

Discovery and Exploration in Astronomy



Why Discovery and Exploration?

- Astronomy is a resource intensive research field
 - We require data data to plan our proposals, write papers, and answer the interesting questions.
 - We rely on access to non-data resources which enable us to utilize the data
- Discovery versus Exploration
 - Discovery: The act of searching for and finding a resource that we can use
 - Exploration: The act of “informed wandering”, which may or may not lead us to a resource we can use



How do astronomers explore and discover?

- Google
 - Search the web (and hope for the best)
- Journals and their portals
 - Go to the published source
- Data “Ingesters/Aggregators”
 - The data collectors
- Archive Centers
 - The data guardians
- The VO



Astronomy via Google



- I know of the name or descriptor of a resource (e.g., data for M31).
- I then simply type, click, and search the WWW
- I then get re-directed to another resource, usually a Journal article, occasionally another web page, and rarely a data source).
- I get my data or resources from this other source.





m31

Search

[Advanced Search](#)
[Preferences](#)

[Messier Object 31](#)

Messier 31 (**M31**, NGC 224) is the famous Andromeda galaxy, our nearest large neighbor
The brightest globular cluster of the Andromeda Galaxy **M31**, G1, ...
www.maa.clell.de/Messier/E/m031.html - 21k - [Cached](#) - [Similar pages](#) - [Note this](#)

[Andromeda Galaxy - Wikipedia, the free encyclopedia](#)

Charles Messier catalogued it as object **M31** in 1764 and incorrectly credited ... To support his claim that "Great Andromeda Nebula" (**M31**) was an external ...
en.wikipedia.org/wiki/Andromeda_Galaxy - 126k - [Cached](#) - [Similar pages](#) - [Note this](#)

[The Andromeda Galaxy - Google Books Result](#)

by Paul W. Hodge - 1992 - Science - 358 pages
With the current developments in instrumentation with which increasingly detailed studies of the Andromeda Galaxy can be made, this book provides a solid...
books.google.com/books?isbn=0792316541...

[Chandra :: Photo Album :: Andromeda Galaxy \(M31\) :: 22 May 07](#)

May 22, 2007 ... Chandra X-ray Image of Andromeda Galaxy (**M31**) ... References, X-ray

Astronomy via Google

Works Well When:

- You just want to type and click to search the WWW
- You want to search every posted PDF paper
- You want to find out everything about something
- You want search results sorted by “relevance”

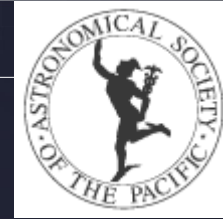
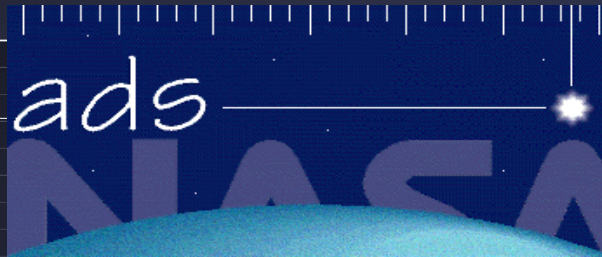
Doesn't Work Well When:

- The data you want is not searchable “in” the WWW
- You really don't want all of those “un-refereed” papers
- You don't want to find out everything
- You want order out of chaos



Astronomy via Journals

IOP Institute of Physics



- I read an article and "see" data.
- I phone or email the author for data-on-media.
- I transcribe journal tables into electronic format.
- I copy and paste HTML/LaTeX versions of tables.
- I access electronic tables directly



Astrophysical Data System

[Sign on](#)

[SAO/NASA Astrophysics Data System \(ADS\)](#)

Query Results from the ADS Database

[Go to bottom of page](#)

Retrieved **200** abstracts, starting with number **1**. Total number selected: **6309**.

