

# The ALMA Proposal Preparation Process

How to get started and what to expect



Cheng-Han Hsieh

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# This talk is for you if...

- You are new to ALMA and have not yet had experience with the relevant documentation...
- You have not downloaded the ALMA Observing Tool (OT) or even know where to get it.
- You have a fabulous science case that will be essential to follow-up with ALMA facilities...
- You would like examples of science use cases for ALMA
- You were familiar with past Cycles and wonder what Cycle 9 capabilities are now available and what changes will be made before the Call for Proposals.

**This talk will be available online for reference after this workshop.**

# FINAL WARNING!!!!

## THERE IS NO SUCH THING AS A “LATE” PROPOSAL

“My internet is down...”

“My proposal won’t validate...”

“My power went out...”

“I thought the time was 16UT not 15UT...”

“My dog at my proposal...”

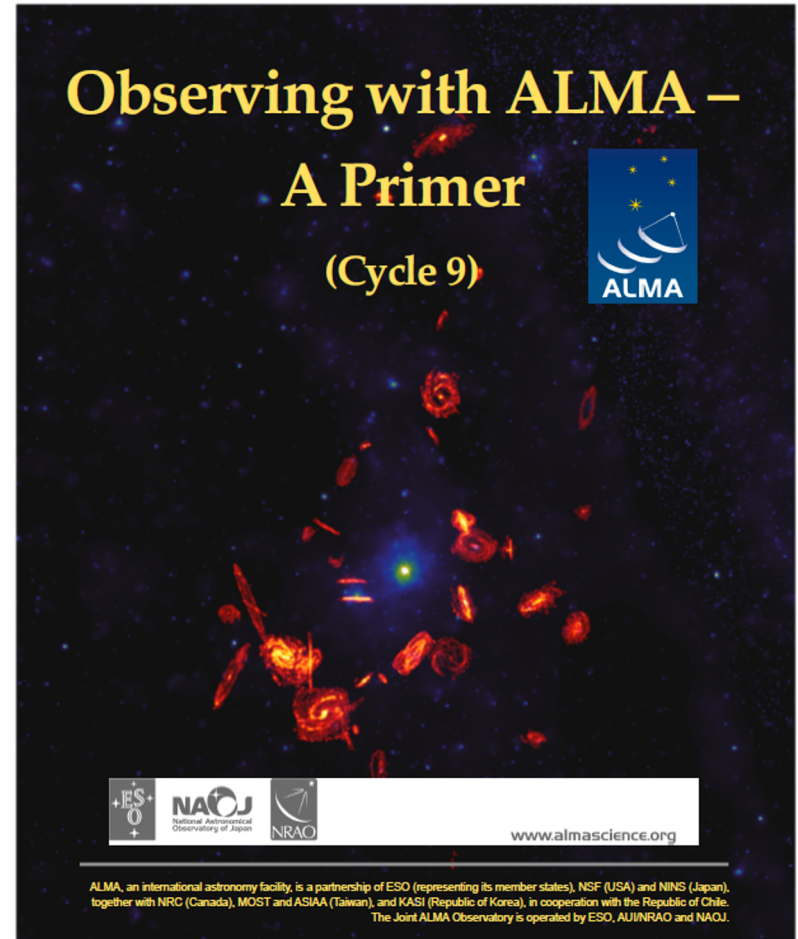
*There is no excuse for a late proposal UNLESS  
the Observatory grants an extension.*

# Proposal Checklist

- Read relevant documentation (CfP, Guide, Primer, etc.)
- Create an ALMA account by registering at the Science Portal ([almascience.org](http://almascience.org))
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  - New capabilities for Cycle 9!
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# Cycle 9 Documentation & Timeline

- Call for Proposals
- Proposer's Guide
- ALMA Primer
- *OT Guide*
- *ALMA Technical Handbook*
- Timeline for Cycle 9
  - 24 Mar – Call for Proposals
  - 21 Apr – Proposal Deadline
  - August – Results to PIs
  - Oct. 2022 – Start of Cycle 9
  - Sept. 2023 – End of Cycle 9



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# ALMA Science Portal @ NRAO

Get the OT  
Call for Proposals  
Helpdesk Support

[www.almascience.org](http://www.almascience.org)

