



# ALADIN

## Aladin V10

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IVOA Interop – May 2017 - Shanghai

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On behalf of the Aladin CDS team,

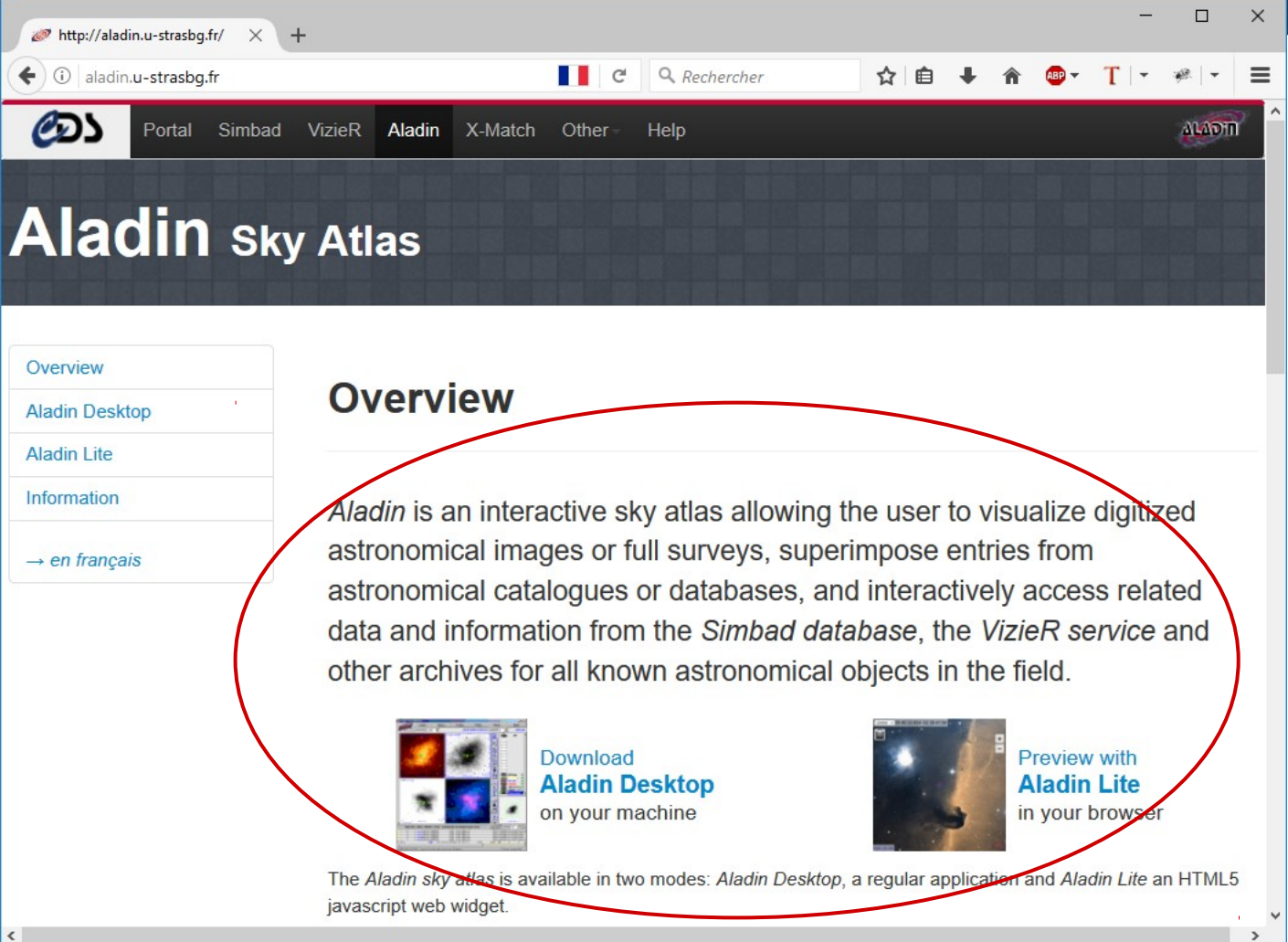


# □ What's the plan ?

- 1) Aladin Sky Atlas ? What it is ?
- 2) Key figures on Aladin Desktop
- 3) Aladin v10 in 3 words
- 4) Demonstration



# □ What Aladin is ?



The screenshot shows the Aladin sky Atlas website. The browser address bar displays <http://aladin.u-strasbg.fr/>. The navigation menu includes Portal, Simbad, VizieR, Aladin, X-Match, Other, and Help. The main heading is "Aladin sky Atlas". A sidebar on the left contains links for Overview, Aladin Desktop, Aladin Lite, Information, and a link to "en français". The main content area is titled "Overview" and contains the following text:

*Aladin* is an interactive sky atlas allowing the user to visualize digitized astronomical images or full surveys, superimpose entries from astronomical catalogues or databases, and interactively access related data and information from the *Simbad database*, the *VizieR service* and other archives for all known astronomical objects in the field.

Below the text are two buttons: "Download Aladin Desktop on your machine" and "Preview with Aladin Lite in your browser". At the bottom, a note states: "The *Aladin sky atlas* is available in two modes: *Aladin Desktop*, a regular application and *Aladin Lite* an HTML5 javascript web widget."