Sort options

#	Bibcode Authors	Score	Date	List of Links Access Control Help	
1	<input type="checkbox"/> 2008MNRAS.388...56B Bogdán, Á.; Gilfanov, M.	1.000	07/2008	A E F X D R C S U	On-line Data (link outside ADS)
2	<input type="checkbox"/> 2008MNRAS.387.1361B Boyarsky, Alexey; Iakubovskiy, Dmytro; Ruchayskiy, Oleg; Savchenko, Vladimir	1.000	07/2008	A E F X R C S U	
3	<input type="checkbox"/> 2008ApJS..177..362C Cortés, C.; Catelan, M.	1.000	07/2008	A E F R C S U	
4	<input type="checkbox"/> 2008ApJS..177..174N Narbutis, D.; Vansevičius, V.; Kodaira, K.; Bridžius, A.; Stonkutė, R.	1.000	07/2008	A E F X R S U	



SIMBAD

The screenshot shows the SIMBAD Astronomical Database website. At the top, there is a navigation bar with the EDS logo and links for Portal, Simbad, Vizier, Aladin, X-Match, Other, and Help. The main title is "SIMBAD Astronomical Database". Below the title, there are three main columns of links: Queries, Documentation, and Information. The Queries column includes links for basic search, by identifier, by coordinates, by criteria, reference query, scripts, TAP queries, options, and a link to display all user annotations. The Documentation column includes links for User's guide, Query by urls, Nomenclature Dictionary, Object types, List of journals, Measurement description, Spectral type coding, and User annotations documentation. The Information column includes links for Presentation and Acknowledgment, and a Release section indicating SIMBAD4 1.223 - 15-May-2014. Below these columns, there are two more sections: Content and Statistics. The Content section describes the database's purpose and how to query it. The Statistics section provides a table of data as of 2014.08.17, showing the number of objects, identifiers, bibliographic references, and citations.

Queries	Documentation	Information
basic search	User's guide	Presentation
by identifier		
by coordinates		Acknowledgment
by criteria	Query by urls	
reference query	Nomenclature Dictionary	
scripts	Object types	
TAP queries	List of journals	
options	Measurement description	
	Spectral type coding	
Display all user annotations	User annotations documentation	
		Release: SIMBAD4 1.223 - 15-May-2014

Content	Statistics								
<p>The SIMBAD astronomical database provides basic data, cross-identifications, bibliography and measurements for astronomical objects outside the solar system.</p> <p>SIMBAD can be queried by object name, coordinates and various criteria. Lists of objects and scripts can be submitted.</p> <p>Links to some other on-line services are also provided.</p>	<p>Simbad contains on 2014.08.17</p> <table border="1"><tbody><tr><td>7,545,456</td><td>objects</td></tr><tr><td>18,546,514</td><td>identifiers</td></tr><tr><td>294,079</td><td>bibliographic references</td></tr><tr><td>10,731,451</td><td>citations of objects in papers</td></tr></tbody></table>	7,545,456	objects	18,546,514	identifiers	294,079	bibliographic references	10,731,451	citations of objects in papers
7,545,456	objects								
18,546,514	identifiers								
294,079	bibliographic references								
10,731,451	citations of objects in papers								



SIMBAD: Query references

other query modes : [Identifier query](#) [Coordinate query](#) [Criteria query](#) [Reference query](#) [Basic query](#) [Script submission](#) [Output options](#) [Help](#)

Enter search criteria:

Journals :

Example: A&A,APJ,mnras

year limits : from to Simbad bibliographic survey began in 1950 for stars (at least bright stars) and in 1983 for all other objects (outside the solar system). *\$currentYear can be used to specify dynamically the current year.*

authors :

Example: JASCHEK & ('egret d'I'acker)

[Find an author](#)

title words :

Example: supernova & ('crab nebula' | cygnus)

or Enter a bibcode or a DOI :

bibcode or DOI :

Example: 2000A&A...353..322A

display objects in the reference (for regular bibcode only)

or reference items: year: [journal abbrev:](#) volume: page:

or Query a file of bibcodes

Enter the name of an ASCII file produced by a text editor, containing one bibcode per line:

No file selected.



Astronomical Catalogs via Journals

Works Well When:

- You personally know the author and their specialty
- You want to explore related research
- You are searching for an “entity”
- You have lots of time and good book keeping skills

Doesn't Work Well When:

- You want to search near a position or within a footprint
- You want “raw” data
- You have >10 s of entities
- You want to spatially cross-match between entities

Data Ingesters / Aggregators



- I want to search a “Database of Everything”.
- I have an object name or a position on the sky.
- I search and see links to 100s or 1000s of objects, each with their own references.
- I browse through the top N of these objects and their references to decide which data are the ones I want.
- I then use the ingested data values or the original references to create a useful datatable.



