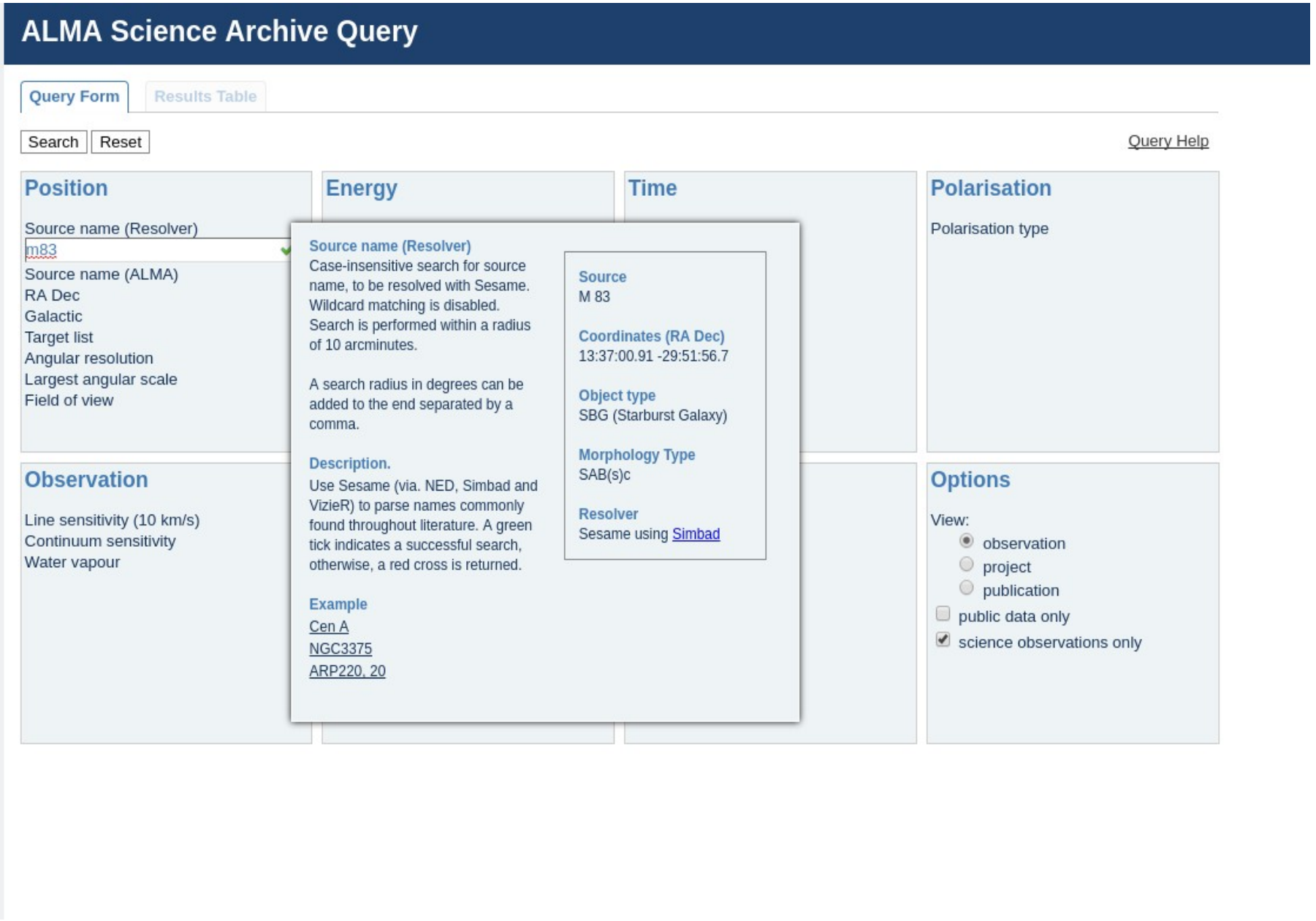
ALMA Science Archive status and plans

Felix Stoehr
ALMA Science Archive

1. Status

query


ALMA Science Archive Query
Query Form
Results Table
Search
Reset
Query Help
Position
Source name (Resolver)
m83
Source name (ALMA)
RA Dec
Galactic
Target list
Angular resolution
Largest angular scale
Field of view
Energy
Time
Polarisation
Polarisation type
Observation
Line sensitivity (10 km/s)
Continuum sensitivity
Water vapour
Options
View:
observation
project
publication
public data only
science observations only
Source name (Resolver)
Case-insensitive search for source name, to be resolved with Sesame. Wildcard matching is disabled. Search is performed within a radius of 10 arcminutes.
A search radius in degrees can be added to the end separated by a comma.
Description.
Use Sesame (via. NED, Simbad and VizieR) to parse names commonly found throughout literature. A green tick indicates a successful search, otherwise, a red cross is returned.
Example
Cen A
NGC3375
ARP220, 20
Source
M 83
Coordinates (RA Dec)
13:37:00.91 -29:51:56.7
Object type
SBG (Starburst Galaxy)
Morphology Type
SAB(s)c
Resolver
Sesame using Simbad

query

ALMA Science Archive Query

Query Form | Results Table

Search | Reset

Query Help

Position
Source name (Resolver)
Source name (ALMA)
RA Dec
Galactic
Target list
Angular resolution
Largest angular scale
Field of view

Energy
Frequency
Bandwidth
Spectral resolution
Band

Time
Observation date
Integration time

Polarisation
Polarisation type

Observation
Line sensitivity (10 km/s)
Continuum sensitivity
Water vapour

Project
Project code
Project title
PI name
Proposal authors
Project abstract
Publication count
Science keyword

gala

Active galaxies
- Active Galactic Nuclei (AGN)/Quasars (QSO)
- Galactic centres/nuclei
- High-z Active Galactic Nuclei (AGN)
- Starburst galaxies

Science keyword
null

Description
null

Publication
Bibcode
Title
First author
Authors
Abstract
Year

Options
View:
- observation
- project
- publication

public data only
science observations only

query

ALMA Science Archive Query

Query Form | Results Table

Search | Reset | Query Help

Position

Source name (Resolver)
Source name (ALMA)
RA Dec
Galactic
Target list
Choose File targets.txt
Angular resolution
Largest angular scale
Field of view

Energy

Frequency
Bandwidth
Spectral resolution
Band

Time

Observation date
Integration time

Polarisation

Polarisation type

Observation

Line sensitivity (10 km/s)
Continuum sensitivity
Water vapour

Publication

Bibcode
Title
First author
Authors
Abstract
Year

Options

View:
- observation
- project
- publication

public data only
science observations only

File upload
Option to allow the use of a user-prepared text file for multi-positional searches.

