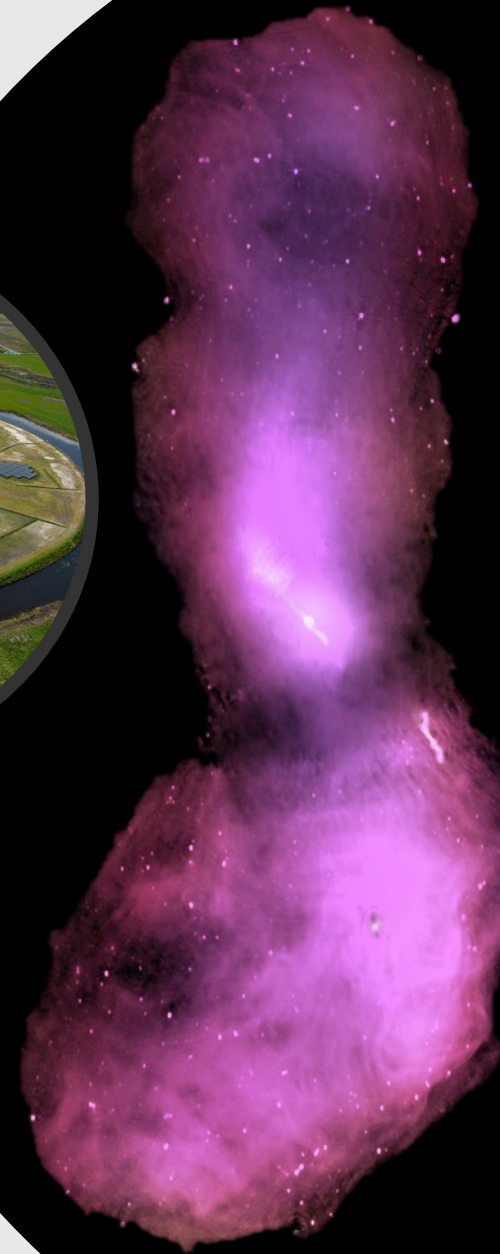# Life cycle of projects and useful data searching tools

Joe Callingham (ASTRON)

Thanks to Marcello Giroletti

Botswana Radio Astronomy School,
Palapye, Botswana
9th of July 2019

You have got the time!

› You have written a proposal and got the time after planning the observing strategy. What now?

Data release policy

› Approved observations are accessible to the proposing team for a limited period (proprietary period), after which the data become public.

› The proprietary period is usually of the order of 12 – 18 months, and can be negotiated only under exceptional circumstances.

› Data archives have a web interface and can be easily accessed

› Depending on the facility, raw or pipelined u-v data are made available. Usually pipeline products need extra messaging

That means it is accessible to anyone

ASTRON

› ATOA example (web example) but all radio telescopes have an archive (often data first have to be staged before downloaded)

That means it is accessible to anyone ASTRON

> › EVN Example (demo)

JIVE

About JIVE
JIVE management
ERIC council
News
User support
Visiting JIVE

EVN Correlator

Correlator overview
e-VLBI
Operations
Software

EVN Data Archive

Archive home →
Archive introduction
Browse catalogue
Search archive
ParselTongue

Select experiment

EVN Data Archive at JIVE

Select EVN experiment

[EM135B ⇕]

Access to EVN archive

- Show experiment EM135B

Info

- Increase of data since 2000 ⬈
- Web statistics since June 2004

Select a sourceposition from EVN experiment EM135B

Ra	Dec	Source	Image	Image
62.6900	76.9459	J0410+7656	sdss	evn
65.5917	73.6667	FRB2	sdss	evn
75.4407	71.4761	J0501+7128	sdss	evn
88.8784	39.8137	J0555+3948	sdss	evn

Access to VO archives

- Aladin Sky Atlas ⬈
- Sloan Digital Sky Survey ⬈

That means it is accessible to anyone ASTRON

FITS-finder Tool for the EVN Archive

Find FITS files in the EVN Archive matching specified selection criteria, including source name or position.