NASA/IPAC Extragalactic Database

[Panel Menu](#)

[Search Objects](#) ▾

[Object Data](#) ▾

[Literature](#) ▾

[Tools](#) ▾

[Information](#) ▾

Classic Navigation

OBJECTS	DATA	LITERATURE	TOOLS	INFO
By Name	Images	References by Object Name	Coordinate Transformation & Extinction Calculator	Introduction
	or			Latest News/Updates
	By Object Name			
	By Region			
Near Name	Photometry & SEDs	References by Author Name	Velocity Calculator	Features
Near Position	Spectra	Text Search	Cosmology Calculators	FAQ
IAU Format	Redshifts	Knowledgebase	Extinction-Law Calculators	Overview (pdf)
By Parameters	Redshift-Independent Distances	Galaxy Distance Tabulations (NED-D)	Skyplot (retired)	Source Nomenclature
				Web Links



NASA/IPAC EXTRAGALACTIC DATABASE

Date and Time of the Query: 2008-09-02 T08:41:28 PDT

[Help](#) | [Comment](#) | [NED Home](#)

Searching NED within 10.0 arcmin of object "ABELL 1882"

873 objects found in NED. [Skyplot\(first 100\)](#)

Object list is sorted on Distance to search center

Row No.	Object Name (* => Essential Note)	EquJ2000.0		Type	Velocity/Redshift		Separ.		Number of					
		RA	DEC		km/s	z	Qual	arcmin	Refs	Notes	Phot	Posn	Vel/z	D
1	ABELL 1882	14h14m39.9s	-00d19m57s	GClstr	>30000	0.136700		0.0	17	0	0	1	0	
2	[MD2000] J141441.443-001955.66	14h14m41.4s	-00d19m56s	VisS	...	...		0.4	1	0	0	0	0	
3	QUEST 130703	14h14m42.1s	-00d20m18s	VisS	...	...		0.7	1	0	0	0	0	
4	[MD2000] J141439.232-002038.36	14h14m39.2s	-00d20m38s	G	...	...		0.7	1	0	0	0	0	
5	[MD2000] J141440.486-001914.62	14h14m40.5s	-00d19m15s	G	...	...		0.7	1	0	0	0	0	
6	[MD2000] J141441.702-001919.17	14h14m41.7s	-00d19m19s	G	...	...		0.8	1	0	0	0	0	
7	[MD2000] J141442.650-002022.67	14h14m42.6s	-00d20m23s	VisS	...	...		0.8	1	0	0	0	0	
8	[MD2000] J141437.809-001907.12	14h14m37.8s	-00d19m07s	G	...	...		1.0	1	0	0	0	0	
9	SDSS J141436.09-002017.2	14h14m36.1s	-00d20m17s	G	...	...		1.0	2	0	1	1	0	
10	[MD2000] J141438.055-001901.52	14h14m38.0s	-00d19m02s	G	...	...		1.0	1	0	0	0	0	
11	[MD2000] J141442.439-001904.40	14h14m42.4s	-00d19m04s	G	...	...		1.1	1	0	0	0	0	
12	[MD2000] J141444.130-001941.09	14h14m44.1s	-00d19m41s	G	...	...		1.1	1	0	0	0	0	
13	[MD2000] J141438.302-001852.72	14h14m38.3s	-00d18m53s	G	...	...		1.1	1	0	0	0	0	
14	[MD2000] J141435.108-001955.39	14h14m35.1s	-00d19m55s	G	...	...		1.2	1	0	0	0	0	
15	QUEST 130614	14h14m36.1s	-00d19m13s	VisS	...	...		1.2	1	0	0	0	0	
16	[MD2000] J141444.851-002003.24	14h14m44.8s	-00d20m03s	G	...	...		1.2	1	0	0	0	0	
17	[MD2000] J141443.898-001912.58	14h14m43.9s	-00d19m13s	G	...	...		1.2	1	0	0	0	0	
18	SDSS J141442.74-001855.2	14h14m42.7s	-00d18m55s	G	>30000	0.138643		1.3	2	0	21	3	2	
19	[MD2000] J141443.416-001900.49	14h14m43.4s	-00d19m00s	G	...	...		1.3	1	0	0	0	0	
20	[MD2000] J141434.385-001937.25	14h14m34.4s	-00d19m37s	G	...	...		1.4	1	0	0	0	0	