Description
A text file with target names or positions can be loaded onto the server and the query is executed for each of them in turn. Constraints in the other input fields are taken into account.
Each target must be placed on a separate line, coordinate values must be separated by a tab or space(s).

Example text file with the content
M87
12:30:31.25 12:25:26.9
187.630187836999994
12.4241224771999992

query

ALMA Science Archive Query

Query Form | Results Table

Search | Reset

Query Help

Position

Source name (Resolver)
Source name (ALMA)
RA Dec
Galactic
Target list
Angular resolution
Largest angular scale
Field of view

Energy

Frequency
Bandwidth
Spectral resolution
Band

Time

Observation date
Integration time

Polarisation

Polarisation type

Observation

Line sensitivity (10 km/s)
Continuum sensitivity
Water vapour

Project

Project code
Project title
PI name
Proposal authors
Project abstract
Publication count
0
Science keyword

Publication

Bibcode
Title
First author
Authors
Abstract

Pub
Number of publications

Description
The number of publications that make use of data of this project. Can be used to find unpublished data.

Example
0
> 10

Options

View:
- observation
- project
- publication

public data only
science observations only

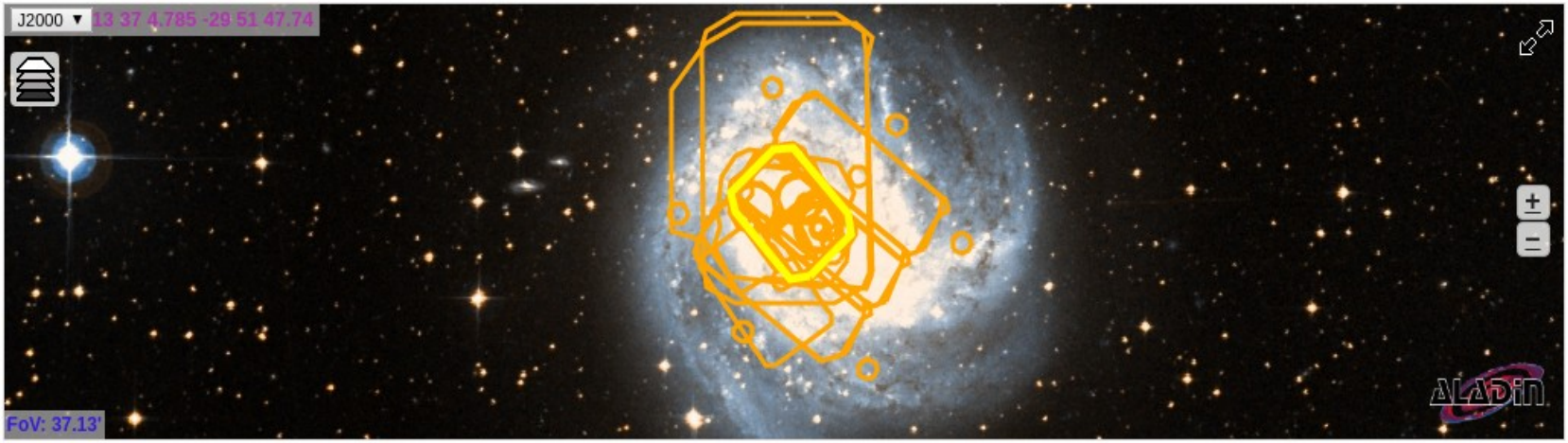
query

ALMA Science Archive Query

Query Form | Results Table

Submit download request

Results Bookmark Export Table Results Help



More columns Showing 55 of 55 rows.

	Project code	Source name	RA	Dec	Band	Integration	*Release date* ▲	Velocity resolution	Frequency support	Pub
Filter:			H:M:S ▼	D:M:S ▼		seconds ▼		m/s ▼		
☐	2011.0.00772.S	M83	13:37:04.79	-29:51:47.7	3	894.219	2013-09-28	1354.73	100.63..115.38GHz	1
☐	2012.1.00762.S	m83	13:37:04.54	-29:50:23.4	3	605.018	2015-05-16	2712.97	99.91..115.54GHz	1
☐	2013.1.01312.S	M83	13:37:03.89	-29:51:37.0	3	1783.466	2016-05-09	4459.43	85.65..101.40GHz	1
☐	2013.1.01312.S	M83	13:37:04.19	-29:51:40.0	3	6118.062	2016-06-04	4460.90	85.58..101.44GHz	1
☐	2013.1.01161.S	M83	13:37:00.74	-29:51:57.9	6	18.678	2016-07-31	2458.27	229.33..247.15GHz	0
☐	2013.1.01161.S	M83	13:37:00.75	-29:51:58.0	6	59.343	2016-07-31	2458.25	229.27..247.21GHz	0
☐	2013.1.00889.S	M83	13:37:05.50	-29:51:23.6	3	665.280	2016-08-05	5639.34	95.91..111.56GHz	0
☐	2013.1.00889.S	M83	13:37:05.50	-29:51:23.6	3	3821.511	2016-08-05	6355.26	84.55..100.11GHz	0