Login  
Set preferences  
Set Expertise for DPR

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

About Science Proposing Observing Data Processing Tools Documentation Help

Science Highlight  
Normal, Dust-Obscured Galaxies in the Epoch of Reionization

REBELS-29-2  
 $z_{\text{CO}}=6.6813$

REBELS-29  
 $z_{\text{CO}}=6.6047$

REBELS-12  
 $z_{\text{CO}}=7.347$

REBELS-12-2  
 $z_{\text{CO}}=7.3523$

QA0+ results now available from SnooPI  
Jan 31, 2022

ALMA Cycle 9 Pre-Announcement  
Dec 15, 2021

ALMA Science Archive object-type search, text-based similarity search and Jupyter Notebooks  
Dec 14, 2021

Cycle 8 2021 has started!  
Oct 04, 2021

The Cycle 8 2021 ACA Supplemental Call for Proposals is now OPEN!!

Toward a More Inclusive Proposal Review Process: Outcomes from the ALMA Cycle 8 Review  
Feb 17, 2022

Community Webinar Series: (Advanced) Synthesis Imaging with CASA  
Mar 24, 2022

18th Synthesis Imaging Workshop  
May 18, 2022

The VLA Sky Survey in the Multiwavelength Spotlight  
Sep 07, 2022

ALMA Status

Configuration Schedule

Refereed publications: 2690  
Last observed source: ESO097-013  
Current configuration: C-3

Quick Links

ALMA Basics ALMA Archive

[CII] 158  $\mu\text{m}$  line and dust emission detections for (a) the REBELS-29 field at  $z=6.68$  and (b) the REBELS-12 field at  $z=7.35$ . Background images are HST F140W and VIDEO J-band, respectively.

As part of the ongoing ALMA large program REBELS (Reionization-Era Bright Emission Line Survey), 40 UV-luminous primary targets were observed at  $z > 6.5$ . Among these targets are REBELS-12 and REBELS-29. In their recent paper, Fudamoto and colleagues report

The ALMA Science Portal is a one-stop source for information and tools aimed at the scientific community as a whole, including proposers, archive researchers, ALMA staff, journalists, and funding agencies.

#### Quick Links

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[ALMA Archive](#)

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# Downloading the ALMA OT

Select the Installer or Tarball  
Installer will automatically update if there  
is a new version of the OT pushed out.

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

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## Observing Tool

The ALMA Observing Tool (OT) is a Java desktop application used for the preparation and submission of ALMA Phase 1 proposals and, for those which are accepted, Phase 2 materials (Scheduling Blocks). It is also used for preparing and submitting Director's Discretionary Time (DDT) proposals and Supplemental Call (ACA stand-alone) proposals. The current [Cycle 8 2021](#) release of the OT is configured for the present capabilities of ALMA as described in the [Cycle 8 2021 Call For Proposals](#) and the Cycle 8 Supplemental Call. Note that in order to submit proposals you will have to register with the ALMA Science Portal beforehand.

### Download & Installation

The OT should run on all common operating systems and depends on a version of Java being available. In previous releases of the OT, it was the responsibility of the user to ensure that a suitable version of Java was installed, but the Cycle 8 version of the OT will come with its own version of Java 11 and thus the user need no longer worry about their local Java installation. Unfortunately, as Java 11 does not include Web Start, this version of the OT is no longer available. (Web Start remains available for the Cycle 7 OT currently used for the submission of DDT proposals.) The Cycle 8 OT can be installed in two different ways, either with a modern installer or manually with a tarball distribution.

It is recommended that the OT be installed using the ALMA **OT Installer**. This uses a modern graphical interface to report the progress of the installation and allows the user to change various settings from their defaults, including the amount of memory the OT may use. The installation will produce an executable file that can be used to start the OT. With the loss of Web Start, automatic updates of the tool are no longer possible, but the OT will detect if an update is available at start-up and inform the user. If problems are encountered with the installer, then the tarball must be used. **The first release of the OT Installer in 2020 would not run on macOS Catalina due to security issues, but these have now been resolved and it should run correctly on all macOS releases, including Catalina and Big Sur.**

The **tarball** version must be installed manually and the instructions for doing this have not changed.

[Installer](#) [Tarball](#)

### Documentation

Extensive documentation is available to help you work with the OT and optimally prepare your proposal:

- If you are a novice OT user you should start with the [OT Quickstart Guide](#), which takes you through the basic steps of ALMA proposal preparation.
- Audio-visual illustrations of different aspects of the OT can be found in the [OT video tutorials](#). These are recommended for novices and advanced users alike.
- More in-depth information on the OT can be found in the [User Manual](#), while concise explanations of all fields and menu items in the OT are given in the [Reference Manual](#). These two documents are also available within the OT under the Help menu.