SkyView Query Form

Use [static Non-JavaScript Query Form](#)

Initiate request: [Reset forms:](#) [Display results in new window](#)

Required Parameters:

[Coordinates or Source:](#)

(e.g. "Eta Carinae", "10 45 3.6, -59 41 4.2", or "161.265, -59.685" [omit the quotes])

[Surveys:](#) Select at least one survey

SkyView Surveys

Gamma Ray:

- Fermi 5
- Fermi 4
- Fermi 3
- Fermi 2
- Fermi 1
- EGRET (3D)
- EGRET <100 MeV

Hard X-ray:

- INT GAL 17-35 Flux
- INT GAL 17-60 Flux
- INT GAL 35-80 Flux
- INTEGRAL/SPI GC
- GRANAT/SIGMA
- RXTE Allsky 3-8keV Flux
- RXTE Allsky 3-20keV Flux

Swift BAT:

- BAT SNR 14-195
- BAT SNR 14-20
- BAT SNR 20-24
- BAT SNR 24-35
- BAT SNR 35-50
- BAT SNR 50-75
- BAT SNR 75-100

Soft X-ray:

- RASS-Cnt Soft
- RASS-Cnt Hard
- RASS-Cnt Broad
- PSPC 2.0 Deg-Int
- PSPC 1.0 Deg-Int
- PSPC 0.6 Deg-Int
- HRI

Diffuse X-ray:

- RASS Background 1
- RASS Background 2
- RASS Background 3
- RASS Background 4
- RASS Background 5
- RASS Background 6
- RASS Background 7

UV:

- GALEX Near UV
- GALEX Far UV
- ROSAT WFC F1
- ROSAT WFC F2
- EUVE 83 A
- EUVE 171 A
- EUVE 405 A

DSS:

- DSS
- DSS1 Blue
- DSS1 Red
- DSS2 Red
- DSS2 Blue
- DSS2 IR

SDSS:

- SDSSg
- SDSSi
- SDSSr
- SDSSu
- SDSSz
- SDSSdr7g
- SDSSdr7i

Other Optical:

- Mellinger Red
- Mellinger Green
- Mellinger Blue
- NEAT
- H-Alpha Comp
- SHASSA H
- SHASSA CC

Infrared High Res:

- 2MASS-J
- 2MASS-H
- 2MASS-K

IRAS:

- IRIS 12
- IRIS 25
- IRIS 60

Planck:

- Planck 857
- Planck 545
- Planck 353

WMAP/COBE:

- WMAP ILC
- WMAP Ka
- WMAP K

Radio:

- GB6 (4850MHz)
- VLA FIRST (1.4 GHz)
- NVSS

Astronomy via the Data Ingesters

Works Well When:

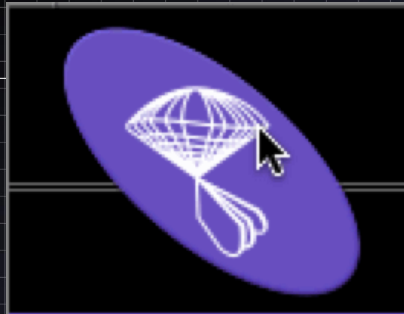
- Searching for anything of a single entity or position.
- You know catalog or table names
- You can define categories or types of objects
- You want more or less "complete" coverage

Doesn't Work Well When:

- You need the "right" data, the "best data" or the "most popular data"
- You want to "data mine"
- You need "raw" data
- You will cross-match > 10 s of objects
- You find more than 100s of objects



Astronomy via the Data Archives



- I know the SDSS/HST/Spitzer archive exists and probably contains the data I am seeking.
- I go to the specific archive, learn the details of the mission and the data, and build advanced queries to find the data I need.
- I bring over to my desktop large catalogs and/or their imaging data to do my science.
- I then analyze these images or use these monolithic, homogenous catalogs to do my science.