# □ Key dates

1995

Proto XWindows (C++)

2000

Applet (java)

2003

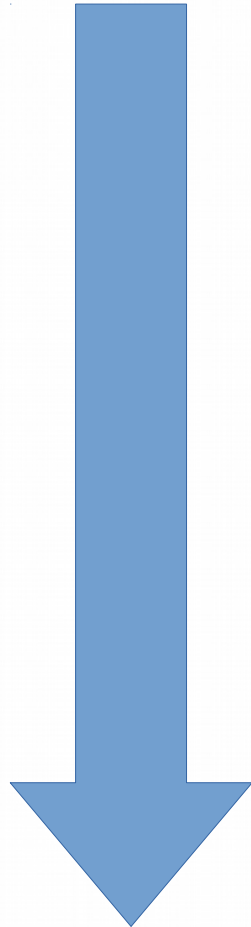
Standalone/Applet (java)

2013

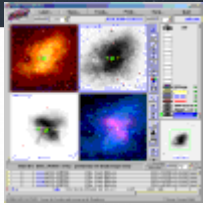
Aladin Lite (javascript)

**2017**

**Aladin v10** (java)



# □ Aladin Sky Atlas, one in two!



## Aladin Desktop

- high level features **desktop**
- access images, catalogs, footprints
- **full range of functionalities**
- interoperable with VO tools
  - Aladin is a VO portal
  - used to validate most standards
- Used for observation preparation tools (APT, GuideCam)
- going all hierarchical now! (HiPS)



## Aladin Lite

- **Web** HiPS visualizer
- preview mode
- embed in any webpage
- **easy appropriation**
- **highly used in wide range of sites/services**
- basic functions... but more and more!

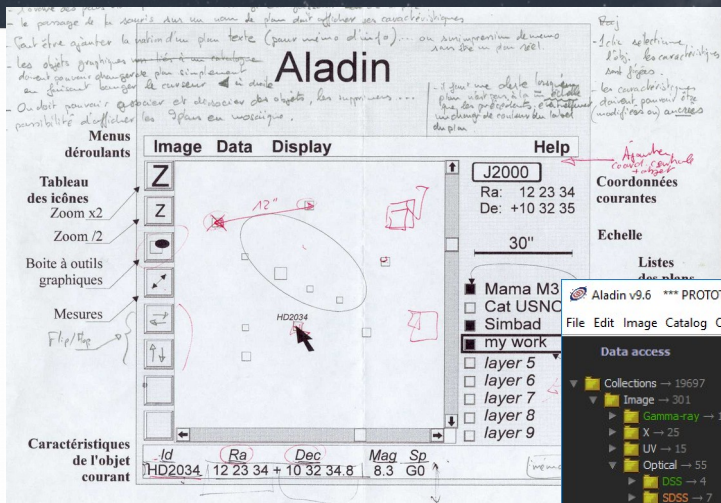
# □ Key figures on Aladin Desktop

- 1) **Code: 5MB jar**, 250k source lines, 500 classes
  - only based on CDS & JDK regular libraries (+ HEALPix lib)
  - 2 main developers (P. Fernique, T. Boch)
    - + dozen of contributors (recently Chaitra)
- 2) **Usage: 1k sessions per day** for 150k http queries (HiPS tiles queries included)
- 3) **Language: 85% en**, 10% fr, 2% de, 1% it, 1% es ..
- 4) **Java: 75% 1.8**, 12% 1.7, 12% 1.6, 0.2% 1.5, ...