Show fields		Select values		Sort fields

Show fields

- ☑ P. Investigator
- ☑ Experiment
- ☑ Source name
- ☑ RA
- ☑ DEC
- ☑ Equinox

- ☑ Frequency
- ☐ Channel width
- ☐ Freq. channels
- ☐ Nr bands
- ☐ Bandwidth / IF
- ☐ Total Width

- ☐ File name
- ☐ File length
- ☐ File startdate
- ☐ File starttime
- ☐ File enddate
- ☐ File endtime

- ☐ Stations
- ☐ Polarization
- ☐ Integr. time
- ☐ Total time
- ☑ Observ. date

Select values

P. Investigator [Any]
Experiment [Any]
Source name [Any]
Polarization [Any]

Select stations:
"," = and
"|" = or (priority in evaluation)
E.g.: Efl|Eb|Wb,Ar|Gb

Any
Ar
Br
Cm
Eb
Ef
Fd

[Any]

Find sources in Circle ☐ Box ☐

RA (hh:mm:ss) [12:00:00]
DEC (dd:mm:ss) [00:00:00]
Radius (degr) [1]
Offset degr RA,DEC [180] [90]

Find sources in frequency range:

Any band
P-band 90,49 cm
L-band 21,18 cm
S-band 13 cm
C-band 6,5 cm
X-band 2 cm
K-band 1 cm

Min. frequency
[320] MHz

Max. frequency
[50000] MHz

[Show list] [Plot list] [Typed Input] [Info] [Defaults] [Reset]

Sort fields

- ☐ P. Investigator
- ☐ Experiment
- ☑ Source name
- ☐ RA
- ☐ DEC
- ☑ Observ. date

- ☑ Frequency
- ☐ Total Width
- ☐ Freq. channels
- ☐ Integr. time
- ☐ Total time
- ☐ Polarization

That means it is accessible to anyone ASTRON

Fitsfiles

Info | Feedback | Logfiles | Standard plots | Pipeline | Fitsfiles | Abstract

EVN fitsfiles of experiment N16C2

Access status: public

Download: Use right mousebutton -> Save target.

If the connection is slow, try GNU wget ⬈. (manual). ⬈
It can be obtained from the web, if not available.

A file selection can be made by filling in the wildcard after the -A option.
To get all fitsfiles of experiment copy next line to your commandwindow:

**wget -t45 -l1 -r -nd http://archive.jive.nl/exp/N16C2_160530/fits -A "*"**

The checksum file can be used to verify the checksum of all datafiles using:
md5sum -c n16c2.checksum (on unix systems).

Filename	Length x 10^9 bytes
n16c2.checksum ⬈	0.000000196
n16c2_1_1.IDI1 ⬈	1.937813760
n16c2_1_1.IDI2 ⬈	1.937813760
n16c2_1_1.IDI3 ⬈	1.937813760
n16c2_1_1.IDI4 ⬈	1.323100800

Published data and surveys

› Good to check published surveys and legacy projects to see if the source has already been observed