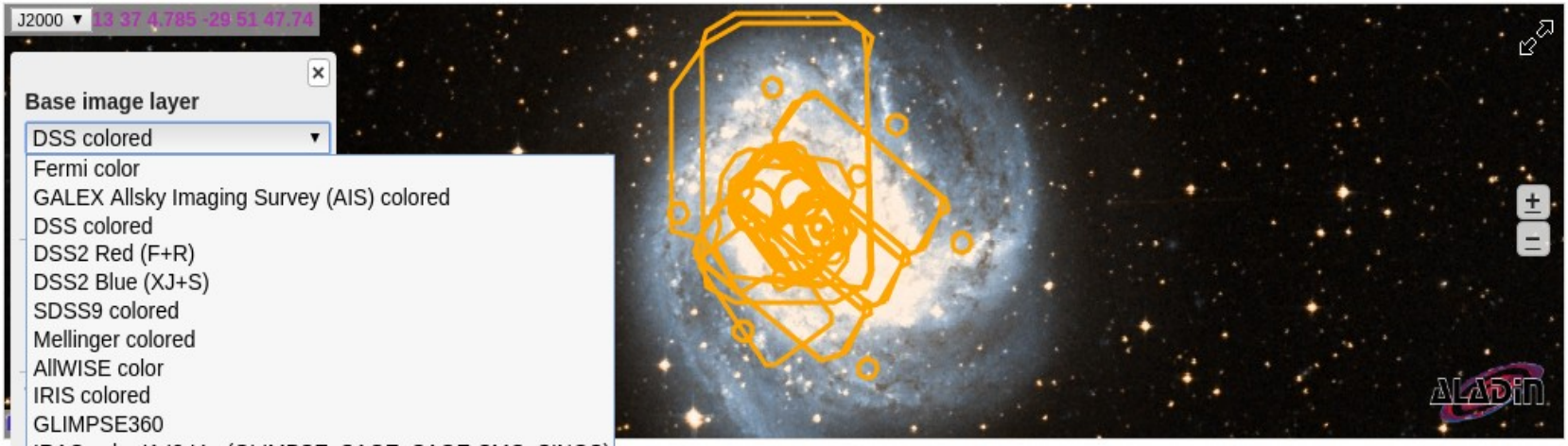
query

ALMA Science Archive Query

Query Form | Results Table

Submit download request

Results Bookmark | Export Table | Results Help



					Band	Integration	*Release date*	Velocity resolution	Frequency support	Pub
						seconds ▼		m/s ▼		
				9:51:47.7	3	894.219	2013-09-28	1354.73	100.63..115.38GHz	1
				9:50:23.4	3	605.018	2015-05-16	2712.97	99.91..115.54GHz	1
☐	2013.1.01312.S	M83	13:37:03.89	-29:51:37.0	3	1783.466	2016-05-09	4459.43	85.65..101.40GHz	1
☐	2013.1.01312.S	M83	13:37:04.19	-29:51:40.0	3	6118.062	2016-06-04	4460.90	85.58..101.44GHz	1
☐	2013.1.01161.S	M83	13:37:00.74	-29:51:57.9	6	18.678	2016-07-31	2458.27	229.33..247.15GHz	0
☐	2013.1.01161.S	M83	13:37:00.75	-29:51:58.0	6	59.343	2016-07-31	2458.25	229.27..247.21GHz	0
☐	2013.1.00889.S	M83	13:37:05.50	-29:51:23.6	3	665.280	2016-08-05	5639.34	95.91..111.56GHz	0
☐	2013.1.00889.S	M83	13:37:05.50	-29:51:23.6	3	3821.511	2016-08-05	6355.26	84.55..100.11GHz	0