Object name [M31](#) resolved by [NED](#) to **MESSIER 031** (G [from Cache])
RA: 0 42 44.32 Dec: 41 16 8.54 (J2000)

```
SELECT *
FROM mast..hst_science_view
WHERE (sci_aec LIKE 'S')
AND (sci_ra BETWEEN 10.534990102 AND 10.8343432314)
AND (sci_dec BETWEEN 41.1565388889 AND 41.3815388889)
```

100 rows displayed, but 552 are available.

Click on Dataset or Target Name entries to preview information on data set.

Click on Ref entries to display list of published papers.

Click on Proposal ID entries to display information on observing program.

Records with a @ character next to the mark button are proprietary, and may only be retrieved by authorized users.

Click on top column headers to sort the table on the column contents.

Click on bottom column headers for more information about the data in that column.

[Plot marked spectra](#) [Submit marked data for retrieval from STDADS](#)

[Mark all](#) [Unmark all](#) [Mark public](#) [Unmark public](#) [Mark proprietary](#) [Unmark proprietary](#)

◀ [Previous](#) [Next](#) ▶ Page 1 of 3

Mark	Dataset	Target Name	RA (J2000)	Dec (J2000)	Ref	Start Time	Stop Time	Exp Time	Instrument	Apert
<input type="checkbox"/>	Y1C8030HT	NGC224-S2	00 42 44.31	+41 16 08.6		1993-06-13 04:40:10	1993-06-13 05:02:50	1300.162	FOS	0.3
<input type="checkbox"/>	Y2IO010HT	NGC224-S1	00 42 44.33	+41 16 08.6		1995-02-22 08:12:40	1995-02-22 08:38:47	1499.985	FOS	0.3
<input type="checkbox"/>	Y1C8030FT	NGC224-S1	00 42 44.33	+41 16 08.6		1993-06-13 02:43:48	1993-06-13 03:04:19	1200.000	FOS	0.3



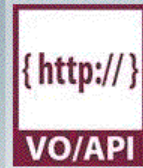
Tuesday 8/19/14 10:00am-12:00pm PDT.
IRSA services will be unavailable.

Search for Source

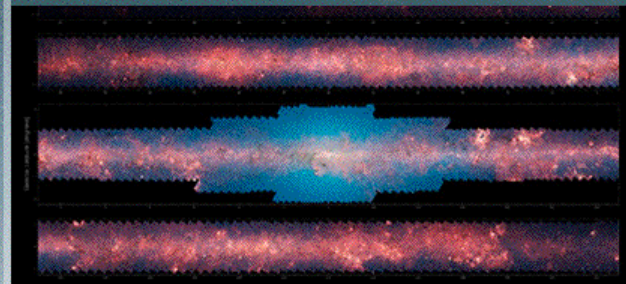
Name or Coordinates

Radius

Search Catalog:



GLIMPSE360 and Vela-Carina



New images and catalogs from the GLIMPSE360 and Vela-Carina Spitzer Exploration Science programs. GLIMPSE360 images from l=174d-240d have now been released. The Vela-Carina program has released images from l=255d-295d, and source lists for the entire program area.

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[Featured Images](#)



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[Video Tutorials](#)

[Help Desk](#)

http://www4.cadc-ccda.hia-ihp.nrc-cnrc.gc.ca/en/

Canadian Astronomy Data Centre

Canada

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CADC Home

Search for data by target

[Advanced Search](#)

Telescope Data Products

- Gemini
- CFHT
- JCMT
- HST
- BLAST
- MOST
- DAO
- MACHO
- OMM
- FUSE
- UKIRT


Advanced Data Products

- MegaPipe
- HLA
- IRIS
- CGPS
- CFHTLS
- WIRwolf

Services

- Meetings
- Community
- SSOIS
- CANFAR
- DSS





NOAO Science Archive

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The NOAO Science Archive connects directly to the **NOAO Archive** where data are ingested from NOAO instruments and pipelines regularly (i.e., daily). The number (of files and data volumes) indicate the currently available contents of the **NOAO Archive** with respect to the different instruments. These numbers are for unique files and include all types (science observations, calibrations, focus or test images, etc.)

