
lambda	179.83381823 [11:59:20.12]	beta	2.08291679 [+02:04:58.5]
l	275.97718257 [18:23:54.52]	b	62.27089338 [+62:16:15.2]

nDataPos 4

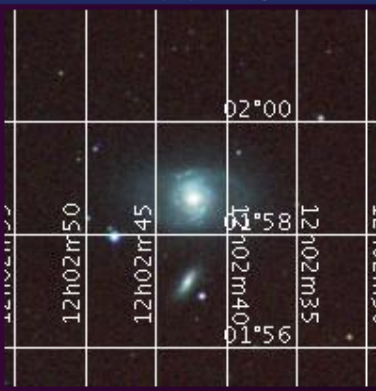
FIS image
Under construction

IRC image
Under construction

SDSS i,r,g (SDSS CAS)


IRIS 100μ,60μ,25μ (SkyView)


2MASS K,H,J (SkyView)


DSS2 IR,R,B (SkyView)


Zoom :   Image scale : 2 "/pix ☒ Draw grid ☐ Invert image update

AKARI-CAS Explore Tool

Input form:

Database :

Instrument :

Search radius : arcmins

Coordinate system :

Longitude [deg or `hh:mm:ss.ss`] :

Latitude [deg or `[±]dd:mm:ss.s`] :

Name to identify by SIMBAD (e.g., M101, NGC4900, etc.) :

ObjID:

submit

You can select version of FIS and IRC catalogs by [Database selector](#).

SDSS i,r,g image is provided by [SDSS SkyServer](#) of the [SDSS project](#).

[SkyView](#) has been developed by [HEASARC](#) at the [NASA / GSFC Astrophysics Science Division](#).



project.

SkyView has been developed by
HEASARC at the NASA / GSFC
Astrophysics Science Division.

Zoom : Image scale : "/pix ☒ Draw grid ☐ Invert image

flux_09	0.240531	flux_18	0.322294
fErr_09	0.0397144	fErr_18	0.0400567
fQual_09	0	fQual_18	0
flags_09	0	flags_18	0
nScanC_09	4	nScanC_18	5
nScanP_09	0	nScanP_18	0
mConf_09	1	mConf_18	1
nData_09	2	nData_18	5
meanAB_09	4.20069	meanAB_18	4.58858

Search other catalogs on the CAS database

FIS	IRC		
---------------------	---------------------	--	--

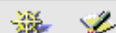
External links

SDSS search	NED search	SIMBAD search	ADS search
-----------------------------	----------------------------	-------------------------------	----------------------------

SkyView links

DSS	DSS1 Red	DSS1 Blue	H-α Comp
DSS2 IR	DSS2 Red	DSS2 Blue	
2MASS-K	2MASS-H	2MASS-J	
IRIS 100μ	IRIS 60μ	IRIS 25μ	IRIS 12μ

Other Surveys (Document):



<http://skyview.gsfc.nasa.gov/cgi-bin/runquery.pl?survey=DSS2+IR,DSS2+Red,D...80.67640475,1.97706975&scale=0.000555555555555556&grid=J2000&gridlabels=1>



Cross Identifications

This page provides an interface for dynamic cross identifications of FIS or IRC objects with a user defined list of object positions. The positions (lon,lat) of user's list can be set by J2000, B1950, Ecliptic or Galactic coordinate.

For each position in your upload list, this tool can search not only a nearest object but also all nearby objects. If you want to obtain the list of all nearby objects, set "All nearby objects" at the Search scope selector.

Conditions:

Search scope	All nearby objects
Search radius (Max 30.0 arcmin)	30.0 arcmins
Coordinate system of Upload list	J2000

Upload list (Cut and paste your list here):

```
name longitude latitude
A1 195.1620 2.5028
A2 162.9899 3.7919
A3 12:55:15.26 +02:53:48.8
A4 02 52 20.38 -87 20 22.6
```

Or, upload list as text file:

 Browse...

Note: Upload list including `[±]12:34:56.7'` and `[±]12 34 56.7'` styles is also accepted. Name column is automatically generated when omitting name column in your list. The upload file is limited to a size of 80kB. See also [Query Limits page](#) for details.