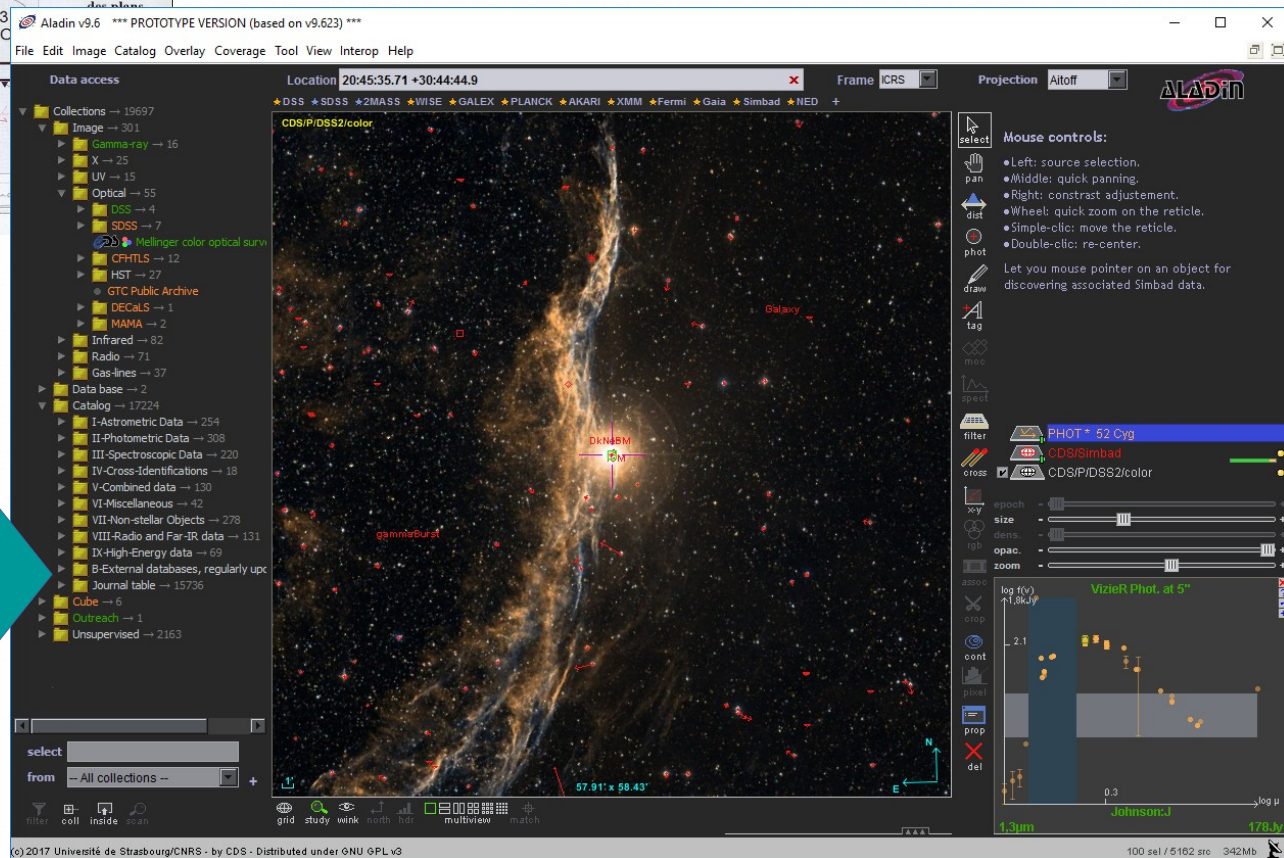


# Aladin Desktop

## Aladin v0 (1999)



## Aladin v10



# □ Release v10



## 1) Desktop only

=> no longer applet support, full screen

## 2) Integration++:

- IVOA protocols: SIAv2, TAP, Datalink/SODA, VO registry (via RegTAP), VOSpace, MOC, HiPS
- CDS advanced services: MocServer, Xmatch, query by MOC

## 3) New look & feel

=> modernisation, simplification

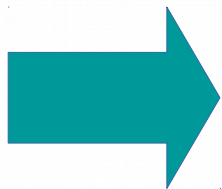


## □ The live demo...



### New use cases based on:

- *Fast browsing/filtering on all VO data collections*
- *Query by regions*
- *Query by criteria*
- *Xmatch with any tables*



<http://aladin.u-strasbg.fr/java/AladinProto.jar>

# □ The plan of the demo...



- 1) Load Simbad over DSS HiPS
- 2) **Load the region** (MOC) of the sky both observed by Chandra and XMM
- 3) **Load sources** from ARXA catalog **inside this region**
- 4) **Xmatch these sources** with MORX catalog
- 5) **Browse** XMM,GALEX surveys (HiPS) for each sources
- 6) Query Chandra **SIA service** for one of them

Live demo...



*Please do not touch your laptop during  
the next 5 minutes...thanks*





# Simbad over DSS color HiPS

Aladin v9.6 \*\*\* PROTOTYPE VERSION (based on v9.623) \*\*\*

File Edit Image Catalog Overlay Coverage Tool View Interop Help

Data access → 24 / 19697      Location 05:43:27.24 -01:54:27.1      Frame ICRS      Projection Aitoff

★DSS ★SDSS ★2MASS ★WISE ★GALEX ★PLANCK ★AKARI ★XMM ★Fermi ★Gaia ★Simbad ★NED +

CDS/P/DSS2/color

Stack controls:

- the icon: show/hide a plane
- size: change object size
- zoom: adjust field size.
- Opacity: adjust transparency.

The view is drawn according to the projection of a reference plane.

For changing the reference, click on its check box.

select  
pan  
dist  
phot  
draw  
tag  
moc  
spect  
filter  
cross  
xy  
size  
dens  
opac  
zoom  
crop  
cont  
pixel  
prop  
del

CDS/Simbad  
 CDS/P/DSS2/color

epoch  
size  
dens  
opac  
zoom

grid study wink north hdr multiview match      Search

	MAIN_ID	OTYPE	RA	DEC	C00...	C00...	C...	PMR
	NAME Flame Nebula	NoICld	05 41 42.7	-01 54 44				
	* zet Ori A	**	05 40 45.527	-01 56 33.26	1	1	90	4
	NGC 2023	RfNeb	05 41 37.9	-02 15 52	3200...	7000...	51	
	* zet Ori	**	05 40 45.52...	-01 56 33.2...	5.189	2.289	90	3
	HD 37903	Ew*	05 41 38.38...	-02 15 32.4...	7.651	3.437	90	-1
	* zet Ori B	Star	05 40 45.571	-01 56 35.59	8	5	90	4
	HD 38087	**	05 43 00.57...	-02 18 45.3...	11.084	5.986	90	
	[Thick88] NGC 2024 FIR 5	dens	05 41 44.6	-01 55 38				