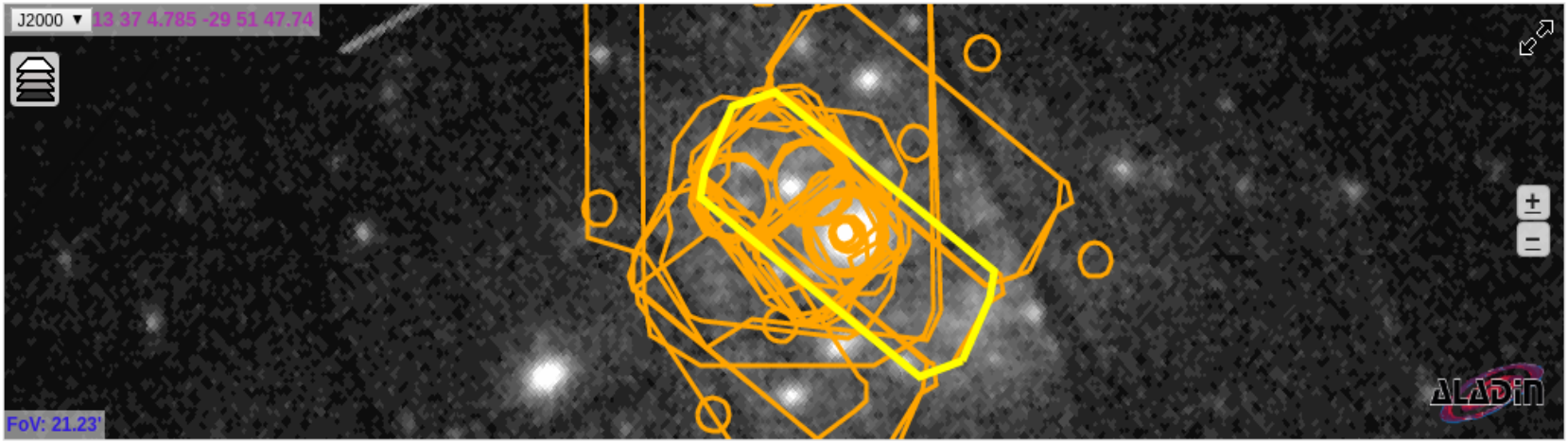
query

ALMA Science Archive Query

Query Form | Results Table

Submit download request

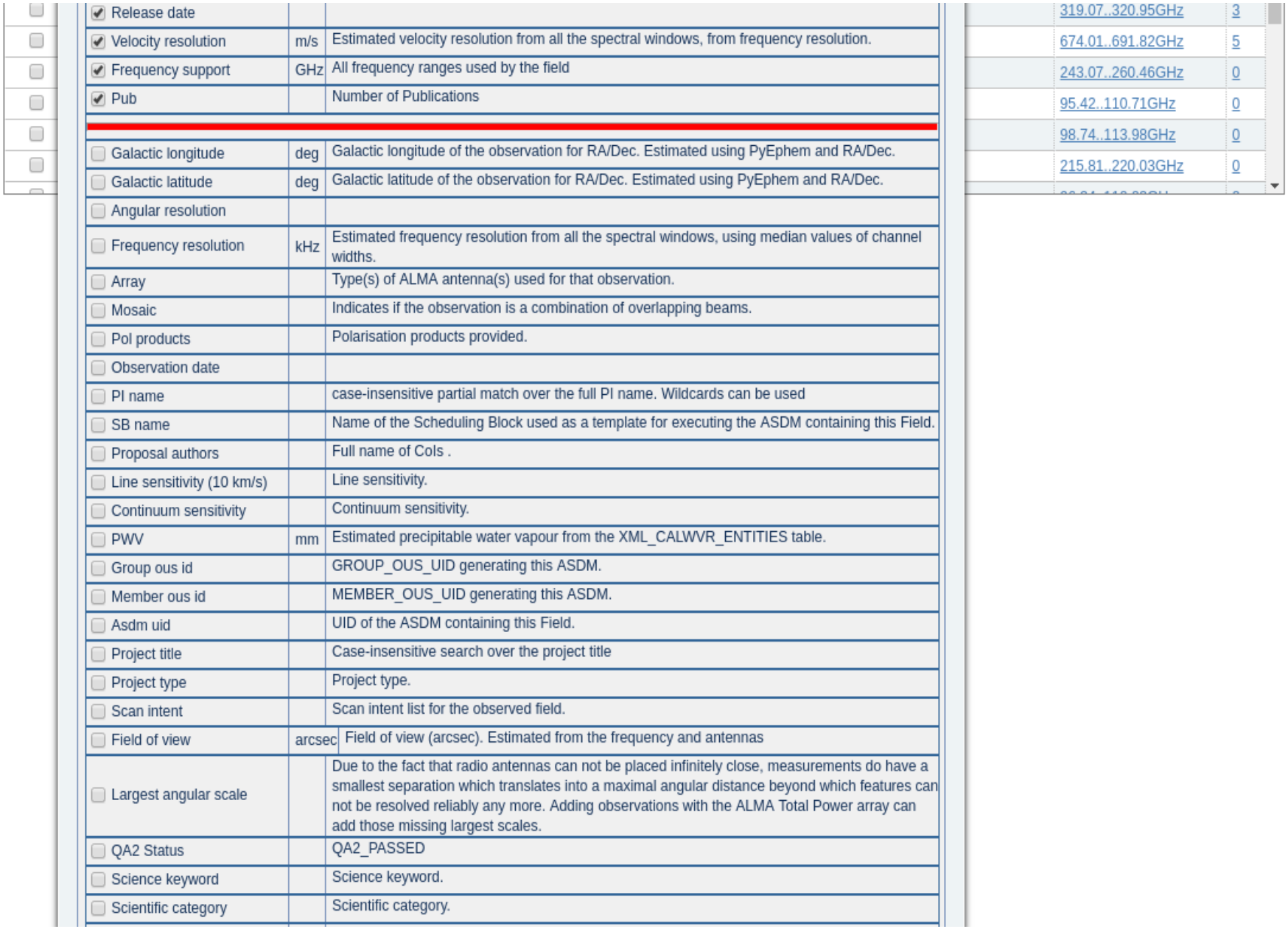
Results Bookmark | Export Table | Results Help



More columns | Showing 55 of 55 rows.

	Project code	Source name	RA	Dec	Band	Integration	*Release date* ▲	Velocity resolution	Frequency support	Pub
Filter:			H:M:S ▼	D:M:S ▼		seconds ▼		m/s ▼		
☐	2011.0.00772.S	M83	13:37:04.79	-29:51:47.7	3	894.219	2013-09-28	1354.73	100.63..115.38GHz	1
☐	2012.1.00762.S	m83	13:37:04.54	-29:50:23.4	3	605.018	2015-05-16	2712.97	99.91..115.54GHz	1
☐	2013.1.01312.S	M83	13:37:03.89	-29:51:37.0	3	1783.466	2016-05-09	4459.43	85.65..101.40GHz	1
☐	2013.1.01312.S	M83	13:37:04.19	-29:51:40.0	3	6118.062	2016-06-04	4460.90	85.58..101.44GHz	1
☐	2013.1.01161.S	M83	13:37:00.74	-29:51:57.9	6	18.678	2016-07-31	2458.27	229.33..247.15GHz	0
☐	2013.1.01161.S	M83	13:37:00.75	-29:51:58.0	6	59.343	2016-07-31	2458.25	229.27..247.21GHz	0
☐	2013.1.00889.S	M83	13:37:05.50	-29:51:23.6	3	665.280	2016-08-05	5639.34	95.91..111.56GHz	0
☐	2013.1.00889.S	M83	13:37:05.50	-29:51:23.6	3	3821.511	2016-08-05	6355.26	84.55..100.11GHz	0

query



Release date		
Velocity resolution	m/s	Estimated velocity resolution from all the spectral windows, from frequency resolution.
Frequency support	GHz	All frequency ranges used by the field
Pub		Number of Publications
Galactic longitude	deg	Galactic longitude of the observation for RA/Dec. Estimated using PyEphem and RA/Dec.
Galactic latitude	deg	Galactic latitude of the observation for RA/Dec. Estimated using PyEphem and RA/Dec.
Angular resolution		
Frequency resolution	kHz	Estimated frequency resolution from all the spectral windows, using median values of channel widths.
Array		Type(s) of ALMA antenna(s) used for that observation.
Mosaic		Indicates if the observation is a combination of overlapping beams.
Pol products		Polarisation products provided.
Observation date		
PI name		case-insensitive partial match over the full PI name. Wildcards can be used
SB name		Name of the Scheduling Block used as a template for executing the ASDM containing this Field.
Proposal authors		Full name of CoIs .
Line sensitivity (10 km/s)		Line sensitivity.
Continuum sensitivity		Continuum sensitivity.
PWV	mm	Estimated precipitable water vapour from the XML_CALWVR_ENTITIES table.
Group ous id		GROUP_OUS_UID generating this ASDM.
Member ous id		MEMBER_OUS_UID generating this ASDM.
Asdm uid		UID of the ASDM containing this Field.
Project title		Case-insensitive search over the project title
Project type		Project type.
Scan intent		Scan intent list for the observed field.
Field of view	arcsec	Field of view (arcsec). Estimated from the frequency and antennas
Largest angular scale		Due to the fact that radio antennas can not be placed infinitely close, measurements do have a smallest separation which translates into a maximal angular distance beyond which features can not be resolved reliably any more. Adding observations with the ALMA Total Power array can add those missing largest scales.
QA2 Status		QA2_PASSED
Science keyword		Science keyword.
Scientific category		Scientific category.

