ALMA Cycle 10 Proposal Preparation Workshop

Presented by Allegro Fellows

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EUROPEAN ARC
ALMA Regional Centre || Allegro

Apr. 20, 2023

Introduction to ALMA

Aida Ahmadi

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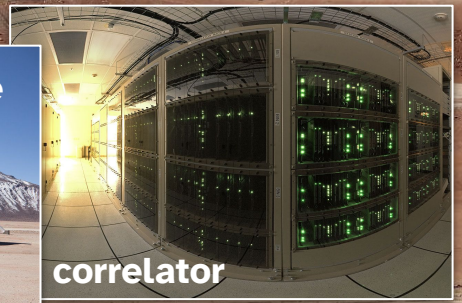
ALMA Regional Centre || Allegro

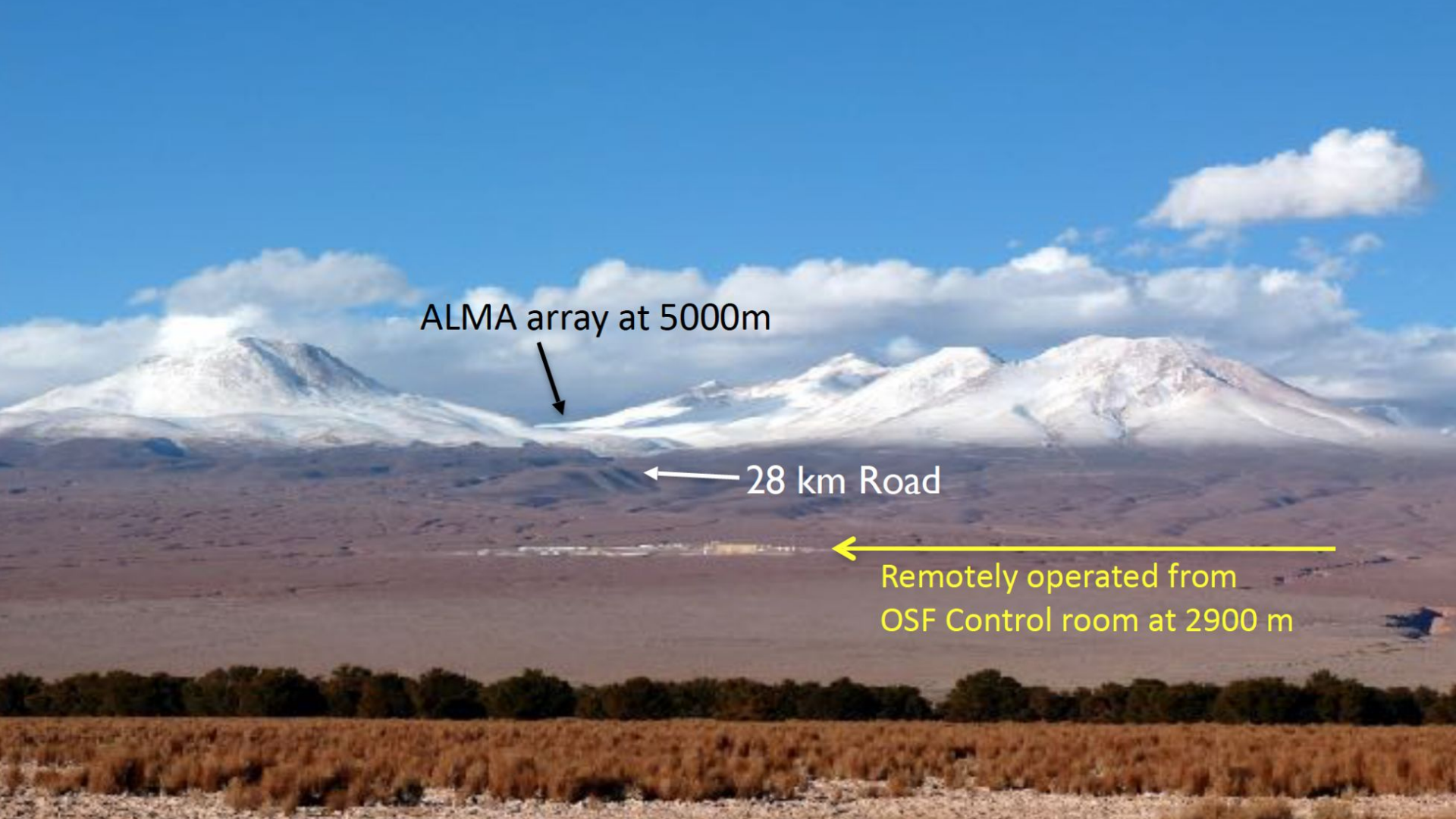
ALMA at the Chajnantor plateau in the **Atacama Desert** in **Chile**