	raw	reduced
totals:	4616411 (121.717 [TB])	780772 (71.185 [TB])
last night:	57 (0.195 [GB])	0

telescope/instrument	raw	reduced	reduced public
ct1m			
y4kcam	228761 (2.407 [TB])	0	0
kp21m			
flamingos	98790 (549.221 [GB])	0	0
gtcam	36386 (57.355 [GB])	0	0
ccd_imager	50664 (135.200 [GB])	0	0
ir_imager	48121 (25.809 [GB])	0	0
ccd_spec	67664 (160.783 [GB])	0	0
lab			
bench	485 (1.581 [GB])	0	0
cosmos	980 (2.412 [GB])	0	0
kosmos	1250 (1.473 [GB])	0	0
none	11 (0.035 [GB])	0	0
ct15m			
ccd_spec	162702 (164.683 [GB])	0	0
echelle	388020 (2.710 [TB])	0	0
ct13m			
andicam	1064557 (1.514 [TB])	0	0
soar			
osiris	95794 (146.517 [GB])	0	0
spartan	62600 (253.995 [GB])	0	0
soi	196214 (515.988 [GB])	0	0
goodman	319240 (648.822 [GB])	0	0
sami	1156 (7.267 [GB])	0	0
kpcf			
ccd_spec	24593 (27.591 [GB])	0	0



NOAO Science Archive

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Display

Displaying images 1 - 20 of 2023 in total
1 2 3 4 5 6 7 8 9 ... 101 102 Next Last →
Current coordinate format: decimal degrees

Refine


Categorize by:

Filter by:




Download

0 rows selected	Access	Proposal ID	Survey ID	Release date	Observing date	UT	PI	RA	Dec	Telescope	Instrument	Filter	Exposure	Observation type	Observing mode	Processing
<input type="checkbox"/>	Retrieve	2013A-0611	?	2014-08-16	2013-02-15	2013-02-16 00:29:11.94	Mackey	99.646042	-50.349056	ct4m	decam	g	1800	object	?	Stacked
<input type="checkbox"/>	Retrieve	2013A-0611	?	2014-08-16	2013-02-15	2013-02-16 03:27:26.027	Mackey	143.747875	17.088528	ct4m	decam	g DECam SDSS c0001 4720.0 1520.0	3600	remap	?	Stacked
<input type="checkbox"/>	Retrieve	2013A-0611	?	2014-08-16	2013-02-15	2013-02-16 03:27:26.027	Mackey	143.747875	17.088528	ct4m	decam	g DECam SDSS c0001 4720.0 1520.0	3600	remap	?	Stacked
<input type="checkbox"/>	Retrieve	2013A-0611	?	2014-08-16	2013-02-15	2013-02-16 03:27:26.027	Mackey	143.747875	17.088528	ct4m	decam	g DECam SDSS c0001 4720.0 1520.0	3600	remap	?	Stacked
<input type="checkbox"/>	Retrieve	2013A-0611	?	2014-08-16	2013-02-15	2013-02-16 03:27:26.027	Mackey	143.747875	17.088528	ct4m	decam	g DECam SDSS c0001 4720.0 1520.0	3600	remap	?	Stacked
<input type="checkbox"/>	Retrieve	2013A-0611	?	2014-08-16	2013-02-15	2013-02-16 03:27:26.027	Mackey	143.747875	17.088528	ct4m	decam	g DECam SDSS c0001 4720.0 1520.0	3600	remap	?	Stacked





Atacama Large Millimeter/submillimeter Array
In search of our Cosmic Origins



Search Site

ESO NRAO NAOJ [Log in](#) | [Register](#) | [Reset Password](#) | [Forgot Account](#)

You are here: [Home](#) > [Data](#) > [Archive](#)

Archive

Public and proprietary data are available from the ALMA archive. Public data can be downloaded anonymously. Proprietary data are available to authenticated users (i.e. those logged in - use the login button at the top right of this page) who have the proper access rights.

Please [go here for a listing of the Cycle 0 deliveries](#) as well as a table of contents of all the Cycle 0 tar files. Cycle 0 deliveries were done differently from later cycles.

Data delegation

PIs can allow access to one or more of their projects to any other registered ALMA user. To do so, PIs need to log into the Science Portal, go to their user profile page in the top right corner of the Science Portal page and then add delegates in the "Project delegation" tab. This delegation is valid for the access to proprietary data.