319.07..320.95GHz	3
674.01..691.82GHz	5
243.07..260.46GHz	0
95.42..110.71GHz	0
98.74..113.98GHz	0
215.81..220.03GHz	0

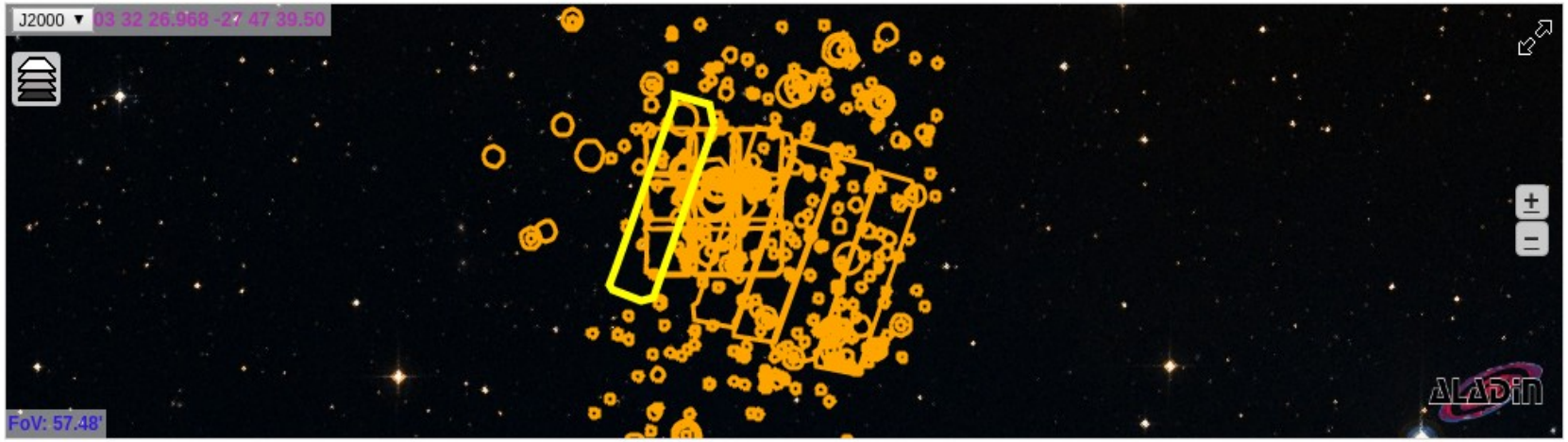
query

ALMA Science Archive Query

Query Form | Results Table

Submit download request

Results Bookmark Export Table Results Help



More columns Showing 466 of 466 rows.

	Project code	Source name	RA	Dec	Band	Integration	Frequency support	Pub	Array	Mosaic
Filter:			H:M:S ▼	D:M:S ▼		seconds ▼				
	2015.1.00098.S	HUDF-JVLA-ALMA	03:32:31.37	-27:48:36.1	6	199.204	244.12..263.00GHz	0	12m	mosaic
	2015.1.00098.S	HUDF-JVLA-ALMA	03:32:31.33	-27:45:29.1	6	175.767	244.12..263.00GHz	0	12m	mosaic
☐	2015.1.00543.S	GOODS-S	03:32:13.06	-27:49:34.6	6	52.416	254.90..274.90GHz	0	12m	mosaic
☐	2015.1.00543.S	GOODS-S	03:32:19.84	-27:49:02.4	6	78.624	254.90..274.90GHz	0	12m	mosaic
☐	2015.1.00543.S	GOODS-S	03:32:46.96	-27:46:53.1	6	78.624	254.90..274.90GHz	0	12m	mosaic
☐	2015.1.00543.S	GOODS-S	03:32:33.40	-27:47:57.8	6	26.208	254.90..274.90GHz	0	12m	mosaic
☐	2015.1.00543.S	GOODS-S	03:32:26.62	-27:48:30.1	6	52.416	254.90..274.90GHz	0	12m	mosaic
☐	2013.1.00718.S	UDF1	03:32:37.90	-27:46:25.0	6	712.931	223.29..242.03GHz	7	12m	mosaic

query

ALMA Request Handler

Anonymous User: Request #799186885 ✓

Request Title: Click to edit

Download Selected

☑ readme ☑ product ☐ raw ☐ raw (semipass)

Project / OUSet / Executionblock	File	Size	Accessible
Request 799186885			
Project 2013.1.00889.S			
☑ readme	2013.1.00889.S.readme.txt		
Science Goal OUS uid://A001/X144/X158			
Group OUS uid://A001/X144/X159			
Member OUS uid://A001/X144/X15a			
SB M83_b_03_TE			
Source M83			
☑ product	2013.1.00889.S_uid___A001_X144_X15a_001_of_001.tar	1.1GB	✓
☐ raw	2013.1.00889.S_uid___A002_Xa0b40d_X21a7.asdm.sdm.tar	15.3GB	✓
Project 2013.1.01161.S			
☑ readme	2013.1.01161.S.readme.txt		
Science Goal OUS uid://A001/X12f/X323			
Group OUS uid://A001/X12f/X324			
Member OUS uid://A001/X12f/X325			
SB M83_a_06_TE			
☑ product	2013.1.01161.S_uid___A001_X12f_X325_001_of_001.tar	1.6GB	✓
☐ raw	2013.1.01161.S_uid___A002_Xa055bc_X595.asdm.sdm.tar	17.0GB	✓
Member OUS uid://A001/X12f/X327			
SB M83_a_06_TC			
☑ product	2013.1.01161.S_uid___A001_X12f_X327_001_of_001.tar	879.6MB	✓
☐ raw	2013.1.01161.S_uid___A002_X984bbe_X2804.asdm.sdm.tar	13.2GB	✓
Member OUS uid://A001/X12f/X329			
SB M83_a_06_7M			
☑ product	2013.1.01161.S_uid___A001_X12f_X329_001_of_001.tar	86.7MB	✓
☐ raw	2013.1.01161.S_uid___A002_X85ade7_Xc2e.asdm.sdm.tar	1.7GB	✓
☐ raw	2013.1.01161.S_uid___A002_X9a9a13_X13cd.asdm.sdm.tar	1.1GB	✓
Member OUS uid://A001/X12f/X32b			

progress

- The most important change:
  - **collapsed rows**: e.g. we now **compute and then show 1 single row for mosaic** including correctly estimated values like average integration time within the mosaic and the computation of footprints
  - Ground work for ingesting **individual files**