Clem & Adri Bacri-Normier (wingsforscience.com)/ESO

ALMA at the Chajnantor plateau in the **Atacama Desert** in **Chile**



Clem & Adri Bacri-Normier (wingsforscience.com)/ESO


ALMA array at 5000m
28 km Road
Remotely operated from
OSF Control room at 2900 m

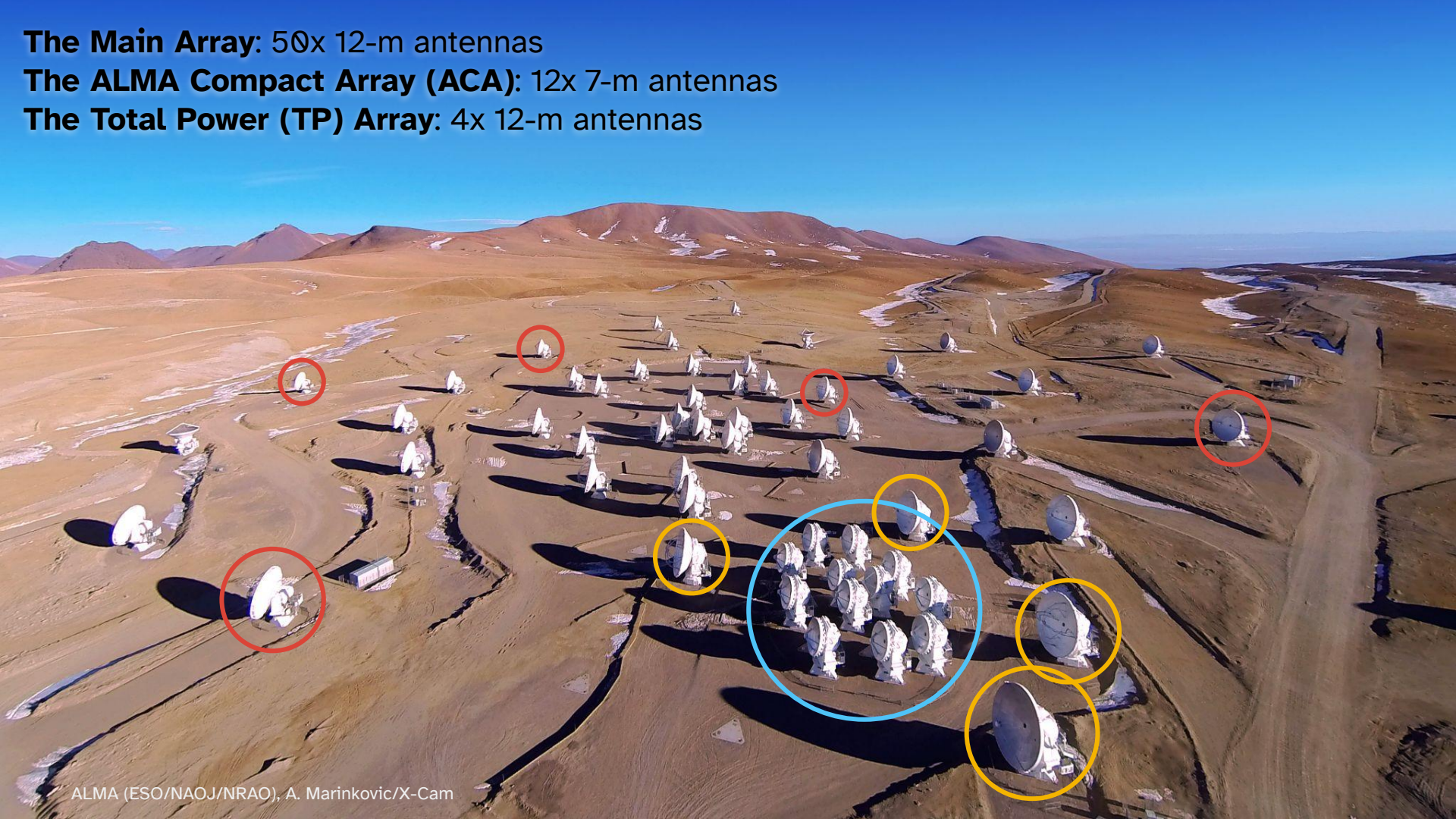
The Main Array: 50x 12-m antennas

ALMA (ESO/NAOJ/NRAO), A. Marinkovic/X-Cam

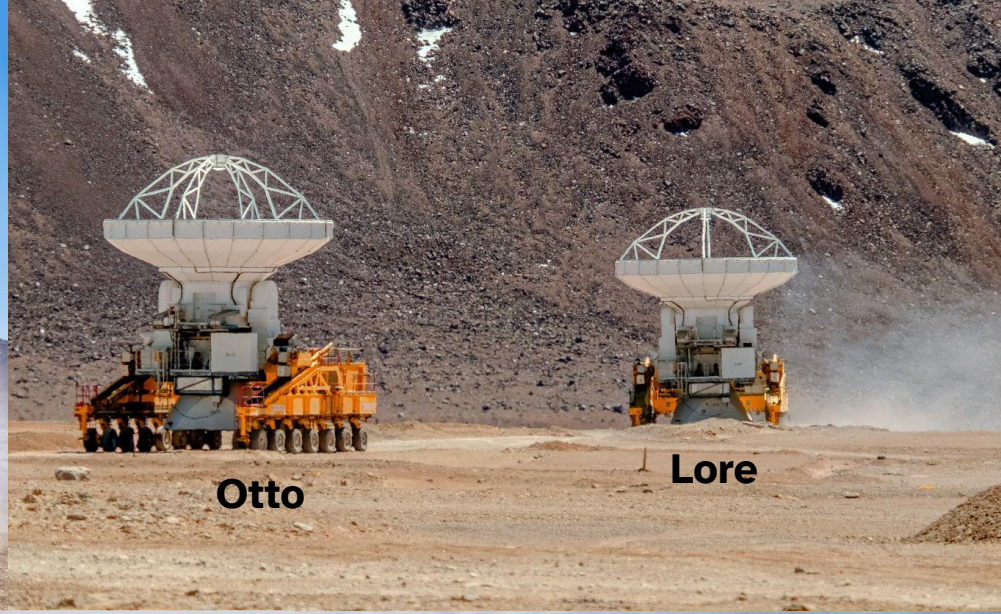
The Main Array: 50x 12-m antennas
The ALMA Compact Array (ACA): 12x 7-m antennas

ALMA (ESO/NAOJ/NRAO), A. Marinkovic/X-Cam

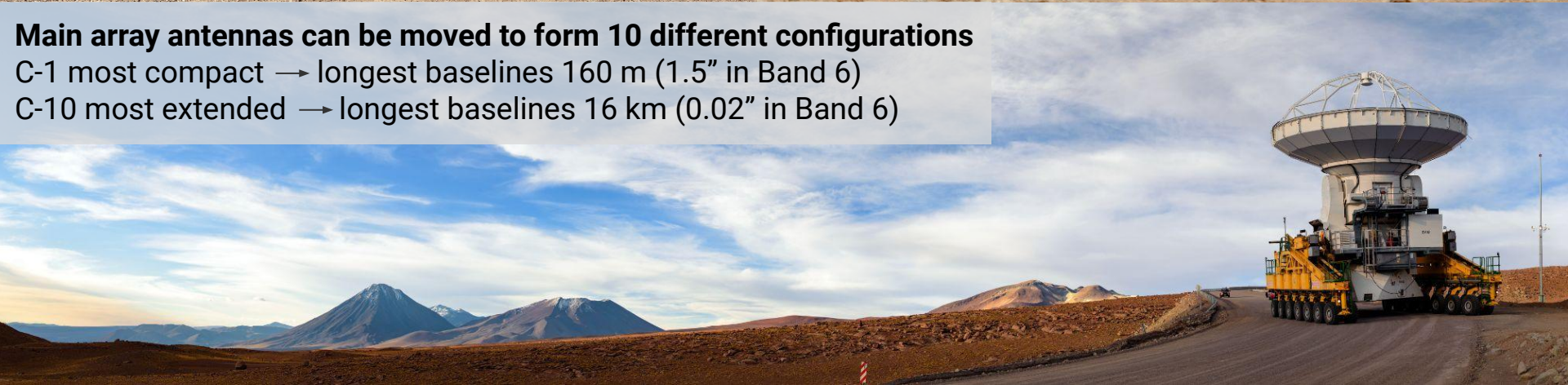
The Main Array: 50x 12-m antennas
The ALMA Compact Array (ACA): 12x 7-m antennas
The Total Power (TP) Array: 4x 12-m antennas