Data format

Data for a project is delivered to the PI in one or more discrete deliveries. Each delivery corresponds to a related set of observations, and has its own release date. Deliveries are usually split into multiple tar files, all of which need to be downloaded and untarred in the same directory in order to produce the full data directory tree. You can use for example the command `for i in `ls *.tar`; do tar -xvf $i; done`

The tar files of a delivery contain scripts and logs, calibration tables and representative images, as well as one or more README files. In Cycle 0, the delivery tar files also contain raw data as well as the fully calibrated data, both in measurement set (MS) format. In Cycle 1, the raw data is provided in ASDM format and the calibrated MS can be produced by the user by applying the supplied calibration tables to the raw data.

Data access

Two ways to access the data are offered:

- About
- Science
- Proposing
- Observing
- Data
 - Archive**
 - Calibrator Catalogue
 - Science Verification
 - Data Processing
- Documents & Tools
- Knowledgebase/FAQ

User Services at ARCs

- Helpdesk
- ALMA Calendars
- EU ARC
- NA ARC
- EA ARC

<http://casu.ast.cam.ac.uk/casuadc/>



Astronomical Data Centre

Home

Welcome to the CASU Astronomical Data Centre

Welcome to the home page of the CASU Astronomical Data Centre (formerly RGO Astronomy Data Centre). The Data Centre is part of the Cambridge Astronomical Survey Unit in the Institute of Astronomy, University of Cambridge, and houses a good selection of data from the UK's ground based telescopes as well as a number of catalogues.

Catalogues of observations

[VISTA Surveys archive](#)

[VST Surveys archive](#)

[Archives of the Isaac Newton Group of telescopes](#)

[Anglo Australian Telescope Data Archive](#)

[Archives of the UK Infrared Telescope \(UKIRT\)](#)

[Observations with the Carlsberg Meridian Telescope](#)

[Wide Field Survey on the Isaac Newton Telescope](#)

Catalogues of sources

[The Hipparcos catalogue](#)

[The Tycho catalogue](#)

[Automatic Plate Measuring \(APM\) \(original interface\)](#)

[Automatic Plate Measuring \(APM\) \(revised interface\)](#)

[VizieR mirror](#)



http://archive.eso.org/cms.html

European Southern Observatory

ESO — Reaching New Heights in Astronomy

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Science Users Information > Science Archive Facility 17 Aug 2014

Science Archive Facility

Welcome to the ESO Science Archive Facility

The ESO Science Archive Facility contains data from ESO telescopes at La Silla Paranal Observatory, including the APEX submillimeter telescope on Llano de Chajnantor. In addition, the raw UKIDSS/WFCAM data obtained at the UK Infrared Telescope facility in Hawaii are available.

The Principal Investigators of successful proposals for time on ESO telescopes have exclusive access to their scientific data for the duration of a proprietary period, normally of one year, after which the data becomes available to the community at large. Please read the [ESO Data Access Policy](#) statement for more information, along with the [relevant FAQs](#).

Browsing the archive does not require authentication, but to request and download data you have to log in to the [ESO User Portal](#). Please [acknowledge the use of archive data](#) in any publication.

Latest News and Updates

- [Release of MUSE Commissioning data \(28 Jul 2014\)](#)
- [GOODS/FORS2 Advanced Data Products Available Through Phase 3 \(17 Jul 2014\)](#)
- [First Data Release of VVV Photometric Catalogues via the ESO Science Archive Facility \(15 Jul 2014\)](#)

[More news ...](#)

To browse the archive

Currently, **raw data** and various types of **data products** can be reached via different interfaces:

Category	Query Forms	Data collection	Data Type	Instruments
LPO Raw Data	Raw data query form (all instruments) Instrument specific query forms Direct retrieval of raw data by file name	All ESO raw data	Various	Many La Silla Paranal instruments
LPO Data Products	Phase 3 main query form Phase 3 imaging query form Phase 3 spectral query form Phase 3 VIRCAM-specific query form	Phase 3 Data Products (ESO public surveys, large programs, pipeline products, etc.) Phase 3 Catalogues (ESO User)	Currently, Imaging and Spectroscopy	Currently, VISTA/VIRCAM, VST/OmegaCAM, UVES pipeline products, zCOSMOS (VIMOS, S.Lilly), GOODS (FORS2, C.Cesarsky), etc.