Selection of Table and Columns:

☒ FIS simple result	Obtain the <u>Result table</u> only.
☐ FIS digest	name_x, seqNo and distance of <u>Result table</u> and all columns of <u>FisObj</u> are selected.
☐ FIS all	name_x, seqNo and distance of <u>Result table</u> and all columns of <u>FisObjAll</u> are selected.
☒ FIS SQL	<pre>SELECT n.name_x, n.seqNo, n.objCount, n.distance, o.objID, o.objName, o.ra, o.dec, o.flux_65, o.flux_90, o.flux_140, o.flux_160 FROM #result n, FisObjAll o WHERE n.objID = o.objID ORDER BY n.id_x, n.objCount</pre>
☒ IRC simple result	Obtain the <u>Result table</u> only.
☐ IRC digest	name_x, seqNo and distance of <u>Result table</u> and all columns of <u>IrcObj</u> are selected.
☐ IRC all	name_x, seqNo and distance of <u>Result table</u> and all columns of <u>IrcObjAll</u> are selected.
☒ IRC SQL	<pre>SELECT n.name_x, n.seqNo, n.objCount, n.distance, o.objID, o.objName, o.ra, o.dec, o.flux_09, o.flux_18 FROM #result n, IrcObjAll o WHERE n.objID = o.objID ORDER BY n.id_x, n.objCount</pre>

Note: Do not remove `#result` and `n.objID = o.objID`.

Database: EDR2 (Fis:b2.0 Irc:b1.0.2) ▼

Format: ☒ HTML ☐ TEXT delimiter: , newline: LF ▼

reset

submit

Image List Tool

Conditions :

Image :	SDSS i,r,g (SDSS CAS)
Image scale :	2.0 "/pix
☐ Draw Grid	☐ Invert Image
Database name in URLs :	EDR2
Coordinate system of list:	J2000

Upload list (Max: 1000 targets) :

name	longitude	latitude
NGC3434	162.989887	3.791931
NGC4043	180.595535	4.329907
NGC4046	180.674820	1.978787
NGC4123	182.045071	2.879724
NGC4178	183.195006	10.868349
NGC4180	183.264100	7.039056
NGC4207	183.876040	9.585894

submit

SDSS i,r,g image is provided by [SDSS SkyServer](#) of the [SDSS project](#).

[SkyView](#) has been developed by [HEASARC](#) at the [NASA / GSFC Astrophysics Science Division](#).

Image List Tool

Click [here](#) to input new targets.

Image : SDSS i,r,g (SDSS CAS)	Database name in URLs : EDR2	update
Image scale : 2.0 "/pix	☐ Draw Grid ☐ Invert Image	

List Page: [1](#) [2](#) [3](#)

NGC3434 FIS IRC SDSS NED SIM ADS 	NGC4043 FIS IRC SDSS NED SIM ADS 	NGC4046 FIS IRC SDSS NED SIM ADS 	NGC4123 FIS IRC SDSS NED SIM ADS 	NGC4178 FIS IRC SDSS NED SIM ADS 
NGC4180 FIS IRC SDSS NED SIM ADS 	NGC4207 FIS IRC SDSS NED SIM ADS 	NGC4234 FIS IRC SDSS NED SIM ADS 	NGC4273 FIS IRC SDSS NED SIM ADS 	NGC4307 FIS IRC SDSS NED SIM ADS 
NGC4316 FIS IRC SDSS NED SIM ADS 	NGC4334 FIS IRC SDSS NED SIM ADS 	NGC4343 FIS IRC SDSS NED SIM ADS 	NGC4370 FIS IRC SDSS NED SIM ADS 	NGC4380 FIS IRC SDSS NED SIM ADS

SQL Search

You can directly submit a SQL (Structured Query Language) query to the `AKARI CAS' of DARTS database server.

We have prepared a lot of example calls to learn the `SELECT' statement of SQL. Let's click the buttons in table, then an explanation and an example SQL statement will be set in the command field. You will easily understand the basic of SQL statement.

If you think that using SQL calls is difficult, see also our [Tutorial page](#) or [SDSS SQL Tutorial page](#).

Example SQL calls (Label on buttons indicate `thema' of calls):

	Basic Calls	Radial Search	Rectangular Search
FIS	=!>< Digest All AND-OR Bit-Flags Sort Random	J2000 Ecliptic Galactic Input 'hh:mm:ss' CrossID Advanced	J2000 Ecliptic Galactic Input 'hh:mm:ss' Random CrossID Advanced
IRC	=!>< Digest All AND-OR Bit-Flags Sort Random	J2000 Ecliptic Galactic Input 'hh:mm:ss' CrossID Advanced	J2000 Ecliptic Galactic Input 'hh:mm:ss' Random CrossID Advanced