ALMA (ESO/NAOJ/NRAO), A. Marinkovic/X-Cam

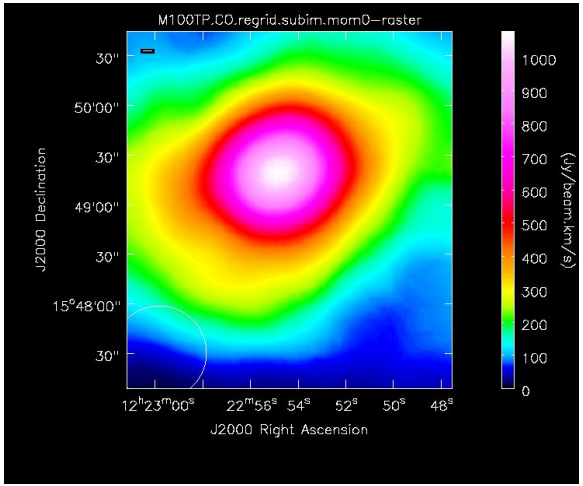


Main array antennas can be moved to form 10 different configurations
C-1 most compact → longest baselines 160 m (1.5” in Band 6)
C-10 most extended → longest baselines 16 km (0.02” in Band 6)

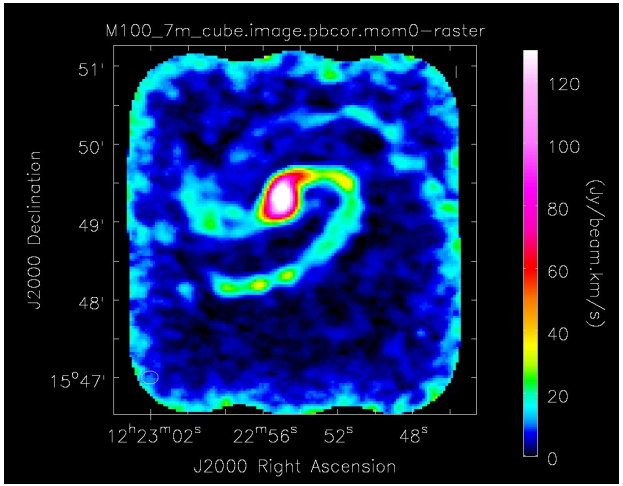


Observations at various scales

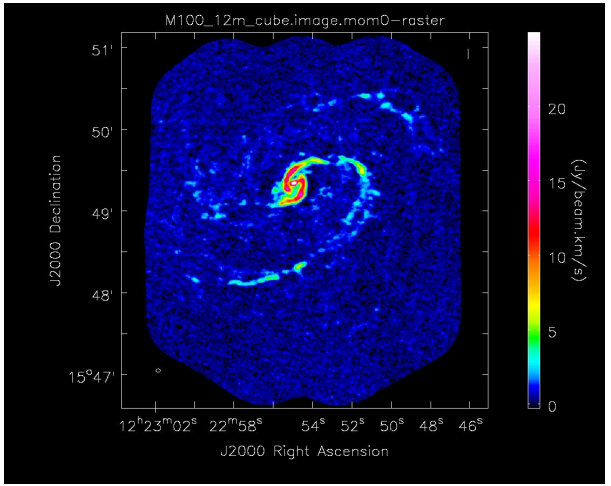
Total Power



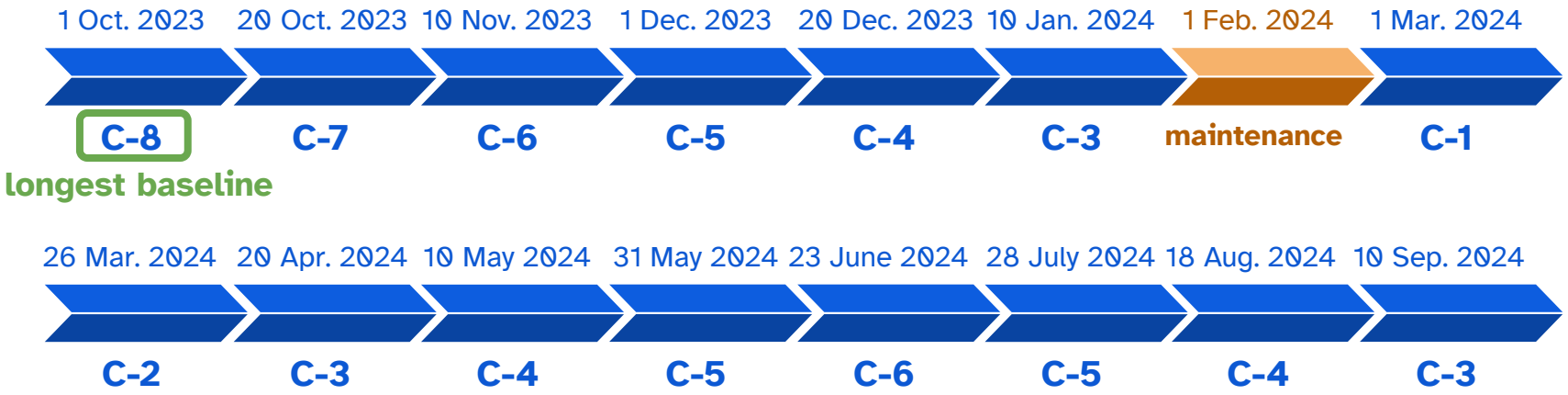
7-m array (ACA)