Due to maintenance reasons, there may be a disruption of archive services on the weekend **23/24 August**. We apologize for any inconvenience this may cause.



http://skyserver.sdss3.org/casjobs

SDSS Query / CasJobs

Help Tools Query History MyDB Import Groups Output Profile Queues SkyServer Logout chrisr

Context **Table (optional)** Task Name
DR10 MyTable_0 My Query

Samples Recent Clear [2 s] Query complete! Syntax Plan Quick Submit

```
1 SELECT ISNULL(s.specobjid,0) AS specobjid, p.ra, p.dec, p.Petromag_u-p.extinction_u, p.Petromag_g-p.extinction_g, p.Petromag_r-p.extinction_r,
2 p.Petromag_i-p.extinction_i, p.Petromag_z-p.extinction_z, ISNULL(s.z, 0) AS z, ISNULL(pz.z, 0) AS pz
3 FROM (Galaxy AS p JOIN dbo.fGetNearbyObjEq( 122.5342,35.2331,12.3928 ) AS GN ON p.objID = GN.objID
4 LEFT OUTER JOIN SpecObj s ON s.bestObjID = p.objID)
5 LEFT OUTER JOIN Photoz pz ON pz.objid = p.objid
6 WHERE p.Petromag_r-p.extinction_r < 19.1 and p.clean = 1
```

118 row(s)

specobjid	ra	dec	Column1	Column2	Column3	Column4	Column5	z	pz
0	122.533248898428	35.2412901354836	19.66357	18.51081	17.77468	17.38292	17.13565	0	0.085338
0	122.54471968194	35.237649703831	20.13593	19.18864	18.42724	18.07684	17.85744	0	0.140915
0	122.516445572347	35.2092495386865	20.70042	19.1426	18.26856	17.91259	17.54462	0	0.096448
0	122.515261846595	35.2523730415665	20.79053	18.80577	17.88589	17.4907	17.20008	0	0.088511
0	122.513388408099	35.2580283944871	21.03896	19.2509	18.32035	17.95111	17.70784	0	0.123676
0	122.511350570809	35.2230337157889	21.67031	19.71781	18.30736	17.94086	17.44281	0	0.249455
1004328595323119616	122.459712850775	35.2333307924511	19.76447	18.12151	17.19591	16.75348	16.464	0.08374395	0.096934
0	122.45733400212	35.226603039604	20.15371	18.55449	17.69941	17.26926	16.9096	0	0.076042
4230238589126443008	122.526343462451	35.2652163567029	18.19753	16.63298	15.60691	15.17866	14.85183	0.08227048	0.102036
1004342064340559872	122.535471362297	35.2752663619843	17.17669	15.63778	14.64054	14.19126	13.97927	0.08399089	0.105755
1004342339218466816	122.573778033512	35.2600545154325	20.3283	18.25837	17.3396	16.91149	16.65178	0.08145504	0.083617
1004343988485908480	122.506058645505	35.2611849046576	20.24224	18.51687	17.61826	17.20341	16.89762	0.08122198	0.081012
1004314576549865472	122.541815952038	35.1895950377715	19.94339	18.18981	17.30138	16.9035	16.55386	0.08605214	0.086428
0	122.555848912445	35.2575904251657	19.79485	18.28454	17.57326	17.17308	16.98879	0	0.125963
0	122.470710031218	35.2181544820854	21.26640	19.2678	18.34244	17.87076	17.7102	0	0.083054

RESULTS Plot Save As HTML DISPLAY Query Results Bot



Astronomy via the Data Archives

Works Well When:

- You already know data was taken by an instrument
- You work with “lower level” data (e.g., original reduced or raw images).
- You need resources for intensive queries
- You want searches to be “complete”
- You use/need many 1000s of objects

Doesn't Work Well When:

- You need multi-wavelength data
- You do not have expert knowledge of the mission
- You want an overview of what is available
- You want to explore

Summary

- Astronomical data is heterogeneous in format, quality, location, access mechanisms, etc
- Archives “guard” data and focus their tools on their own data.
- Ingesters or Aggregators take data and merge it into a useful form.
- Data access, management, cleaning, re-formatting can easily take up the majority of your time.