Press buttons to import examples ;-)

```
-- Basic of SELECT statement of SQL:
-- - SELECT col1 [as c1], col2 [as c2], ...
--   Set required columns after SELECT keyword.
--   You can define aliases after 'as' keyword.
-- - FROM table1 [t1], table2 [t2], ...
--   Set table or view names after FROM keyword.
--   t1 and t2 are aliases of each table.
-- - WHERE conditions...
--   Set conditions after WHERE keyword.
--
-- This is an example query to obtain the first 10
-- rows of FIS catalog using a flux cut.
SELECT objID, objName, ra, dec,
       fDeg2LonStr(ra) as ra_hms,
       fDeg2LatStr(dec) as dec_dms,
       fQual_65, fQual_90, fQual_140, fQual_160,
       flux_65, flux_90, flux_140, flux_160
FROM FisObjALL
WHERE
  19.5 < flux_90 AND flux_90 <= 20.0
LIMIT 10
```

Database:

☐ Check Syntax Only?

Format: ☒ HTML ☐ TEXT delimiter:

誰でもできる SQL (1)

【典型的な検索例】

どのカラムが欲しい?

objid と objname と ra と dec と flux_90 と Flux_140

どのテーブルから検索する?

fisobjall (FIS の天体)

どんな条件で検索する?

fqual_90 と fqual_140 が 3 で, flux_90 が 20 以上

最大で何件表示する?

10 件

誰でもできる SQL (2)

【典型的な検索例】

SELECT

objid, objname, ra, dec, flux_90,
flux_140

FROM

fisobjall

WHERE

fqual_90 = 3 AND fqual_140 = 3 AND
20 <= flux_90

LIMIT

10

誰でもできる SQL (3)

     Search  Print 

Your SQL command was:

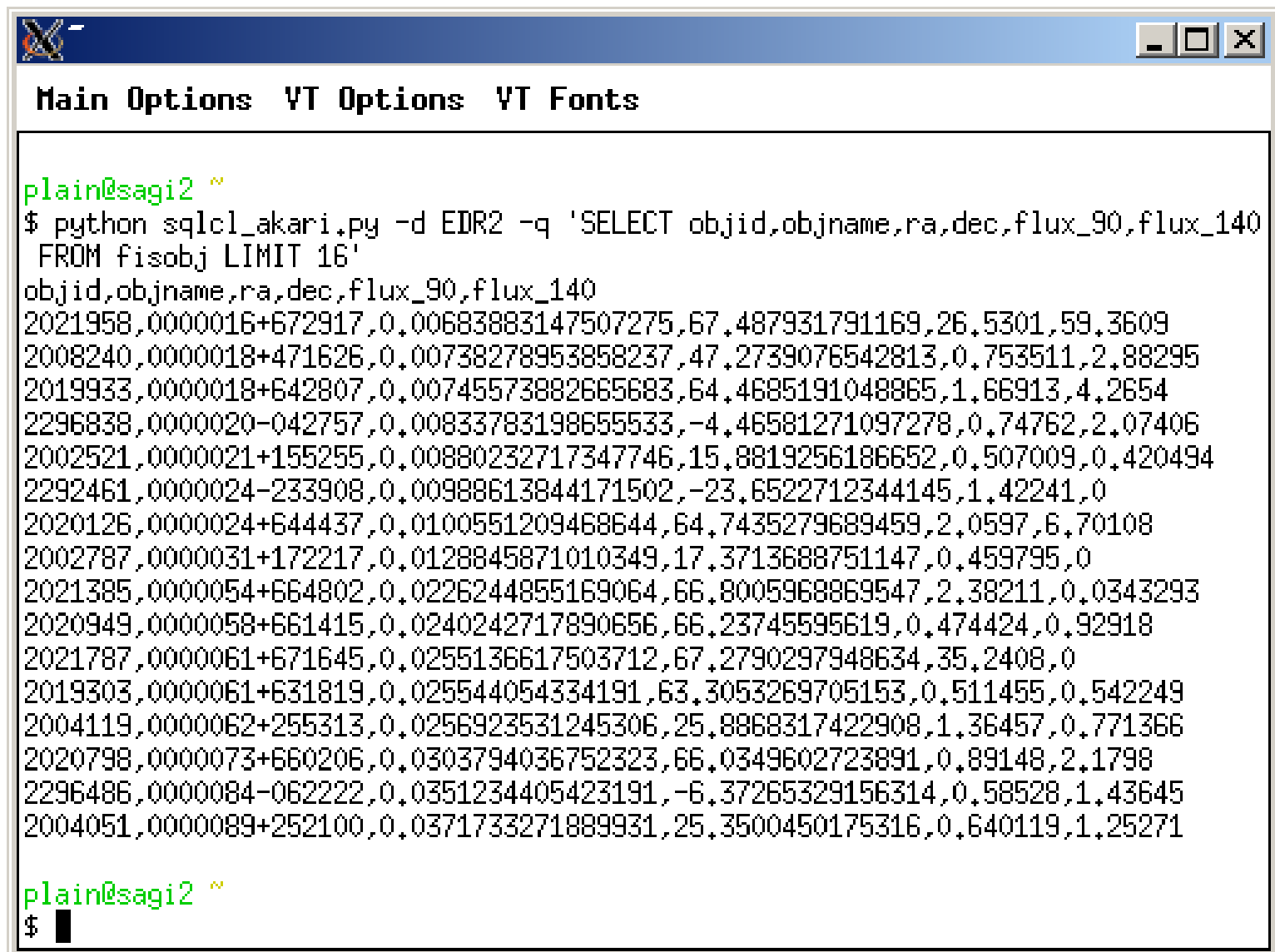
```
SELECT objid, objname, ra, dec, flux_90, Flux_140
FROM fisobjall
WHERE fqual_90 = 3 AND fqual_140 = 3 AND 20 <= flux_90
LIMIT 10
```