http://www.physics.purdue.edu/astro/MOJAVE/
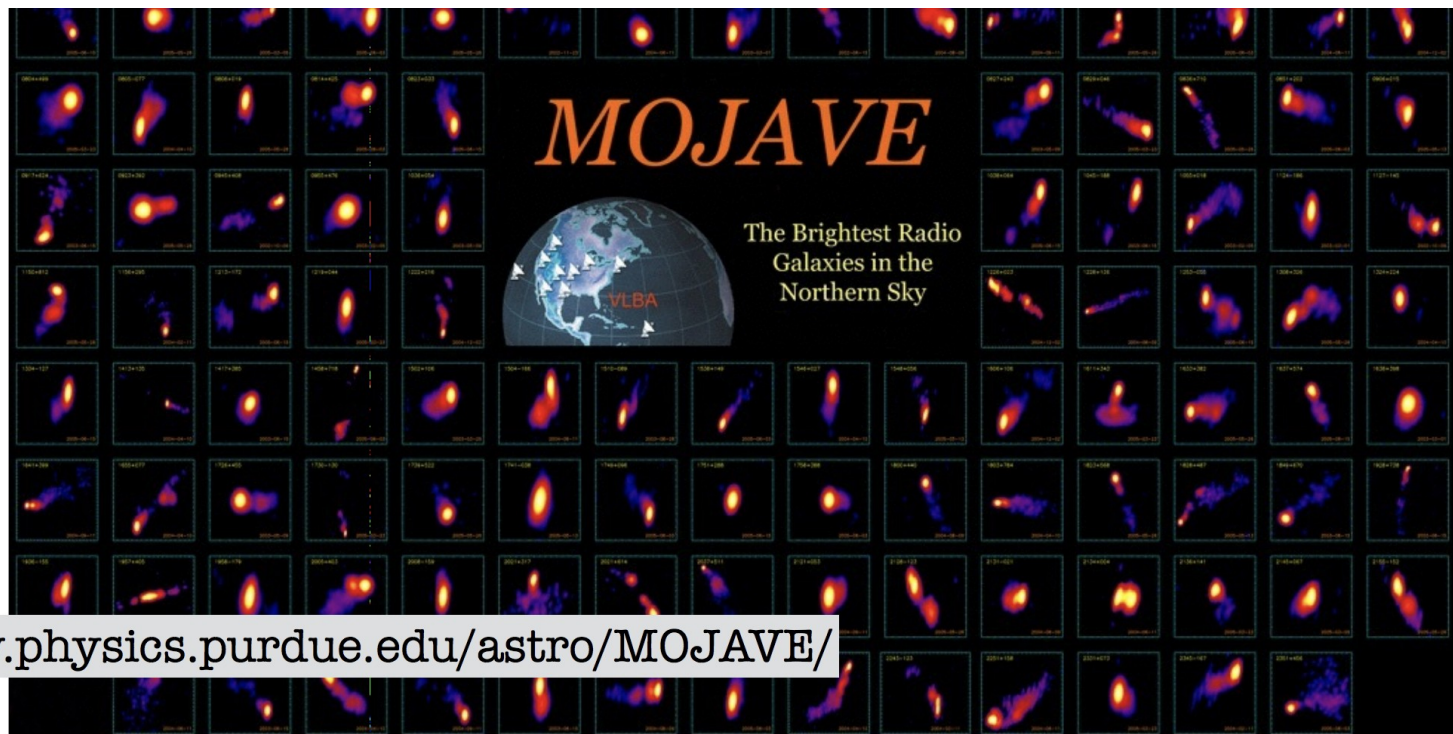
Multi-λ & multiepoch monitoring of radio loud AGNs with the VLBA at 15 GHz, huge database, whose value has become even more relevant in the Fermi-LAT era.

Published data and surveys

› Good to check published surveys and legacy projects to see if the source has already been observed

Survey	ν MHz	Ang. Res. arcsec x arcsec	Sensitivity 1σ, mJy/b	Area deg^2
NVSS VLA-D	1400	40 x 40	0.45	$\delta > -40°$, 35000
FIRST VLA-B	1400	5 x 5	0.15	$\delta > -10°$, 10000
SUMSS Molonglo	843	45 x 45cosecδ	~ 6 - 10	$\delta < -30°$, 11600
WENSS WSRT	327	54 x 54cosecδ	3.6	$\delta > 30°$, 10000
TGSS-ADR GMRT	150	20 x 20	3.5	$\delta > -53°$, 36900
VLSSr VLA-B	74	80 x 80	100	$\delta > -30°$, 30000
GLEAM MWA	72-231	120 x 120	10-15	$\delta < +30°$, 24400
LoTSS (goal)	150	5 x 5	0.1	$\delta > 0°$, 9000