select simbad  
from -- All collections --

filter coll inside scan



Data access → 38 / 19697

Location 16:50:20.58 -68:31:35.0

- ▼ Collections → 38 / 19697
  - ▼ Catalog → 38 / 17224
    - ▼ B-External databases, regular
      - AAVSO International Variable Star List
      - The DENIS database (DENIS-1)
      - Catalogue of Stellar Spectra
      - ESO Science Archive Catalogue
      - The Washington Visual Double Star Catalogue
    - ▼ General Catalogue of Variable Stars
      - Extragalactic Variable Stars
      - The Suspected Variable Stars
      - The GCVS Catalog (General Catalogue of Variable Stars)
      - The PASTEL catalogue (Pulsar and Asteroid Spectroscopically Identified)
    - ▼ Log of CFHT Exposures (CFHT Log)
      - The CFHT Observations
      - The CFHT Observations
    - ▼ HST Archived Exposures Catalogue
      - Merged log of HST Observations
      - HST WFPC2 associated observations
      - The HST logs observations
      - Asiago Supernova Catalogue
      - XMM-Newton Observations
      - The Chandra Archive Log
      - Spectroscopically Identified
    - ▼ IRAM Observation Logs (IRAM Log)
      - List of observations
      - The Plateau de Bure
      - The Plateau de Bure
    - ▼ Optically visible open dust clouds
      - The Catalogue Data
      - Removed clusters (VizieR)
      - SB9: 9th Catalogue of Stars
    - ▼ Cataclysmic Binaries, LMXB
      - Catalogue of Cataclysmic Binaries
      - Catalogue of Low-Mass X-ray Binaries
      - Catalogue of Related

★ DSS ★ SDSS ★ 2MASS ★ WISE ★ GALEX ★ PLANCK ★ AKARI ★ XMM ★



**2 data sets selected**

In view + Coverages:  All  Union  Intersection

*CDS/B/xmm/xmmlog, CDS/B/chandra/chandra*

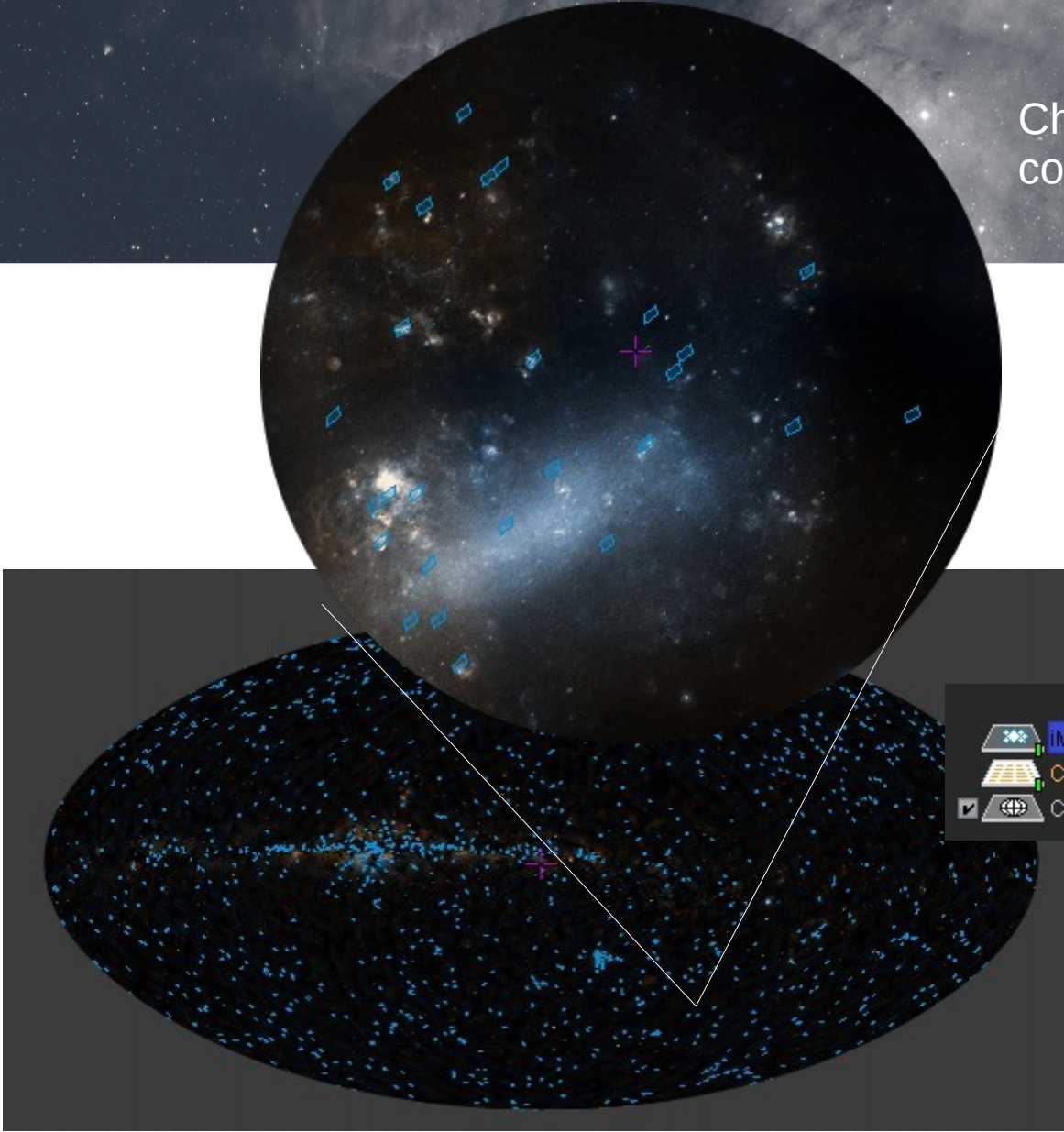
Query the region simultaneously observed by Chandra & XMM

select  
from Log missions

5" 23.47° x 24.78°



# Chandra and XMM coverage intersection



- iMOCs
- CDS/Simbad
- CDS/P/DSS2/color





Access Data Tree filtering:  
Catalog only + X regime  
=> query by region

Collection registry filter

Filter name  store Delete

Global constraints Catalog constraints HIPS constraints

Keywords

Data type  Catalog  Unsuperv...  Image  Cube  
 Data base

Sky fraction

Regime  Radio  millimeter  Infrared  Optical  
 UV  Euv  X-ray  Gamma-ray  
 visible