- More progress
  - **Scientific keywords** (from the OT) and **scientific categories**
  - search on **publications** (count!, abstracts!, authors, title, bibcode):
    - “show me all public unpublished data”
    - “show me all data (or projects) used in publications which have 'molecular hydrogen' in their abstract”
    - “show me all publications from data of 'Disks around high-mass stars'”
    - display all results as **publication view**

more progress

- query on **field of view** (including for mosaics)
- query on **largest angular scale** (per Member OUS, i.e. array)
- display of the existing observations as **footprints on the sky**
- upload of a **list of targets** for simultaneous search
- interactive **change of units** (decimal degrees/sexagezimal, m/s→km/s, …) on the results table
- query on **continuum sensitivity** (estimated from the raw data)
- query on **line sensitivity** @10km/s (estimated from the raw data)
- query on **Co-Is** (after the call)
- query on **scientific keywords** and **categories**

even more progress

- subfiltering on **mosaics** vs single pointings
- subfiltering on **array-types** (12m, 7m, TP)
- subfiltering on QA2 status

- The ALMA Science Archive then has **more and better query input fields** than

  HST (https://archive.stsci.edu/hst/search.php), XMM (http://nxsa.esac.esa.int), HLA (hla.stsci.edu), ESO (http://archive.eso.org), VLA (https://archive.nrao.edu/archive/advquery.jsp), Chandra (http://cda.harvard.edu/chaser/), Keck (https://koa.ipac.caltech.edu/cgi-bin/KOA/nph-KOAlogin?more), CARMA (http://carma-server.ncsa.uiuc.edu:8181/asp/carmaQuery.cgi), Herschel (http://www.cosmos.esa.int/web/herschel/science-archive), CADC (http://www.cadc-ccda.hia-iha.nrc-cnrc.gc.ca/en/search/), GEMINI (https://archive.gemini.edu/searchform), LOFAR (http://lofar.target.rug.nl/), GALEX (http://galex.stsci.edu/galexview/), APEX (http://archive.eso.org/wdb/wdb/eso/apex/form), EVN (http://archive.jive.nl/scripts/avo/fitsfinder.php), eMerlin (http://www.merlin.ac.uk/archive/archive_form.html), SUBARU (http://smoka.nao.ac.jp/fssearch.jsp), GTC (http://gtc.sdc.cab.inta-csic.es/gtc/jsp/searchform.jsp), SMA (https://www.cfa.harvard.edu/cgi-bin/sma/smaarch.pl), **…**

even more progress

- Request-Handler:
  - product categories can be selected
  - complete tree is displayed
  - SB names and Source names now available directly on the RH before download
  - readme file with the content and the full directory names