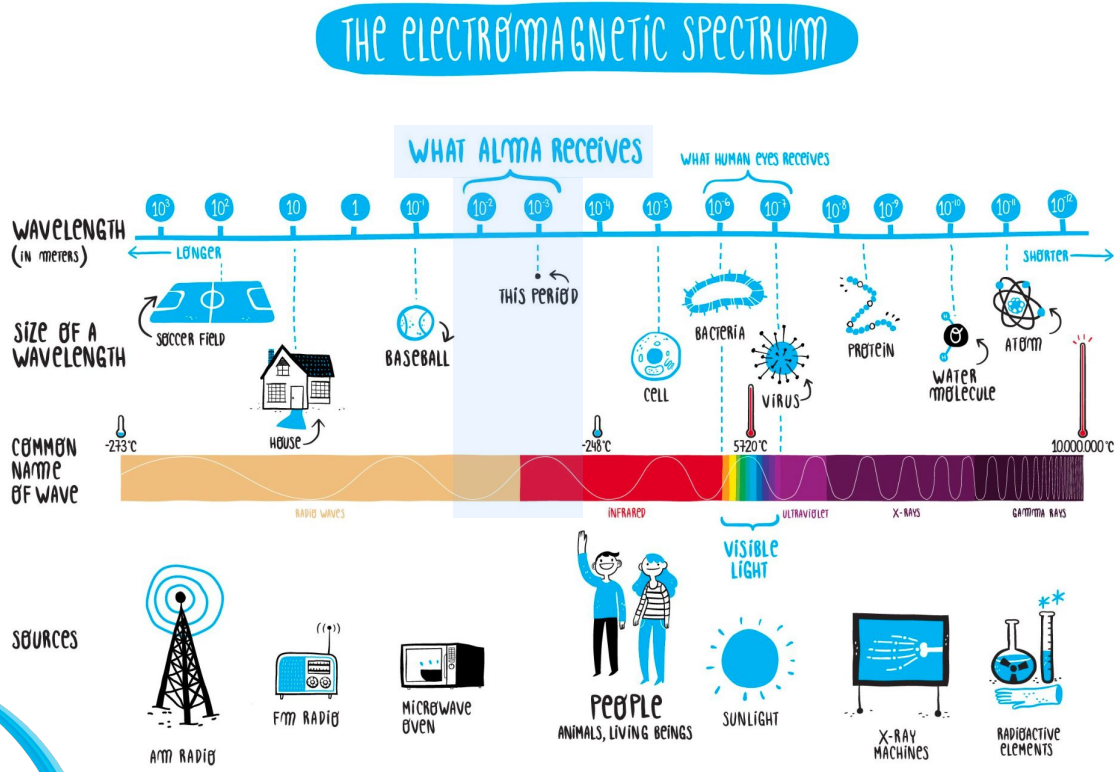
12-m array



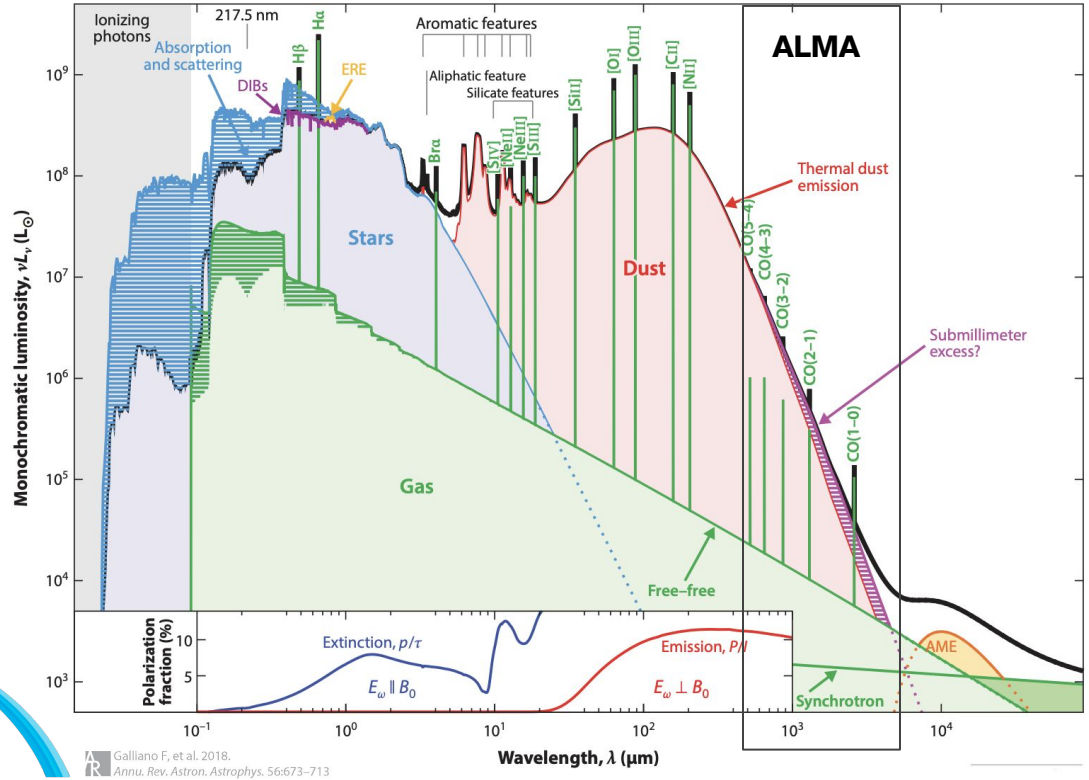
Configuration schedule - Cycle 10



What does ALMA see?