### Troubleshooting

If you have problems with the OT, particularly with installation and/or startup, please see the [troubleshooting page](#). A list of currently known bugs, their status and possible workarounds can be found on the regularly updated [known OT issues](#) page. A further source of

# OT Video Tutorials



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

About Science Proposing Observing Data Processing Tools Documentation Help

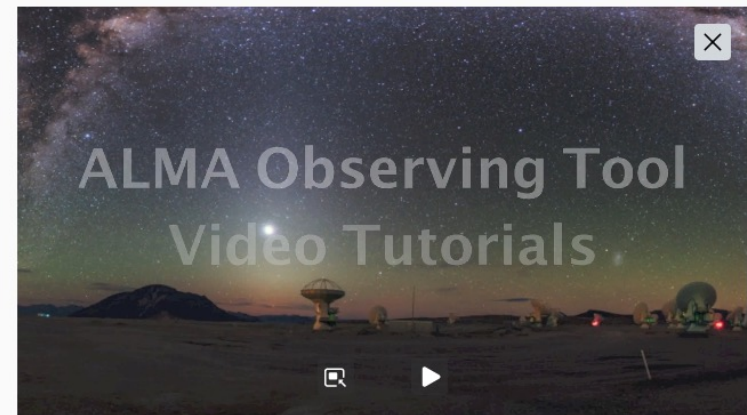
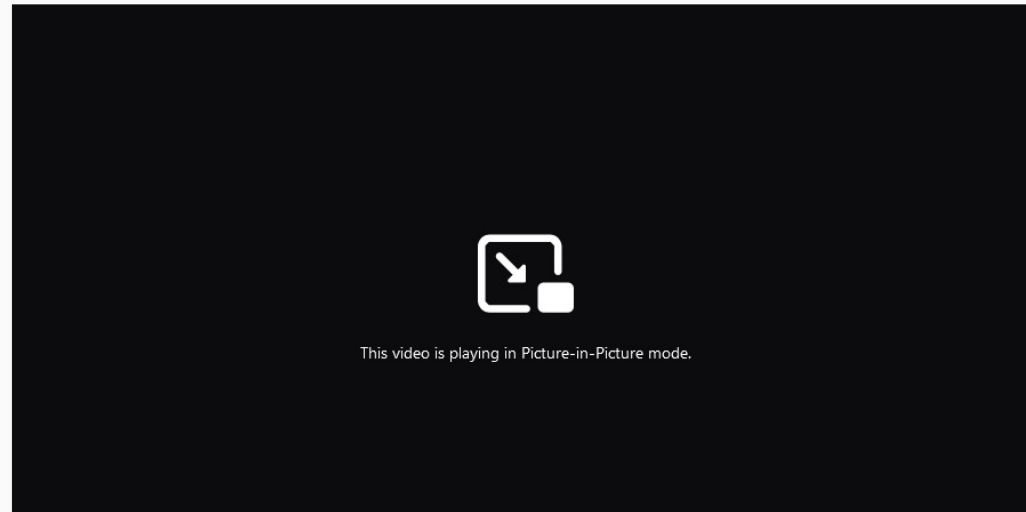
## OT Video Tutorials

**Note: the videos presently only play in the Firefox browser. We are working on a fix.**

The OT video tutorials provide an audio-visual demonstration of different aspects of proposal preparation in the OT. Novice users should start with the first video and work their way down, while more experienced users may want to jump straight to one of the special modes. The video tutorials have not been updated for some time, but continue to be available in the hope that they might prove useful. Some new features, however, will not be covered and the appearance of the OT will have undergone some changes.

### OT Video Tutorial 1: Useful to Know

This video will help you get started with the OT and introduce you to some handy tips and tricks. Topics covered include navigating the OT, using the help function, the template library, time estimation, validation, opening & submitting projects including re-submission in standard modes. Although this video is from Cycle 4, it will still give a useful introduction to the OT. Note that time constraints can now also include simultaneous 12-m and 7-m observations and re-submissions are no longer defined by the user.