2. plan

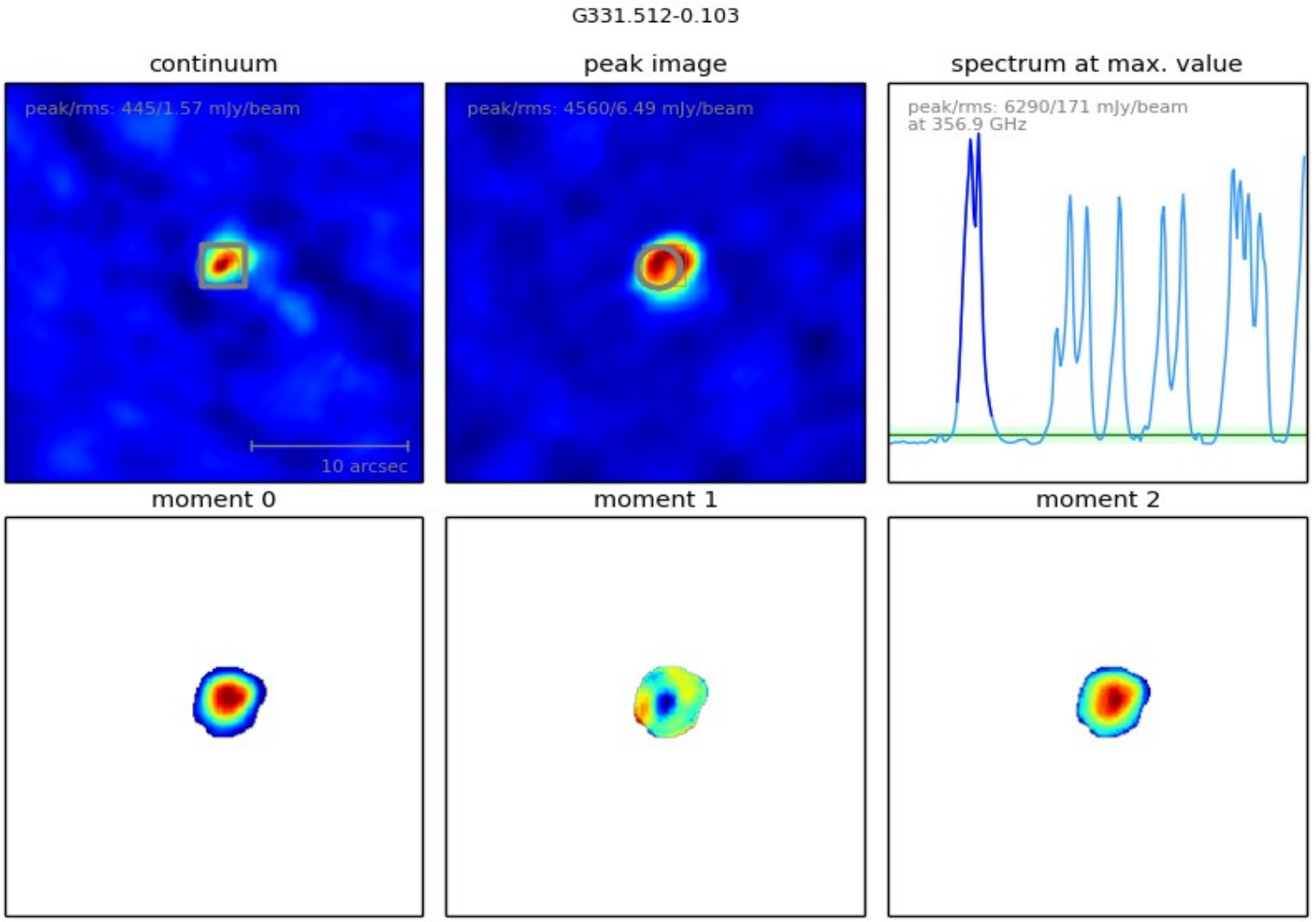
5-year plan

	Title	Description	Components	Expected/proposed deployment	Priority
1	query interface improvements	abstract display and search, largest angular scale search	AQ	Q1 2016	1
2	row collapsing	computing “collapsed rows” from the raw data metadata resulting in rows	Harvester	Q3 2016	2
3	query interface improvements 2	showing of collapsed rows only, bibliography search, result list streaming	AQ	Q3 2016	3
4	individual product ingestion	ingest new files from pipeline and manual reduction individually rather than in tar files allowing to also offer individual access of products (FITS cubes, weblog, README, ...)	PipelineIngestion, Harvester, DP	Q3 2016	4
5	query interface improvements 3	access to individual files, previews	AQ	Q1 2017	5
6	VO+cutout services	ObsTAP, SIAPv2, DataLink, cutout using DataAccess	AQ, RH, NGAS, DP	Q3 2017	6
7	ADMIT integration 1	inclusion of ADMIT into the workflow and ingestion of ADMIT products and their delivery	PipelineIngestion, RH, DP	Q3 2017	7
8	user reprocessing	service to allow users to execute a modified pipeline (or MS generation, or calibrator data extraction) on the ARC clusters	AQ, RH, DP	Q1 2018	8
8	CARTA integration	allow users to visualize large ALMA cubes remotely through their browsers	AQ, RH, NGAS, Clusters	Q3 2018	9
10	query interface improvements 4	solar system object search, ultra-fast query engine, facets/histograms, AladinLite with footprint display	AQ	Q3 2018	10
11	ADMIT integration 2	Ingestion of identified sources and lines	ProductIngestion, Harvester, DP, RH	Q1 2019	11
12	query interface improvements 5	search capabilities for individual ADMIT results	AQ	Q1 2019	12
13	Ingestion of external products 1	allow FITS cubes, README files and tar files producted by the PIs of LPs to be ingested. Potentially allow for the addition of links to external resources (e.g. zenodo.org)	RH, DP, Product Ingestion	Q1 2020	13
14	Ingestion of external products 2	display the LP products and allow for individuall downloads of FITS and README (maybe more)	AQ	Q1 2020	14
15	query interface improvements 6	recommender system for data and publications	AQ, RecommenderSystem?	Q3 2020	15

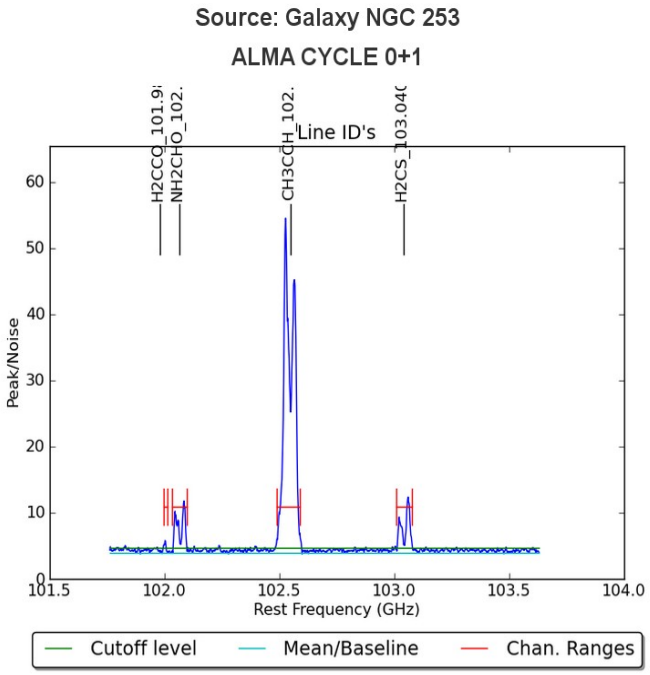
5-year plan

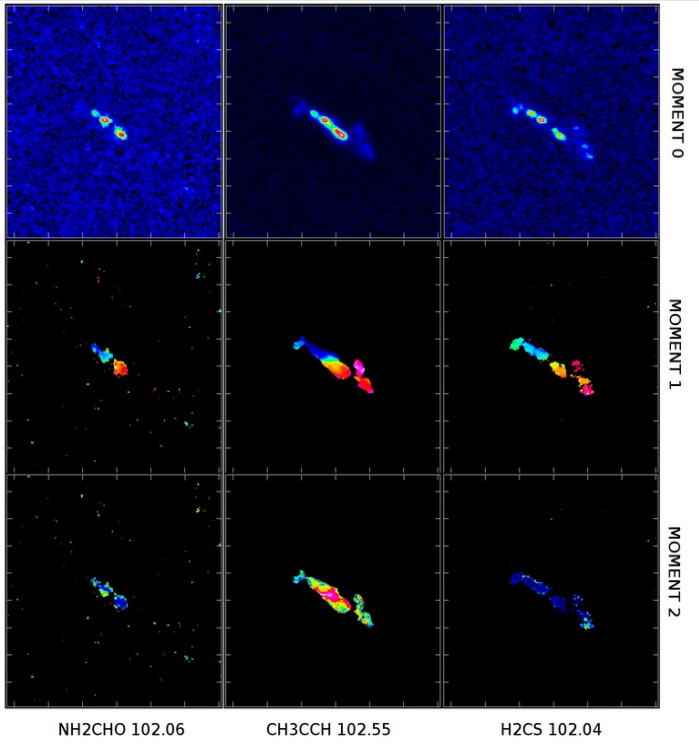
- Ingestion of individual files
- Interface improvements
- VO services
- Generation and display of previews
- ADMIT integration into the workflow
- CARTA visualization solution integration
- Remote user reprocessing (PPI)
- ...

previews


G331.512-0.103
continuum
peak/rms: 445/1.57 mJy/beam
10 arcsec
peak image
peak/rms: 4560/6.49 mJy/beam
spectrum at max. value
peak/rms: 6290/171 mJy/beam
at 356.9 GHz
moment 0
moment 1
moment 2