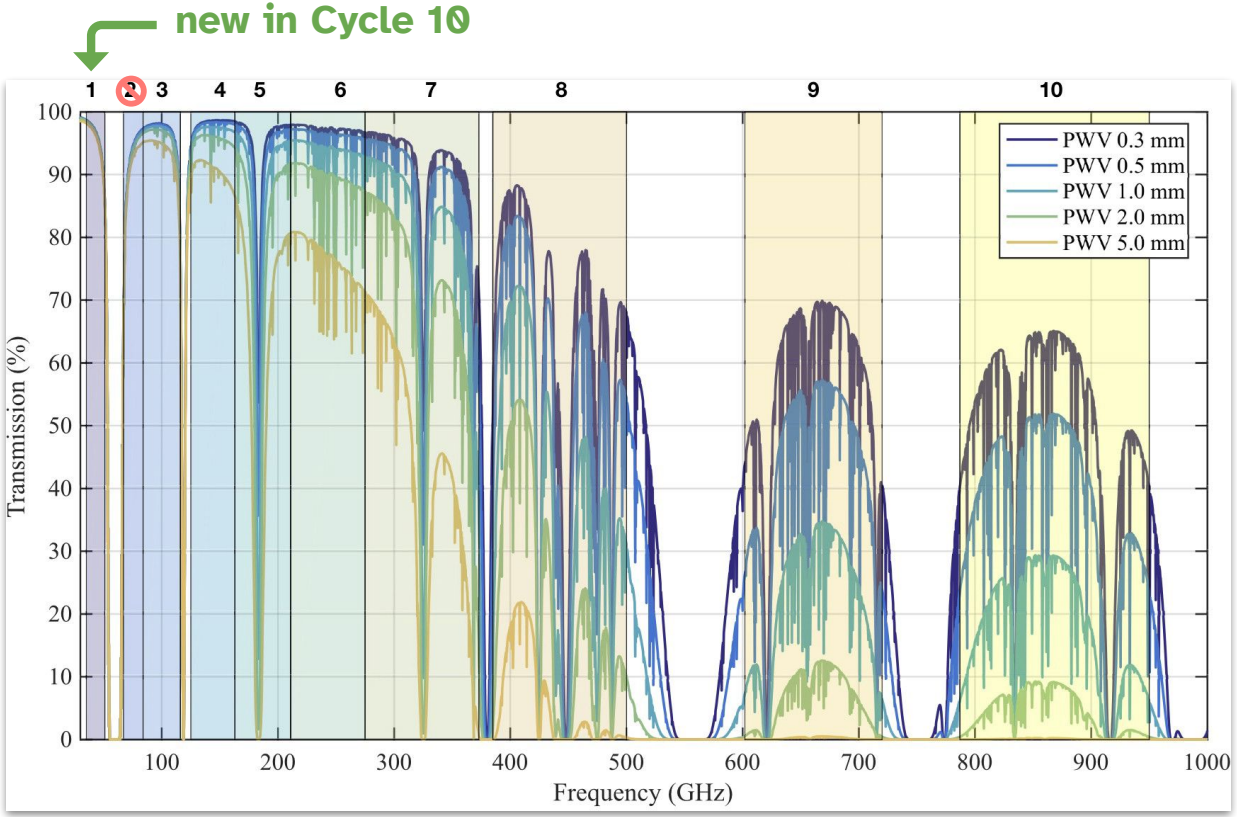
What can ALMA see?



Galliano F, et al. 2018. *Annu. Rev. Astron. Astrophys.* 56:673–713

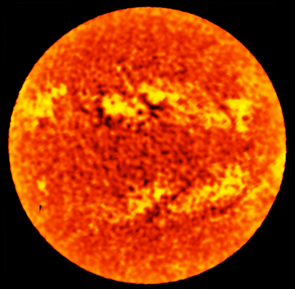
Atmospheric Transmission & ALMA Bands

Band	ν (GHz)	λ (mm)
1	35 – 50	8.5 – 6
3	84 – 116	3.6 – 2.6
4	125 – 163	2.4 – 1.8
5, 6, 7	158 – 373	1.9 – 0.8
8	385 – 500	0.78 – 0.60
9	602 – 720	0.50 – 0.42
10	787 – 950	0.38 – 0.32

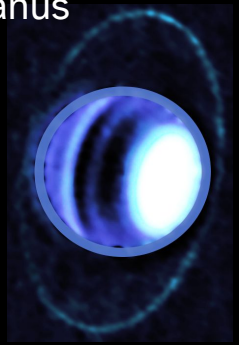


ALMA Science Gallery

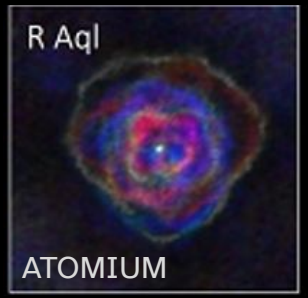
Sun



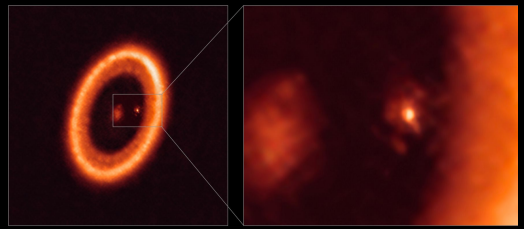
Uranus



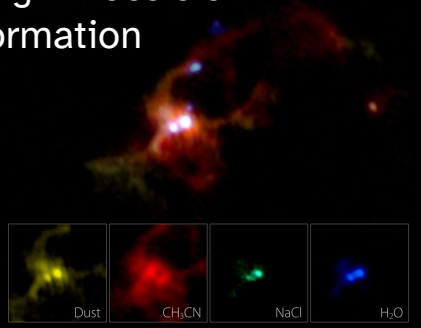
Red giant stars



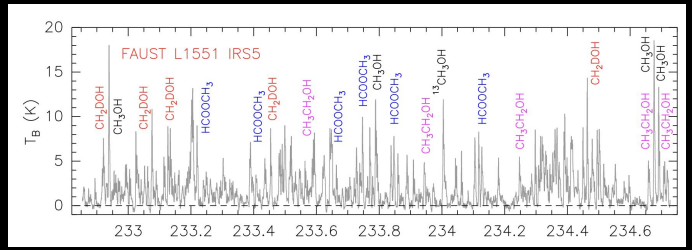
Planet-forming disks



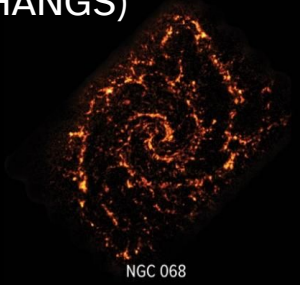
High-mass star formation



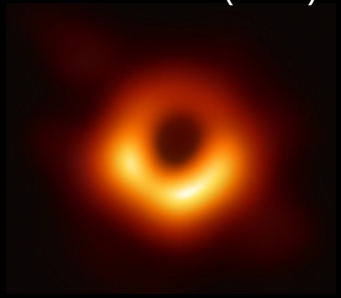
Chemistry in protostars (FAUST)



Nearby galaxies (PHANGS)



Black-holes (EHT)



High-z galaxies (REBELS)

ALMA Science Primer for more: https://almascience.eso.org/proposing/early-science-primer

Proposal types

- **Regular**
  - Projects requesting < 50 hours on the 12-m Array or < 150 hours on the 7-m Array
- **Large Programs**
  - Projects requesting > 50 hours on the 12-m Array (with or without accompanying ACA time) or > 150 hours on the 7-m Array in stand-alone mode
- **Target of Opportunity (ToO)** for certain classes of astronomical transient events that occur at frequent and unpredictable intervals (e.g. gamma ray bursts)
- **mm-VLBI** and **Phased Array** proposals (anticipated to be in March/April 2024)
- **Joint Proposals** (partnered with JWST, VLA, & VLT)