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## Science Case

- Must include:
  - Astronomical Importance
  - Estimated intensity, S/N
- May include:
  - Figures
  - Tables
  - References
- Free-form PDF document
  - 12+ font, English only! (OT will check for font size)
  - 20 MB file size
  - 4 pages (6 for Large Programs)

# Dual-Anonymous Proposal Review Guidelines:

- Do not identify the PI or any of the co-PIs or co-Is in the proposal.
  - Figure 1 shows the image from our Cycle 7 ALMA program (~~2019.1.02045.S, PI Smith~~).
  - Figure 1 shows the data from a ALMA Cycle 7 program (**private communication**).
- Proposers should use third person or neutral wording when referencing their own work.
  - In Smith et al. (2018), **we** demonstrated...
  - **As** demonstrated in Smith et al. (2018)...
- Do not refer to data from ALMA or other observatories in a self-identifying fashion. If data from a project have been published, then a reference to that publication may be used. Unpublished data can be referenced as private communication or by listing the project code, but a PI name cannot be listed.
  - Figure 1 shows the CO image of the cloud from ~~Chang et al. (in preparation)~~
  - Figure 1 shows the CO image of the cloud (**private communication**).
  - This is a resubmission of ~~our ongoing Cycle 7 program 2019.1.02045.S (PI: Smith)~~.
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# New Capabilities for Cycle 9

- Solar total power regional mapping in bands 3, 5, 6, and 7
- VLBI continuum observations in Band 7
- VLBI spectral line observations in Band 3 with one spectral window fixed on the 86 GHz SiO maser line
- **High frequency + long-baseline observations**, including Band 8 in 12m configurations up through C43-10, Band 9 in configurations up through C43-9, and Band 10 in configurations up through C43-8

# Cycle 9 Capabilities - I

- **Antennas:** 43+ in the 12-m Array; ten 7-m antennas; three 12-m total power, spectral line antennas in the ACA
- **Receiver bands:** 3, 4, 5, 6, 7, 8, 9, 10
  - (wavelengths 3.1, 2.1, 1.5, 1.3, 0.87, 0.74, 0.44, 0.35 mm)
- **Maximum baselines/largest 12m array configurations:**
  - 16.2 km (bands 3–8), 13.9 km (band 9), 8.5 km (band 10)
  - C43-10 (bands 3-8), C43-9 (band 9), C43-8 (band 10)
- **Spectral line, continuum, and mosaic observations:**
  - Spectral line and continuum observations with the 12-m and 7-m Arrays in all bands
  - Single field interferometry (all bands) and mosaics (Bands 3 - 9) with both the 12-m and 7-m arrays
  - Single dish (total power) spectral line in Bands 3 - 8



# Cycle 9 Capabilities - II

- **Polarization**

- Single pointing, on-axis, full linear or circular polarization for continuum and full spectral resolution observations in Bands 3-7 on the 12-m Array
- Linear polarization near on-axis imaging in continuum and full spectral resolution modes at the 0.1% ( $3\sigma$ ) fractional polarization level with the very brightest calibrators and 0.2% ( $3\sigma$ ) level for a typical observation
- Minimum detectable circular polarization 1.8% of peak flux for both continuum & full spectral resolution observations
- Mosaicing of continuum linear polarization observations in Bands 3 to 7
- Single pointing on-axis linear polarization in Bands 3-7 with the standalone ACA (ACA + 12m pol not available)

# Cycle 9 Capabilities - III

The following capabilities were introduced in Cycle 8-2021

- Solar observations in Band 5
- Phased array mode for
  - VLBI on faint science targets having  $< 500$  mJy in an unresolved core at ALMA, on baselines up to 1 km with a known bright phase calibrator within  $5^\circ$
  - Band 3-only phased array .P projects (pulsars)
- HF Band 9 and 10 observing with the standalone 7-m Array
- Mosaicking continuum lin. pol. in bands 3-7 with 12m Array
- Spectral scans with the 7-m Array including standalone ACA
- A step toward astrometry “enhanced positional accuracy”