ADMIT

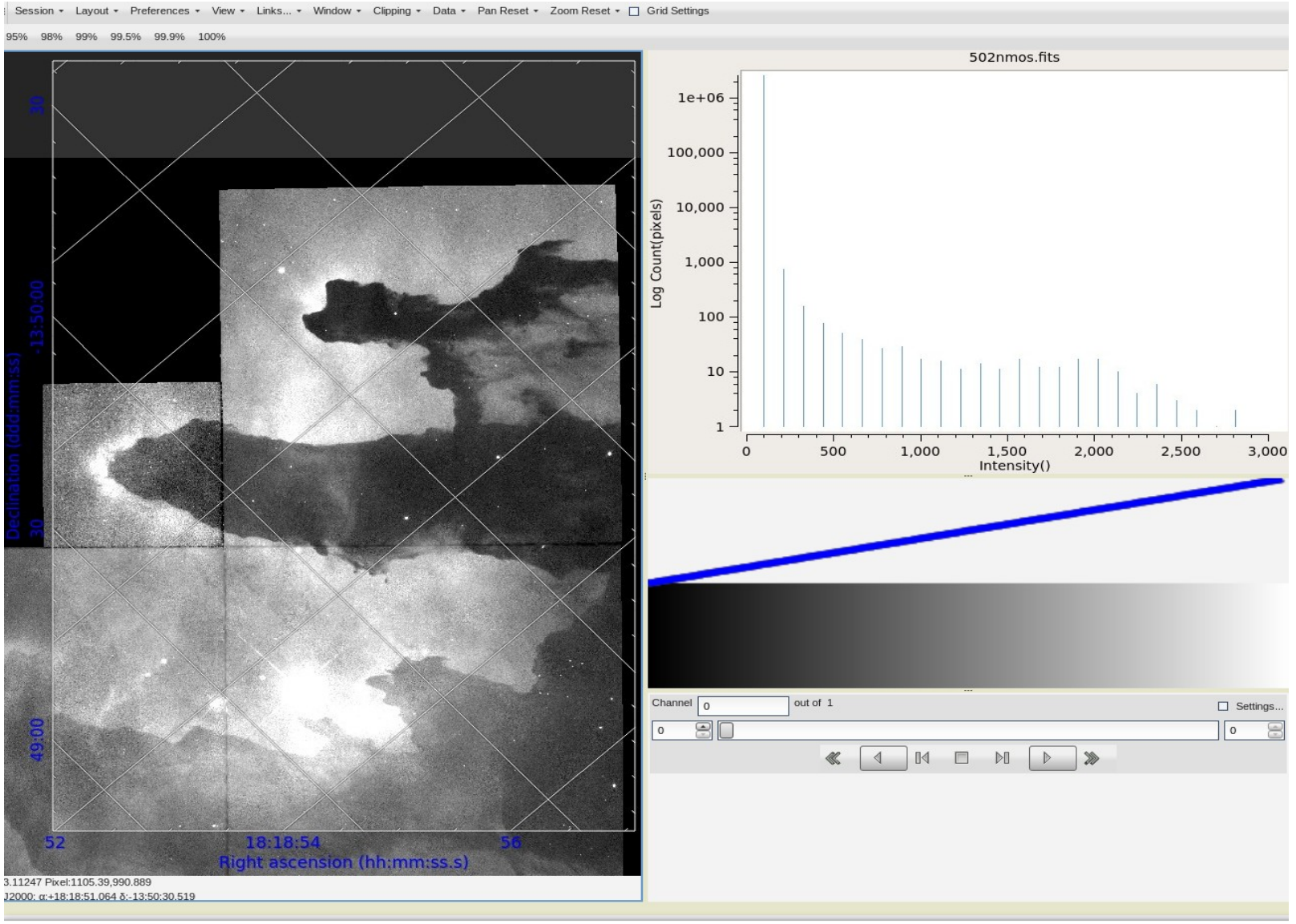




Identified lines

frequency	formula	transition	velocity	fwhm	startchan	endchan
101.98143	H2CCO	5(1,4)-4(1,3)	2.938E+02	2.413E+01	828	836
102.06427	NH2CHO	5(1,5)-4(1,4)	2.382E+02	2.354E+02	783	816
102.54798	CH3CCHv=0	6(0)-5(0)	2.300E+02	2.343E+02	532	583
103.04055	H2CS	3(0,3)-2(0,2)	2.359E+02	2.332E+02	283	318

CARTA


Session
Layout
Preferences
View
Links...
Window
Clipping
Data
Pan Reset
Zoom Reset
Grid Settings
95%
98%
99%
99.5%
99.9%
100%
502nmos.fits
Log Count(pixels)
Intensity()
Declination (ddd:mm:ss)
Right ascension (hh:mm:ss.s)
18:18:54
Channel
out of 1
Settings...

3. products

products

- **data-management problems**
  - still very large amounts of **manual data reduction** required
  - Pipeline **not ready** for science-grade imaging (but starting!)

    → amount of products is **very low**
  - only about **8% of all science channels are imaged**!
  - if calibrators are included, only about 3%

- Cycle 5: hopefully close to complete imaging (with mitigation for the product sizes for the largest 3 configurations)

- Archive **needs full, complete and generic products** from Pipeline/JAO
  - to enable/facilitate/speed up **archival research**
  - for **additional services**: previews, VO, visualization (CARTA), analysis (ADMIT)

products

- Users **want products** as recorded in the Helpdesk:
  - “Hi, I was looking at Cycle 1 band-3 data for [...]. The pipelined data has no actual image products in the products directory, only masks. With a couple of hours of expert help from [...] at the [...] ARC., we were able to edit and run the scripts and make continuum images. I just thought you'd like to know, because I would normally have given up, I just happened to be at the ARC for something else so could ask about the problem. [...]”
  - “Hello, I would like to be able to analyse the full range of observed channels in archive data. The processed cube files I found had the channels already cut, probably according to the aim of the original goal of the observations. In order to get access to the full range of channels, is it necessary to re-reduce the data from raw product, or the calibrated measurement file prior to the frequency selection is kept in the archive? if so, where can i find it? [...]”

products

- Users **want previews/products** as recorded in the UserSurvey:
  - “quick-look image or spectrum”
  - “quick look tools”
  - “To view a quick image of the data”
  - “quick look images”
  - “Easy access to clean image”
  - “Making plots. “
  - “eventually it will be great to have images available of calibrators and science targets”
  - “quick look imaging and coarsely-binned cubes.”
  - “ It would be nice to have images archive for all spectral lines”

products

- continued ...
  - “complete full cubes, complete products, not only PI targets.
  - “FITS files”
  - “images, data cubes”
  - “Imaged datasets”
  - “data cubes”
  - “quicklook images”
  - “quicklook images (but that's probably difficult to achieve)”

summary

- The ALMA Science Archive is making **huge progress**
- **Still a LOT of work** to do
- But:

For the first time, the ALMA
Science Archive starts to be competitive