Published data and surveys

› Good to check published surveys and legacy projects to see if the source has already been observed
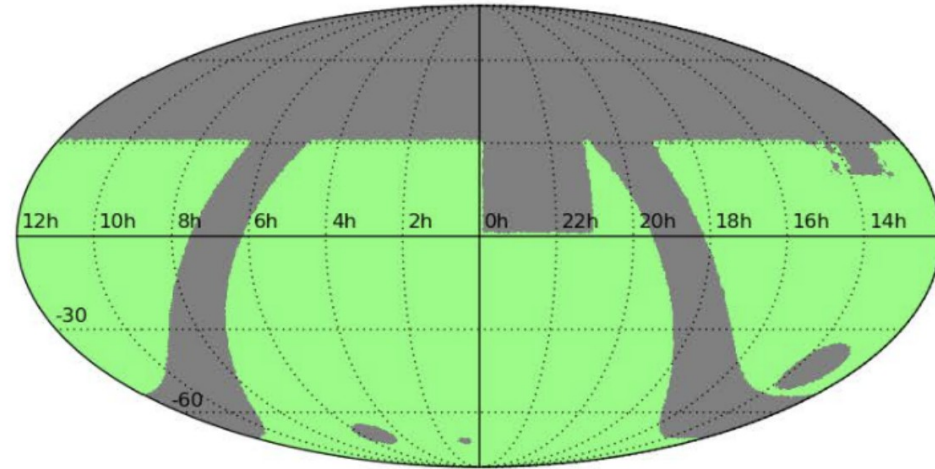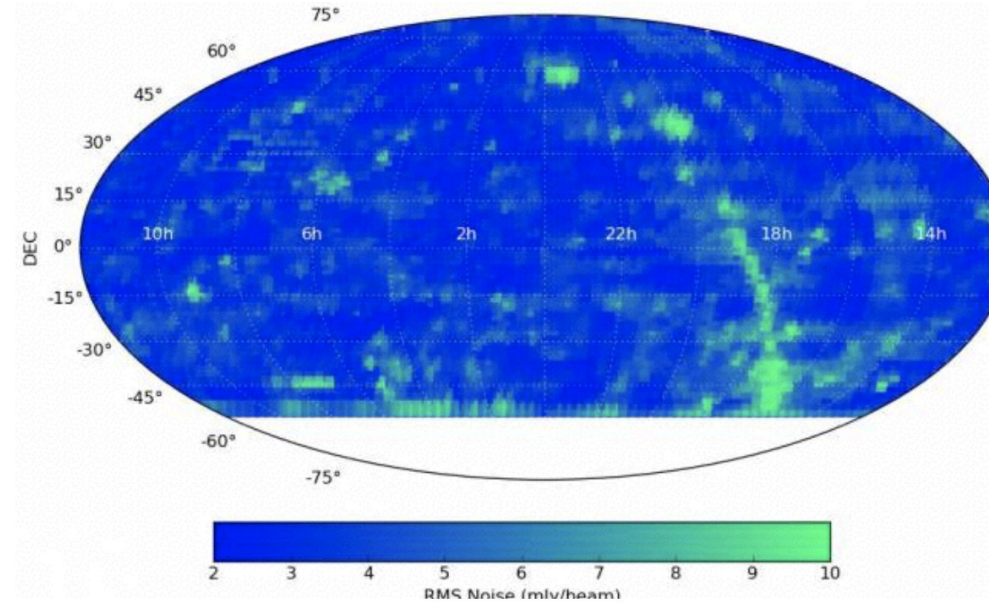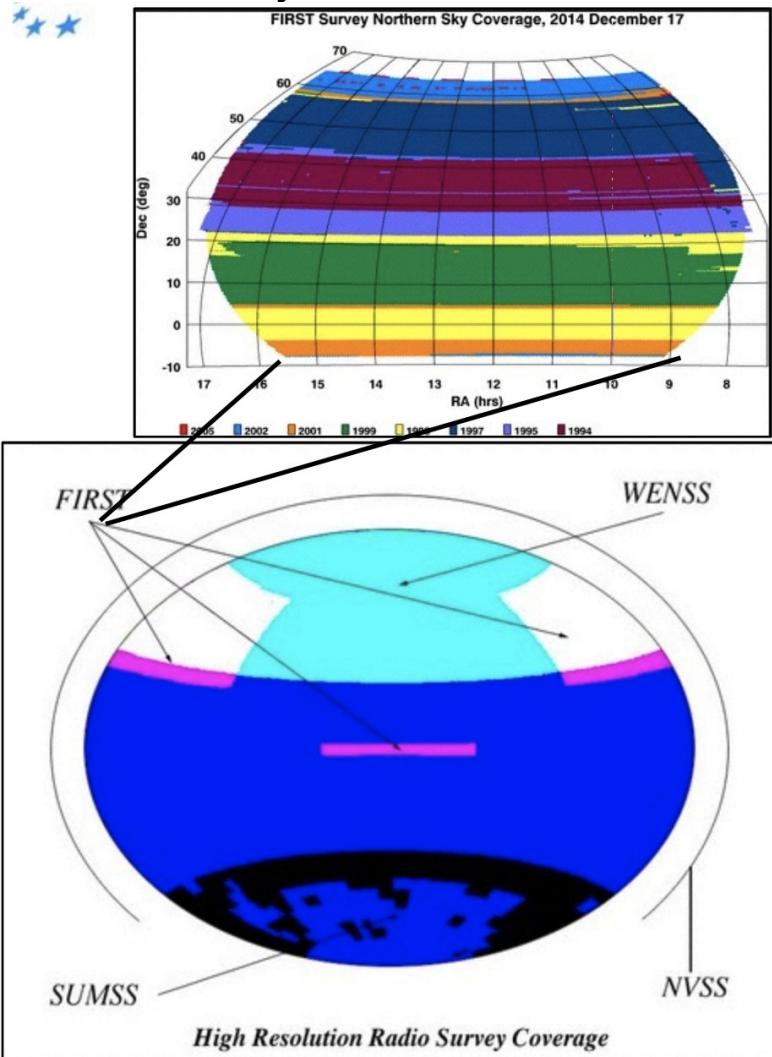
Prime example