Submission procedure

ALMA proposals consist of **two parts**:

1. The **technical details** that are set up in the ALMA Observing Tool (OT)
2. The **Scientific Justification** that must be uploaded in the OT:
    - 4 pages for Regular, ToO, VLBI, Phased Array, and DDT proposals
    - 6 pages for Large Programs
    - Must follow certain rules (e.g. be anonymised)
    - Formatting templates available: https://almascience.eso.org/proposing/proposal-template
    - Tips for writing a good proposal:
        - I-TRAIN presentation: https://almascience.eso.org/euarcdata/itrain13/HowToWriteReview_ITRAIN.pdf
        - I-TRAIN video: https://www.youtube.com/watch?v=FP8H-ObMMnU

Duplicate observations

- **Duplicate observations** of the same location on the sky with similar observing parameters (frequency, angular resolution, coverage, and sensitivity) are **not permitted!**

- It is the responsibility of the proposers to check for duplicates:
  - For more information see: https://almascience.eso.org/proposing/duplications
  - Check the ALMA Science Archive: https://almascience.eso.org/aq/
  - Use ALminer: a Python-based code to effectively query, analyse, and visualize the ALMA science archive https://alminer.readthedocs.io/

ALMA Science Archive

Live demo

https://almascience.eso.org/aq/

Dual Anonymous Review Process

Andrés Pérez-Sánchez

Dual anonymous review process

- In order to **reduce the systematic bias** during the selection of the proposals, ALMA requires all proposals to be written in the anonymous fashion:
    - The reviewers of the proposal do not know who is in the proposal team, and the proposal team do not know who is reviewing the proposal.

- The primary goal of the dual anonymous process is to ensure reviewers will **focus on the scientific merits of the proposals**, rather than on the proposal team members/“prestige”.

Dual anonymous review process

A number of studies reported the results of the analysis of the **final proposal rankings** for different telescope facilities:

- Gender-Correlated Systematics in the **HST** Proposal Selection. (***Reid 2014***)
- Gender Systematics in Telescope Time Allocation at **ESO**. (***Patat 2016***)
- Gender-Related Systematics in the **NRAO** and **ALMA** Proposal Review Processes. (***Lonsdale et al. 2016***)
- Systematics in the **ALMA** Proposal Review Rankings. (***Carpenter 2020, Carpenter et al. 2022***)

Bias identified:

- Gender.
- Experienced vs Young Researchers.
- Demographic or Regional affiliation.

The anonymous fashion

- **General guidelines** https://almascience.eso.org/proposing/alma-proposal-review/dual-anonymous
- It is the responsibility of the proposers to **ensure anonymity of all team members in the proposal**.

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- It is the responsibility of the proposers to **ensure anonymity of all team members in the proposal**.
- Use **third person** and **neutral wording** when referring to your work.
  - “In Pérez et al. (1997), we demonstrated…”
  - “As demonstrated in Pérez et al. (1997)…”

The anonymous fashion

- **General guidelines** https://almascience.eso.org/proposing/alma-proposal-review/dual-anonymous

- It is the responsibility of the proposers to **ensure anonymity of all team members in the proposal**.

- Use **third person** and **neutral wording** when referring to your work.
  - "In Pérez et al. (1997), we demonstrated..."
  - "As demonstrated in Pérez et al. (1997)..."

- **Do not self-identify** when mentioning your previous proposals.
  - "The data from our pilot study (2022.1.01770.S, P.I. Durango)"
  - "The data from program (2022.1.01770.S)"

The anonymous fashion

- **General guidelines** https://almascience.eso.org/proposing/alma-proposal-review/dual-anonymous
- It is the responsibility of the proposers to **ensure anonymity of all team members in the proposal**.
- Reference to **Software**
  - Public: Normal citation.
  - Private Software: Cite as “obtained via **private communication**”. **Do not include name after.**
    - We use our group’s archive mining tool ALminer…
    - We use the archive mining tool ALminer…

The Observing Tool

Ashley Bemis

Cycle 10 OT Resources

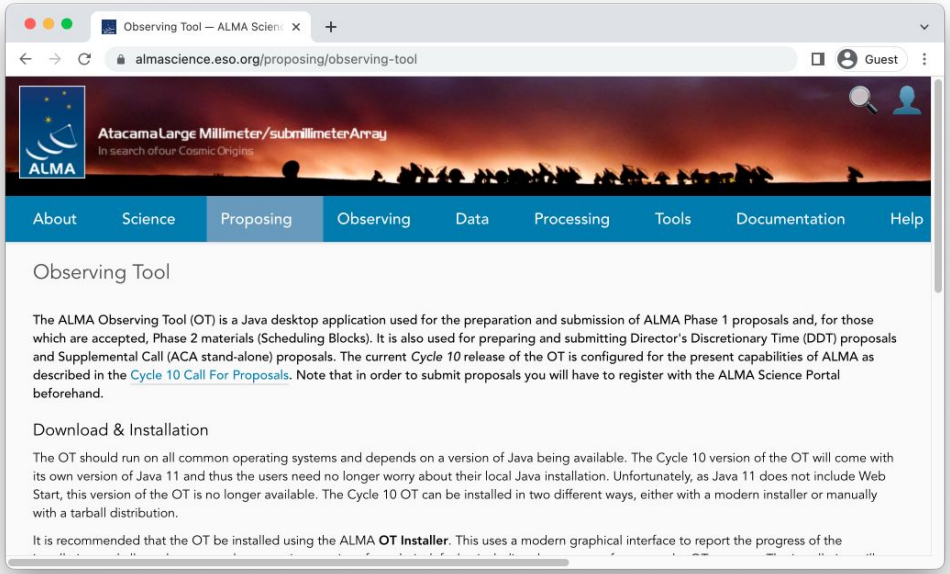
https://almascience.eso.org/documents-and-tools

Phase 1 & 2

ALMA Phase 1 (observing proposal) and Phase 2 (telescope runfiles for accepted proposals) materials are submitted through the ALMA Observing Tool (OT). Below are documentation which will aid the created and submitted of Phase 1 and Phase 2 with the OT.