Bib. year

Authority  CDS  nasa.he...  
 irsa.ipac  org.gavo.dc  
 ov-gso  wfau.roe...  
 uk.ac.le...  mast.stsci  
 svo.cab  ia2.inaf.it

Obs. epoch  ..

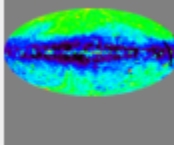
Protocol  HIPS  SIA  SSA  
 Cone search  Progenitors

corresponding filter expression  
client\_category=Catalog\* && obs\_regime=x-ray

Apply

Data access → 1 / 19697

- ▼ Collections → 1 / 19697
  - ▼ Catalog → 1 / 17224
    - ▼ V-Combined data → 1 / 130
      - Atlas of Radio/X-ray associa

 Atlas of Radio/X-ray associations (ARXA) (Flesch, 2010) (more...)

Provenance: CDS

Sky coverage: 1.15% Nb rows: 602 570 Reference pub. year: 2010

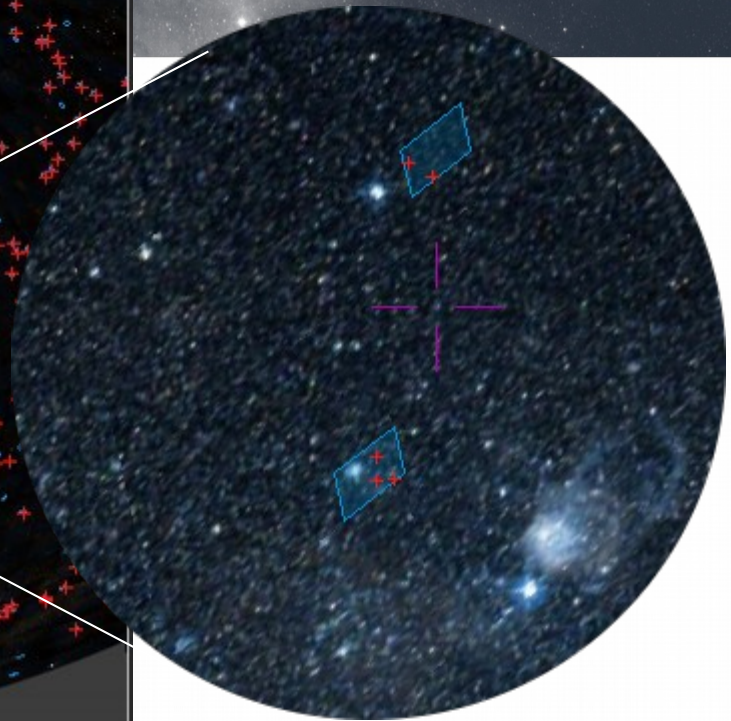
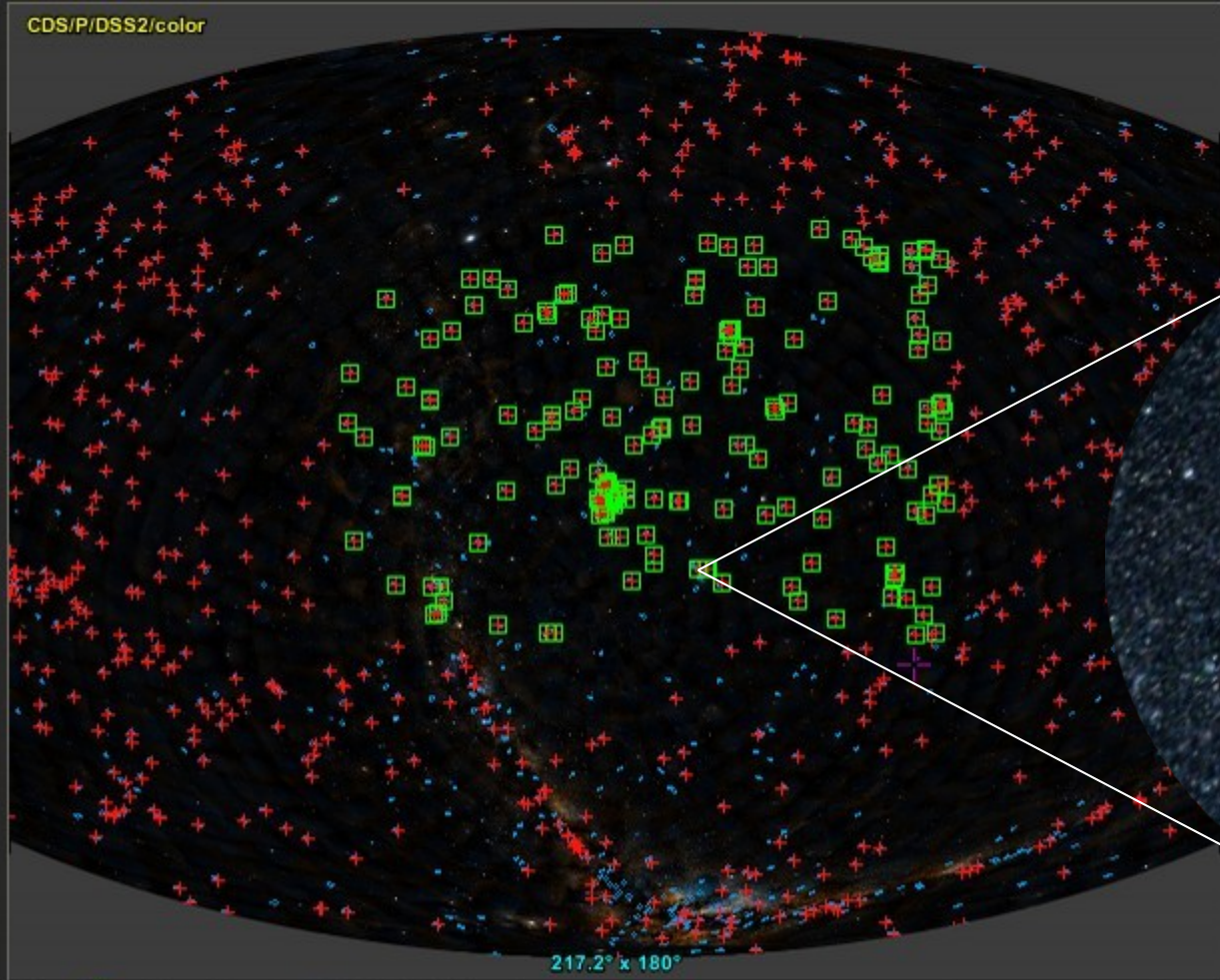
in view  in region or MOC  via Xmatch  by criteria +  Coverage  Density map