› Imagine you have found a source you are interested (imagine you saw it double in flux density between two observations in two surveys), how can you find out extra information about it?

Public archives

› Vizier is very powerful but high-level data (demo)

Public archives

› SIMBAD gives more processed information on limited number of sources (demo)

ASTRON

SIMBAD query by identifier

other query modes : Identifier query | Coordinate query | Criteria query | Reference query | Basic query | Script submission | TAP | Output options | Help

Query an identifier

Identifier : [   ]

Examples
sirius, M31, MCG+02-60-010
How to write an identifier can be found in the dictionary of nomenclature
IAU format can also be used, with the following format:
    `iau [J|B]1230+08 [* `*enlarging-factor* `] [= `*Object-type* `]`

you can choose to query : [only this object   ▼]

around the object, define a radius : [2] [arc min ▲▼]

[submit id]   [clear]

Public archives

› The same goes for NED but is a bit more complete for radio sources that are extragalactic then SIMBAD (demo)

NASA/IPAC Extragalactic Database

Home | Search Objects » | Tools » | Services » | Information »

Object Name, coordinates with search radius, etc. | Go

**May 2019 Release Highlights**

Content additions:

- 1.7 million new object links to 1,297 references
- 25,414 new photometric measurements integrated into SEDs
- 293 H I images and 372 radio continuum images
- 0.5 million spectra from the SDSS
- Latest total counts are available here

Other improvements:

- Some known issues in the user interface resolved
- The TAP service and its documentation have been updated

In the menu bar, the links to the Classic Home Page and Level 5 are located under Services.
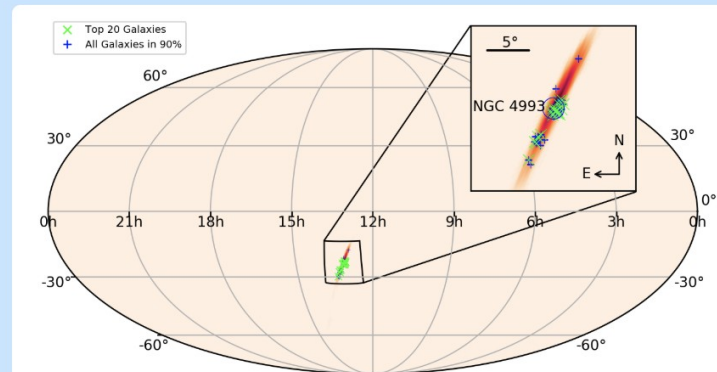
Candidate galaxies in the LIGO 90% probability volume of gravitational wave event GW170817

Literature Search

› NASA ADS is your one stop shop for all papers – links to arxiv (free versions, no download. (demo)

› Good to start with a review paper for a new field (ask colleagues)

Literature Search

› Google scholar can be good for broad searches

Google Scholar

Articles   Case law

Recommended articles

Multi-epoch Low-radio-frequency Surveys of the Kepler K2 Mission Campaign Fields 3, 4, and 5 with the Murchison Widefield Array
SJ Tingay, PJ Hancock - The Astronomical Journal, 2019