# Proposal Checklist

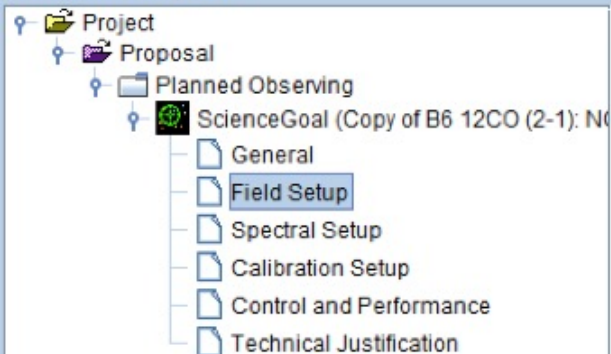
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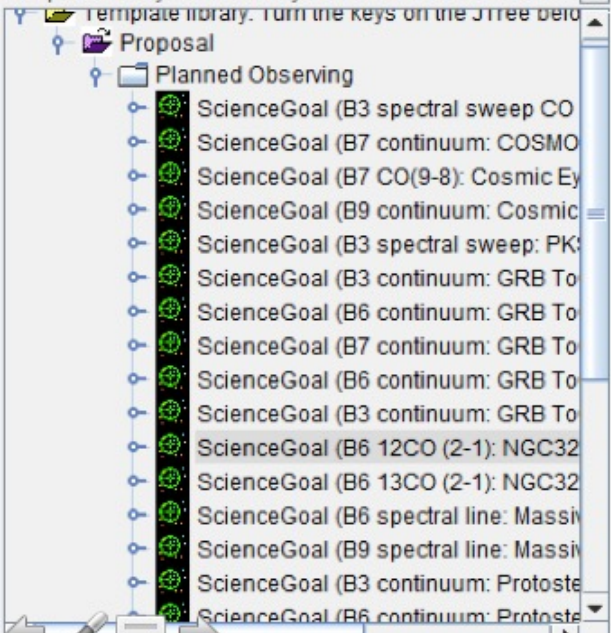
## Project Structure

Proposal Program

Unsubmitted Proposal



Template library. Turn the keys on the JTree below & r...



## Editors

Spectral Spatial Field Setup

Source Name  Resolve

Choose a Solar System Object?  Name of object

System  Sexagesimal display?  Parallax

Source Coordinates RA  PM RA

Dec  PM DEC

Source Radial Velocity    z  Doppler Type

Target Type  Individual Pointing(s)  1 Rectangular Field

Expected Source Properties

Peak Continuum Flux Density per Beam

Continuum Polarization Percentage  %

Peak Line Flux Density per Beam

Line Width

Line Polarization Percentage  %

Rectangle

Coords Type  ABSOLUTE  RELATIVE

System

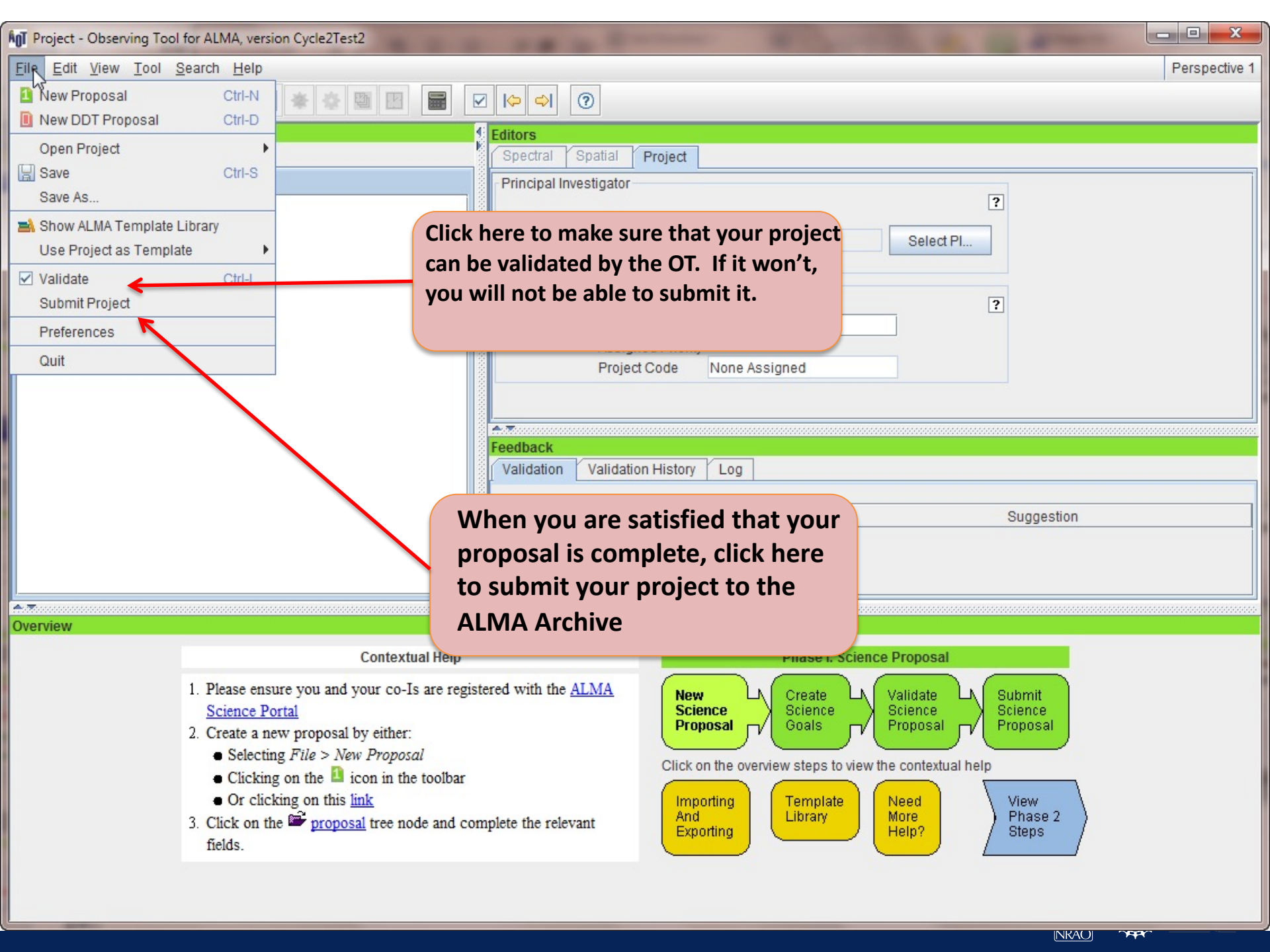
Field Center Coordinates Offset(Longitude)