[CDS/V/134/arxa \(more...\)](#)



CDS/P/DSS2/color

ARXA sources inside  
the region



grid study wink north hdr multiview match Search

RAJ2000	DEJ2000	Name	C1	Rmag	Bmag	z	p...	p...	p...	Q0	Rad	X
23 56 58.6	-34 45 16		X	18.8	20.1	NaN	13	75	1	Q0	Rad	X
23 56 59.2	-34 45 37		X	18.8	19.1	NaN	70	10	1	Q0	Rad	X
23 57 00.0	-34 44 49		X	19	20.3	NaN	45	29	4	Q0	Rad	X
23 57 00.8	-34 45 34	ESO 349-10	GRX	9.2	9.4	0.049	6	87	6	Q0	Rad	X
23 57 02.4	-34 45 21		X	17	18.3	NaN	27	58	0	Q0	Rad	X
23 58 56.8	-55 26 21		X	19.3	21.9	NaN	22	71	1	Q0	Rad	X
23 58 58.9	-55 26 35		X	NaN	22.8	NaN	88	5	1	Q0	Rad	X
23 59 00.1	-55 27 30	NGC 7796	GX	4.1	8.5	0.011	0	10	47	Q0	Rad	X
23 59 07.9	-30 37 40	1H 2351-...	BRX	16.8	17.9	0.165	24	72	0	Q0	Rad	X





# Xmatching ARXA sources with MORX catalog

The screenshot displays a web-based astronomical data interface. At the top, a navigation bar lists various survey catalogs: DSS, SDSS, 2MASS, WISE, GALEX, PLANCK, AKARI, XMM, Fermi, Gaia, Simbad, and NED. Below this, a sidebar on the left shows a hierarchical tree of collections, including 'The MORX catalogue (Fles...)' and 'The catalogue (morx...)'.

The main content area features a modal dialog box titled 'The catalogue (morx) (more...)'. The dialog includes a small thumbnail image of a star field. Below the title, it provides metadata: 'Provenance: CDS', 'Sky coverage: 1.843%', 'Nb rows: 107 655', and 'Reference pub. year: 2016'. A red lightning bolt icon is positioned over the 'Nb rows' value. The dialog contains several checkboxes: 'in view', 'in region or MOC', 'via Xmatch' (which is checked), 'by criteria', 'Coverage', and 'Density map'. At the bottom of the dialog are buttons for 'Load' and 'Close', along with information and bookmark icons.

Below the dialog, a large visualization of a star field is shown, with numerous red crosses marking individual sources. A red arrow points from the 'via Xmatch' checkbox in the dialog to the star field. On the right side of the interface, a vertical toolbar contains various interaction tools like 'select', 'pan', 'dist', 'phot', 'draw', 'tag', 'moc', and 'sp'. At the bottom right, a layer control panel shows several layers, including 'CDSM/134...', 'IMOCs', 'CDS/Simba...', and 'CDS/P/DSS...', with a red arrow pointing to the 'CDS/P/DSS...' layer.





# Resulting tables, sorted by magnitude

The screenshot displays a software interface for astronomical data analysis. The main window shows a galaxy image with several objects marked by green squares. A red arrow points from the 'moc' icon in the control panel to the 'CDSM/148/morx via Xmatch' entry in the filter list. Another red arrow points from the 'search' button to the table below.