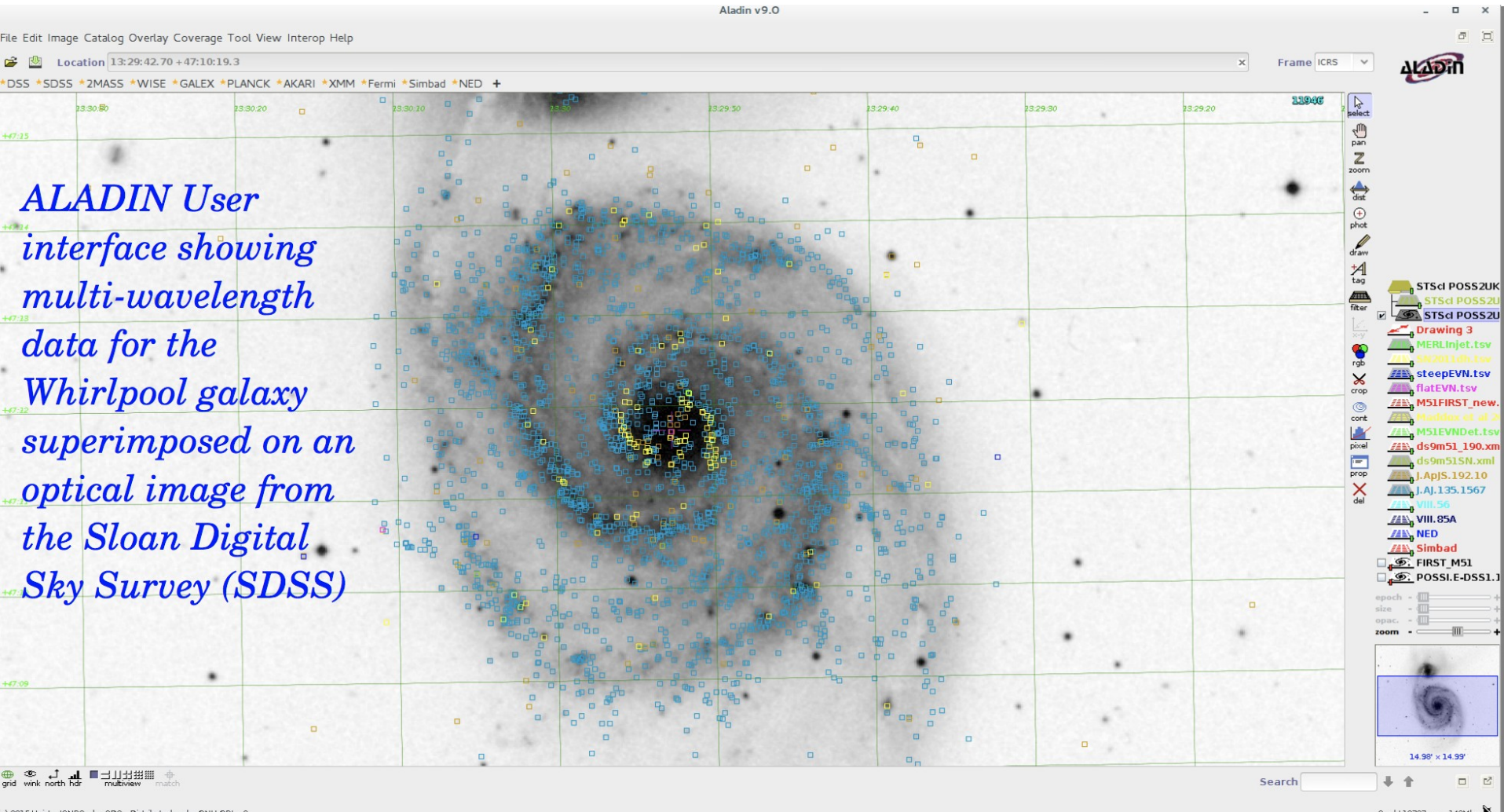**GMRT observations of extragalactic radio sources with steeply inverted spectra**
M Mhaskey, P Dabhade, S Paul, S Salunkhe… - Monthly Notices of the Royal …, 2019

See all recommendations

Stand on the shoulders of giants

Useful tools to understand data

› Aladdin (LoTSS demo)

ALADIN User interface showing multi-wavelength data for the Whirlpool galaxy superimposed on an optical image from the Sloan Digital Sky Survey (SDSS)