Document	Description
OT Quickstart	A Quick Start Guide for using the Observing Tool
OT User Manual	Describes how to use the Observing Tool for preparing ALMA proposals
OT Reference Manual	An in-depth description of the Observing Tool
Video Tutorials	Video how-to for the Observing Tool
Known OT issues	For those instances when OT problems are encountered
Phase 2 Quickstart Guide	A Quick Start Guide for approved ALMA observing proposals - the process of Phase 2
A User's Guide to ALMA Scheduling Blocks	(Cycle 4) Guide to understanding the structure and content of ALMA Scheduling Blocks (SBs) using the Observing Tool (OT)

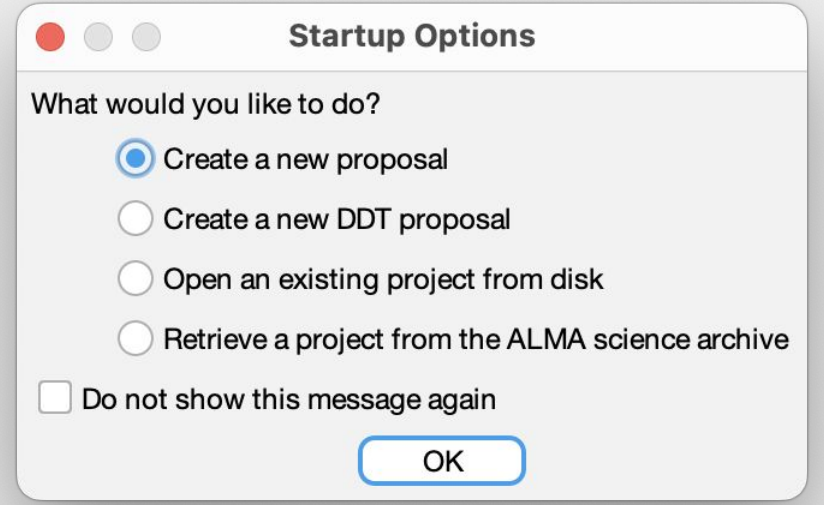
Acquiring the OT



https://almascience.eso.org/proposing/observing-tool

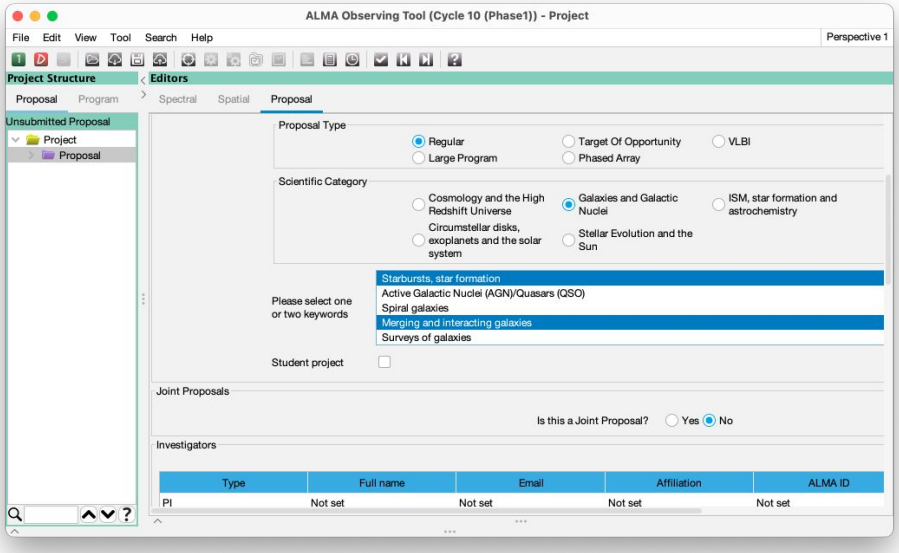
- Download installer or tarball, recommendation: installer
- No automatic updates
  - OT will notify when one is available

Main Startup Options



1. **Create a new proposal:** Start from scratch
2. **Retrieve project from archive:** download previously submitted project, save, & **use as template**

First Steps



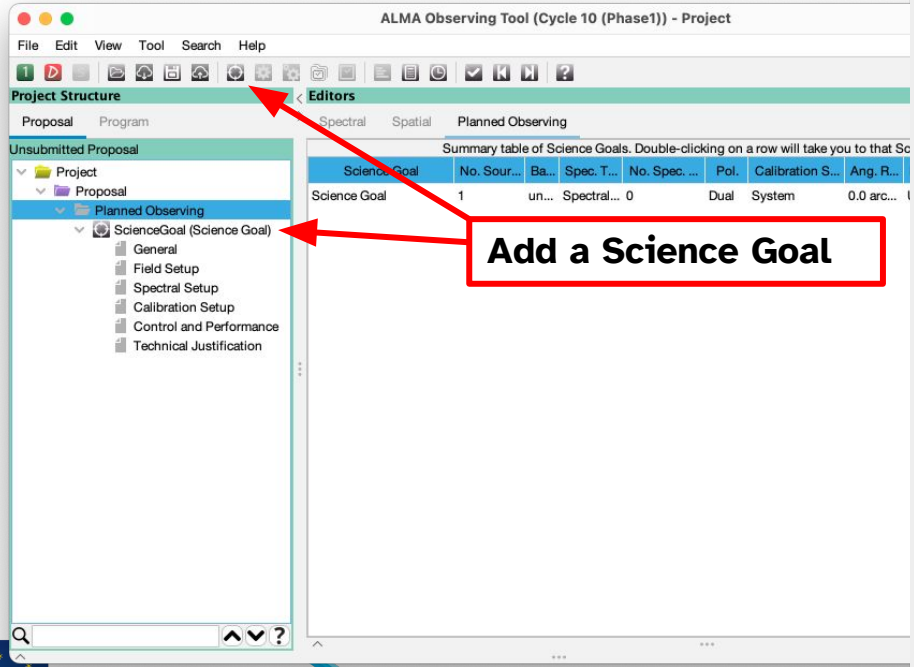
Project & Proposal

- Select PI, add co-Is
- Basic proposal information
  - Title, Abstract
  - Proposal Type
  - Scientific Category Keywords
- Designate Reviewer
- Justify duplicate observations
  - **Check the ALMA archive!**
- Attach scientific justification