Offset(Latitude)

## Feedback

Validation Validation History Log

Description	Suggestion



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## After submission

- Remember, you can resubmit as often as needed, but keep in mind that the server is quite busy right before the deadline
- Distributed peer review will be used for all proposals requesting less than 50 hours on the 12-m Array, and ACA stand-alone proposals requesting less than 150 hours on the 7-m Array.
- In this review system, for each submitted proposal the PI (or one of the delegated co-Is) will be responsible for reviewing up to 10 other submitted proposals, thus increasing the involvement of the ALMA community in the review process – **if you don't submit reviews, YOUR proposal will be rejected!**
- Large proposals will be reviewed by science review panels, as in previous cycles.
- All proposals will be subject to Technical Assessment by a selected group of JAO and ARC experts.

## After submission

- Proposals will be assessed on the basis of the overall scientific merit of the proposed investigation and its potential contribution to the advancement of scientific knowledge.
- Following approval by the Directors Council, the outcome of the Proposal Review Process will be communicated to the PIs of all valid submitted proposals - expected around August 2022.
- Any change requests need to go to the Helpdesk, and possibly a formal change request
  - Being prompt helps ensure your project can be observed!
- Then wait – dynamic scheduling means your Contact Scientist doesn't know when your project will run. As observations are made, updates are shown in the SnooPI tool on the Science Portal:

<https://almascience.nrao.edu/observing/snoopi>



## ALMA Science Portal @ NRAO

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### Science Highlight

Normal, Dust-Obscured Galaxies in the Epoch of Reionization

(a) REBELS-29 field at  $z \sim 6.68$   
REBELS-29-2  $z_{\text{CO}} = 6.6813$   
REBELS-29  $z_{\text{CO}} = 6.6847$

(b) REBELS-12 field at  $z \sim 7.35$   
REBELS-12  $z_{\text{CO}} = 7.347$   
REBELS-12-2  $z_{\text{CO}} = 7.3521$

[CII] 158  $\mu\text{m}$  line and dust emission detections for (a) the REBELS-29 field at  $z \sim 6.68$  and (b) the REBELS-12 field at  $z \sim 7.35$ . Background images are HST F140W and VIDEO J-band, respectively.