**Table Data:**

RAJ2000	DEJ2000	Name	De...	Rmag	Bmag	$\Delta$	C...	R
51.5833334	-21.3386...	J032620....	X			6.6	j	x
334.0379...	-36.8437...	IC 5179	GRX	7.1		7.0	j	1
59.904125	-67.6342...	NGC 1511	GRX	0.5		7.6	j	1
198.849875	-16.3855...	NGC 5044	GRX	11.4		7.8	p	1
191.28615	-0.46191	2MRS J12...	G2X			7.9	p	x
182.6358...	39.4058334	NGC 4151	ARX	11.1		8.0	p	n
179.63091	43.94702	2MRS J11...	GRX	11.2		8.0	pm	n
335.1861...	-24.6786...	NGC 7252	GRX	8.3		8.1	p	n

**Control Panel:**

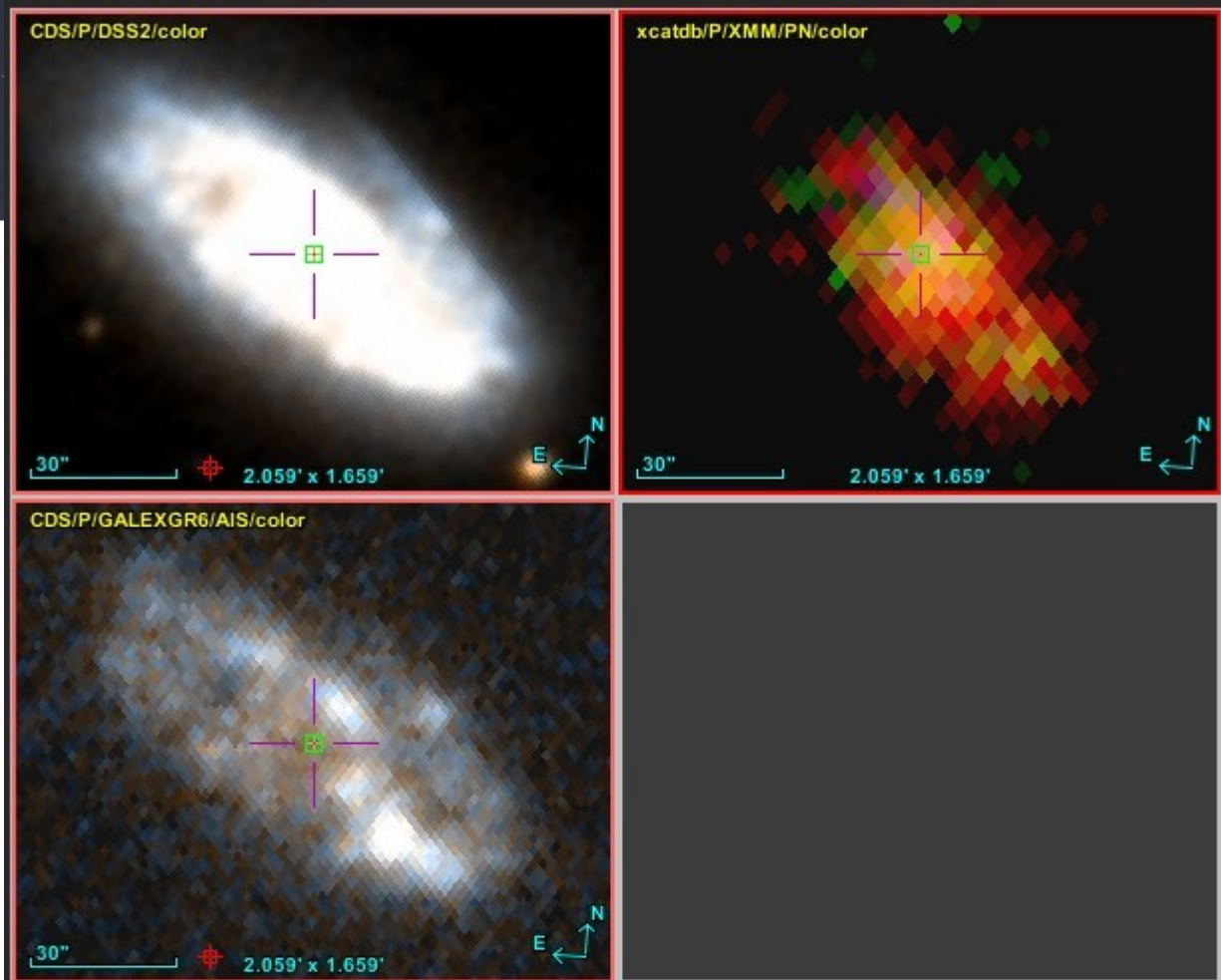
- dist
- phot
- draw
- tag
- moc
- filer
  - CDSM/148/morx via Xmatch
  - CDSM/134/anxa by MOC
  - iMOCs
  - CDS/Simbad
  - CDS/P/DSS2/color
- cross
- x-y
- rgb
- epoch
- size
- dens.
- opac.
- zoom
- assoc
- crop
- oont
- pixel
- prop
- del

**Bottom Panel:**

Frame: ICRS

03 26 19.97 -21 20 18.8  
4.117' x 3.325'