Useful tools to understand data
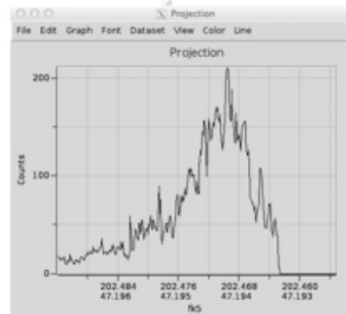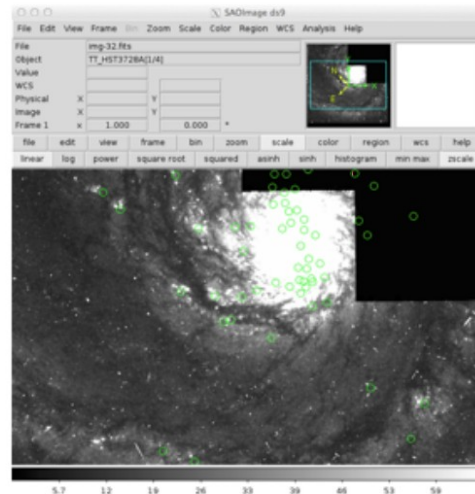

› SAODS9

GUI

False Color Images

RGB Images

3D Images

SAOImage DS9 development has been made possible by funding from the Chandra X-ray Science Center (CXC) and the High Energy Astrophysics Science Archive Center (HEASARC). Additional funding was provided by the JWST Mission office at Space Telescope Science Institute to improve capabilities for 3-D data visualization.
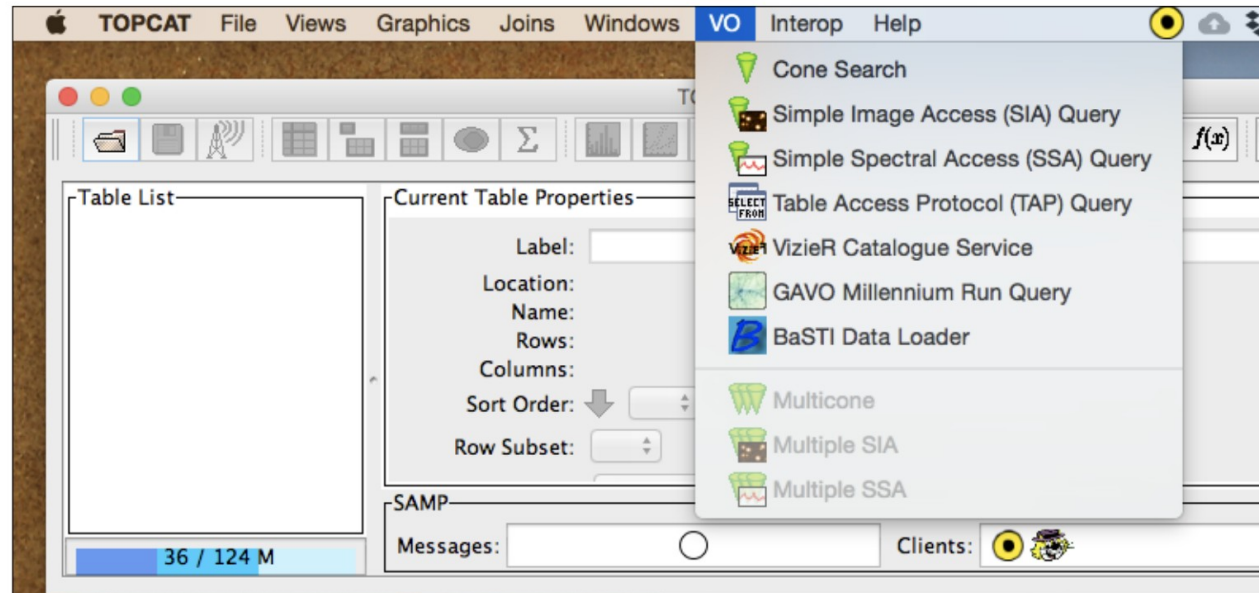
Useful tools to understand data

› Topcat

RadioNet

Tool for **OP**erations on **C**atalogues **A**nd **T**ables

- http://www.star.bris.ac.uk/~mbt/topcat/

- an interactive graphical viewer and editor for tabular data

- but also a convenient interface to **lots** of MWL archives and databases

- well documented, very powerful and easy to use

Conclusions and tips

> › Google is your friend. Typing "telescope_name + archive" will likely point you in the right direction

> › There is lots of public data out there. Start with Vizier and then refine search. Always make sure you double check the literature

> › You are a digital detective - trying to find out what we know about a source!

> › Publication is the end result of a long, (often) tiresome journey… rinse and repeat