As part of the ongoing ALMA large program REBELS (Reionization-Era Bright Emission Line Survey), 40 UV-luminous primary targets were observed at  $z > 6.5$ . Among these targets are REBELS-12 and REBELS-29. In their recent paper, Fudamoto and colleagues report two additional emission line neighbours found after inspecting the ALMA data cube of these two sources. The images on the left show [CII] 158  $\mu\text{m}$  line and dust emission detections for (a) the REBELS-29 field at  $z \sim 6.68$  and (b) the REBELS-12 field at  $z \sim 7.35$ . Background images are HST F140W and VIDEO J-band, respectively. White horizontal bars correspond to 10 proper kpc. Solid red and light blue contours show  $2\sigma$  to  $5\sigma$  levels (and  $-5\sigma$  to  $-2\sigma$  for dashed contours) for the continuum and [CII] moment-0 maps, respectively. The continuum

### Observatory News

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<a href="#">ALMA Science</a>	<a href="#">SnooPI</a>
<a href="#">ALMA Primer</a>	<a href="#">Configuration Schedule</a>

# I could use a hand...

*Have no fear, the ALMA Helpdesk is here...*

# ALMA



Atacama Large Millimeter/submillimeter Array  
Observer Support

ALMA Science

Agent ▾

Submit Helpdesk Ticket

AR ▾

How can we help you today?

Help Center > [Knowledgebase](#) TOO

## Knowledgebase

### General (1)

- What Cycle 8 proposal issues and clarifications should I be awa...

[View all articles in General >](#)

### ALMA Observing Tool (OT) (47)

- What are the restrictions on multiple spectral setups within a s...
- Can I set up monitoring observations with the OT?
- How do I change which sideband my spectral windows are plac...
- How do I set up a mosaic in the OT?
- How do I convert flux measurements given in Jy km/s or K km/...

[View all articles in ALMA Observing Tool \(OT\) >](#)

### Proposal Handling (7)

### Historical Articles (20)



26

## ALMA Cycle 9 Proposal Workshop @Yale





How can we help you today?

[Help Center](#) [TOO](#) [Search Sci Portal](#)



Knowledgebase

[View all articles >](#)



Submit Helpdesk Ticket

[Get in touch for help>](#)



My Tickets

[View your tickets >](#)



Face to Face Visit

[Arrange a visit >](#)

Welcome to the new ALMA Helpdesk User Interface!

For “Face-to-Face Visit” – try the new “ALMA Chats” option which is more than a ticket but less than a full virtual f2f visit!

[help.almascience.org](https://help.almascience.org)

**ALMA Helpdesk @ NRAO (logged in view)**

## Submit Helpdesk Ticket

Please complete this form and one of our agents will reply to you by email as soon as possible.

Name \*

Anthony Remijan

Email

aremijan@nrao.edu

Cc

Department \*

Select

Project Planning (NA)

General Queries (NA)

Face to Face Support (NA)

Data Reduction (NA)

Observing Tool (NA)

Proposal Handling (NA)

Archive and Data Retrieval (NA)

Proposal Submission Emergency

 Choose files or  Drag and drop

Submit

Reset

# help.almascience.org

## ALMA Helpdesk @ NRAO (logged in view)



**For more info:**  
<https://almascience.nrao.edu/>

The Atacama Large Millimeter/submillimeter Array (ALMA), an international astronomy facility, is a partnership of Europe, North America and East Asia in cooperation with the Republic of Chile. ALMA is funded in Europe by the European Organization for Astronomical Research in the Southern Hemisphere (ESO), in North America by the U.S. National Science Foundation (NSF) in cooperation with the National Research Council of Canada (NRC) and the National Science Council of Taiwan (NSC), and in East Asia by the National Institutes of Natural Sciences (NINS) of Japan in cooperation with the Academia Sinica (AS) in Taiwan. ALMA construction and operations are led on behalf of Europe by ESO, on behalf of North America by the National Radio Astronomy Observatory (NRAO), which is managed by Associated Universities, Inc. (AUI), and on behalf of East Asia by the National Astronomical Observatory of Japan (NAOJ). The Joint ALMA Observatory (JAO) provides the unified leadership and management of the construction and operation of ALMA.



**[www.nrao.edu](http://www.nrao.edu)**  
**[science.nrao.edu](http://science.nrao.edu)**  
**[public.nrao.edu](http://public.nrao.edu)**

*The National Radio Astronomy Observatory is a facility of the National Science Foundation  
operated under cooperative agreement by Associated Universities, Inc.*