Generate X and UV  
thumbnail images for  
each source



grid study wink north hdr multiview match [View A2] - CDS/P/GALEXGR6/AI: Search

	RAJ2000	DEJ2000	Name	De...	Rmag	Bmag	Δ	C...	R	
	51.5833334	-21.3386...	J032620....	X			6.6	j	x	-
	334.0379...	-36.8437...	IC 5179	GRX	7.1		7.0	j	1	1
	59.904125	-67.6342...	NGC 1511	GRX	0.5		7.6	j	1	1
	198.849875	-16.3855...	NGC 5044	GRX	11.4		7.8	p	1	-
	191.28615	-0.46191	2MRS J12...	G2X			7.9	p	x	-
	182.6358...	39.4058334	NGC 4151	ARX	11.1		8.0	p	n	1
	179.63091	43.94702	2MRS J11...	GRX	11.2		8.0	pm	n	1
	335.1861...	-24.6786...	NGC 7252	GRX	8.3		8.1	p	n	r





Collection registry filter

Filter name  store Delete

Global constraints Catalog constraints HIPS constraints

Keywords

Data type  Catalog  Unsuperv...  Image  Cube  
 Data base

Sky fraction

Regime  Radio  millimeter  Infrared  Optical  
 UV  Euv  x-ray  Gamma-ray  
 visible

Bib. year

Authority  au.csiro  tohoku.u.  
 bsdc.icr...  jacobsuni  
 xaovo  ed.ipac  
 cvo.naoc  ar.nova  
 idoc.ginco  cxc.harv...

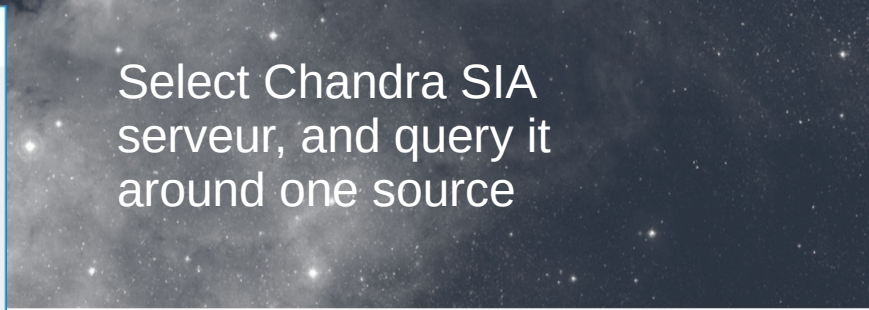
Obs. epoch  ..

Protocol  HIPS  SIA  SSA  TAP  
 Cone search  Progenitors

corresponding filter expression

```
(ID=cxc.harvard.edu*) && sia*==* && obs_title,obs_description,obs_collection,ID=*chandra*
```

Apply Reset Close



Select Chandra SIA server, and query it around one source

- ▼ Collections → 2 / 19697
  - ▼ Unsupervised → 2 / 2163
    - ▼ Image by SIA → 2 / 244
      - ▼ cxc.harvard.edu → 2
        - Chandra X-ray Observator
        - Chandra Source Catalog

no preview

**Chandra Source Catalog (more...)**  
*Coverage unknown (no available MOC)*

In view

[cxc.harvard.edu/csc.siap \(more...\)](http://cxc.harvard.edu/csc.siap) ⓘ ⓘ Load Close



# Load one Chandra image from the SIA result

Aladin v9.6 \*\*\* PROTOTYPE VERSION (based on v9.623) \*\*\*

File Edit Image Catalog Overlay Coverage Tool View Interop Help

Data access → 2 / 19697 Location 12:45:09.80 -00:27:10.7 Frame ICRS Projection Aitoff

DSS SDSS 2MASS WISE GALEX PLANCK AKARI XMM Fermi Gaia Simbad NED +

ons → 2 / 19697 supervised → 2 / 2163 Image by SIA → 2 / 244 cxc.harvard.edu → 2 Chandra X-ray Observatory Data Archive Chandra Source Catalog

**CDS/P/DSS2/color** **xcatdb/P/XMM/PN/color**

**CDS/P/GALEXGR6/AIS/color** **IMAGE[0]**

30" 2.059' x 1.659' 30" 2.059' x 1.659' 30" 2.059' x 1.659' 1' 19.94' x 16.07'

http://cdftp.cfa.harvard.edu/cgi-bin/chaser\_ftp\_rel  
cxc.harvard.edu/cda/siap  
CDS/N/148/morx via Xmatch  
CDS/N/134/anxa by MOC  
IMOCs  
CDS/Simbad  
 CDS/P/GALEXGR6/AIS/color  
 xcatdb/P/XMM/PN/color  
 CDS/P/DSS2/color

epoch size dens. opac. zoom

grid study wink north hdr multiwv match This source at the reticle location Search

imgscale	imgfmt	acore	filesize	obsid	exptime	bandlo	bandhi
366666...	image/fits	<a href="#">http://cdftp.cfa.harvard.edu/cgi-bin/chaser_ftp_rel</a>	2152800	4018	4.935107...	0.2	20.0
001093...	image/fits	<a href="#">http://cdftp.cfa.harvard.edu/cgi-bin/chaser_ftp_rel</a>	495360	4018	4.935107...	0.2	20.0

select from -- My working list --

filter coll inside scan

26.67' x 35.23'