Click number of objid column to open the Explore Tool.

objid	objname	ra	dec	flux_90	flux_140
2021958	0000016+672917	0.00683883147507275	67.487931791169	26.5301	59.3609
2021952	0000484+672505	0.201629453114126	67.4181217549456	28.4814	34.2419
2021753	0000561+670933	0.23357317563246	67.1591702139363	27.4844	73.9438
2022127	0000583+673531	0.243051348189787	67.5920561753191	39.3109	91.7646
2021617	0001048+665856	0.269848205411766	66.9821436573136	22.4263	42.7645
2021755	0001327+670632	0.386096672844622	67.1087828135149	43.0691	69.485
2021793	0001462+670835	0.442366069505465	67.1429232520921	36.8892	44.7615
2023049	0004266+683546	1.11072301923845	68.5960170012198	26.1312	105.03
2022184	0005224+671747	1.3431862755973	67.2962759255802	28.6665	50.7682
2022177	0005529+671418	1.47037513442138	67.2382442077857	23.7618	42.8093

  Done  

コマンドラインツール



A terminal window titled "Main Options VT Options VT Fonts" with standard window controls. The prompt is "plain@sagi2 ~". The command executed is "python sqlcl_akari.py -d EDR2 -q 'SELECT objid,objname,ra,dec,flux_90,flux_140 FROM fisobj LIMIT 16'". The output is a table of 16 astronomical objects with columns: objid, objname, ra, dec, flux_90, flux_140.

```
plain@sagi2 ~  
$ python sqlcl_akari.py -d EDR2 -q 'SELECT objid,objname,ra,dec,flux_90,flux_140  
FROM fisobj LIMIT 16'  
objid,objname,ra,dec,flux_90,flux_140  
2021958,0000016+672917,0.00683883147507275,67.487931791169,26.5301,59.3609  
2008240,0000018+471626,0.00738278953858237,47.2739076542813,0.753511,2.88295  
2019933,0000018+642807,0.00745573882665683,64.4685191048865,1.66913,4.2654  
2296838,0000020-042757,0.00833783198655533,-4.46581271097278,0.74762,2.07406  
2002521,0000021+155255,0.00880232717347746,15.8819256186652,0.507009,0.420494  
2292461,0000024-233908,0.00988613844171502,-23.6522712344145,1.42241,0  
2020126,0000024+644437,0.0100551209468644,64.7435279689459,2.0597,6.70108  
2002787,0000031+172217,0.0128845871010349,17.3713688751147,0.459795,0  
2021385,0000054+664802,0.0226244855169064,66.8005968869547,2.38211,0.0343293  
2020949,0000058+661415,0.0240242717890656,66.23745595619,0.474424,0.92918  
2021787,0000061+671645,0.0255136617503712,67.2790297948634,35.2408,0  
2019303,0000061+631819,0.025544054334191,63.3053269705153,0.511455,0.542249  
2004119,0000062+255313,0.0256923531245306,25.8868317422908,1.36457,0.771366  
2020798,0000073+660206,0.0303794036752323,66.0349602723891,0.89148,2.1798  
2296486,0000084-062222,0.0351234405423191,-6.37265329156314,0.58528,1.43645  
2004051,0000089+252100,0.0371733271889931,25.3500450175316,0.640119,1.25271  
  
plain@sagi2 ~  
$ █
```