Set Reviewer

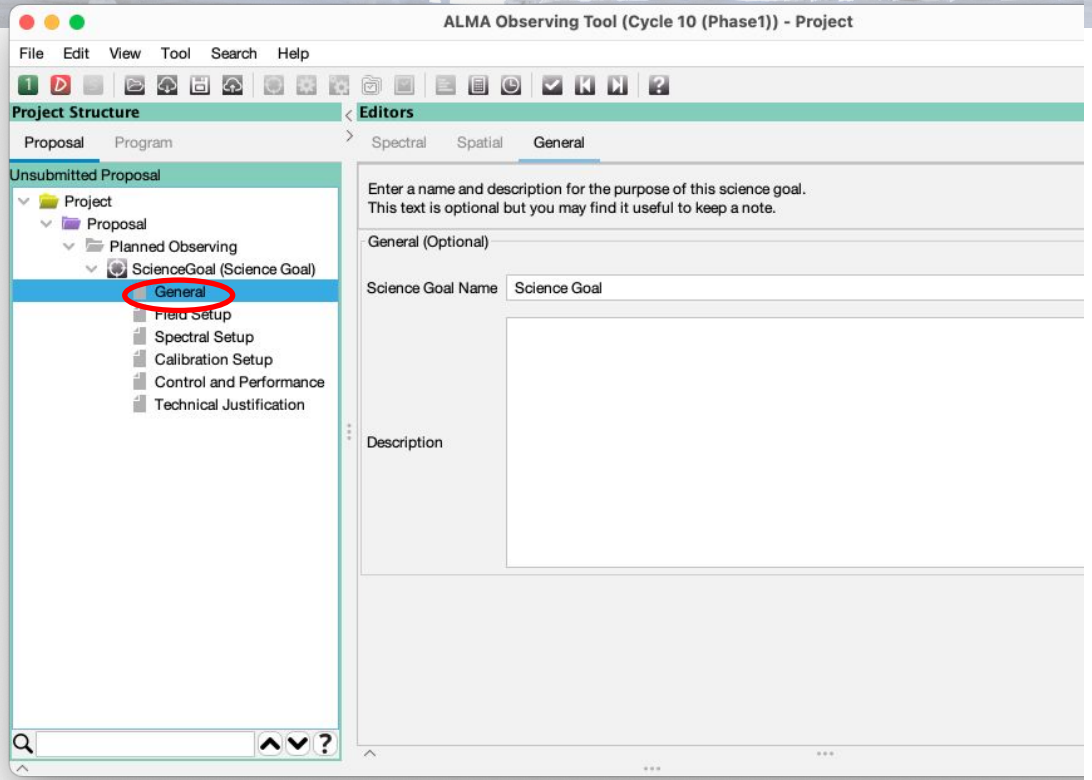
- **Choose reviewer among CO-Is:** Recommendation: **review no more than 30 proposals, max 50**
- **Reviewer without PhD:** ensure a mentor is chosen, does not have to be CO-I

Setting up a Science Goal



Science Goal:

1. General
2. Field Setup
3. Spectral Setup
4. Calibration
5. Control and Performance
6. Technical Justification

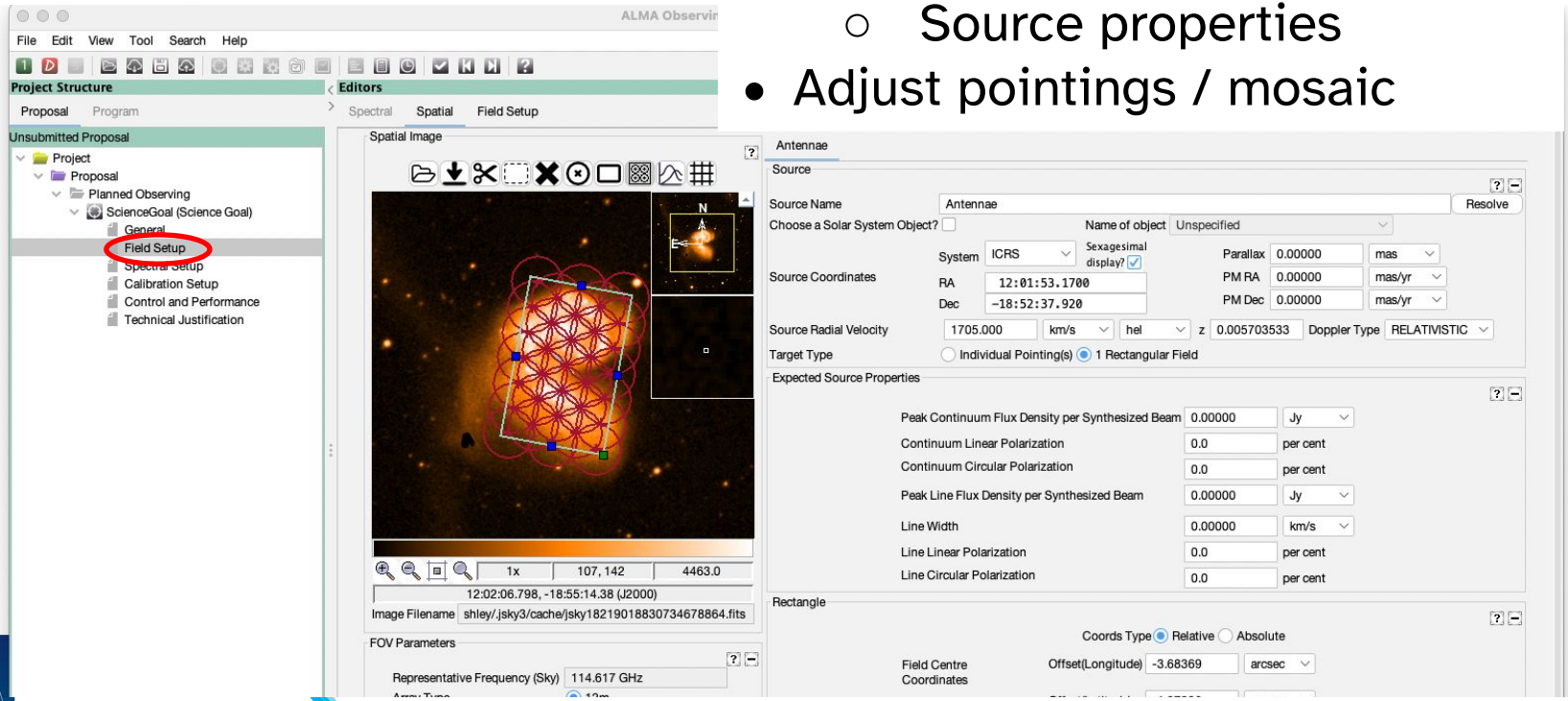


General

- Give each Science Goal a unique name
- Add description

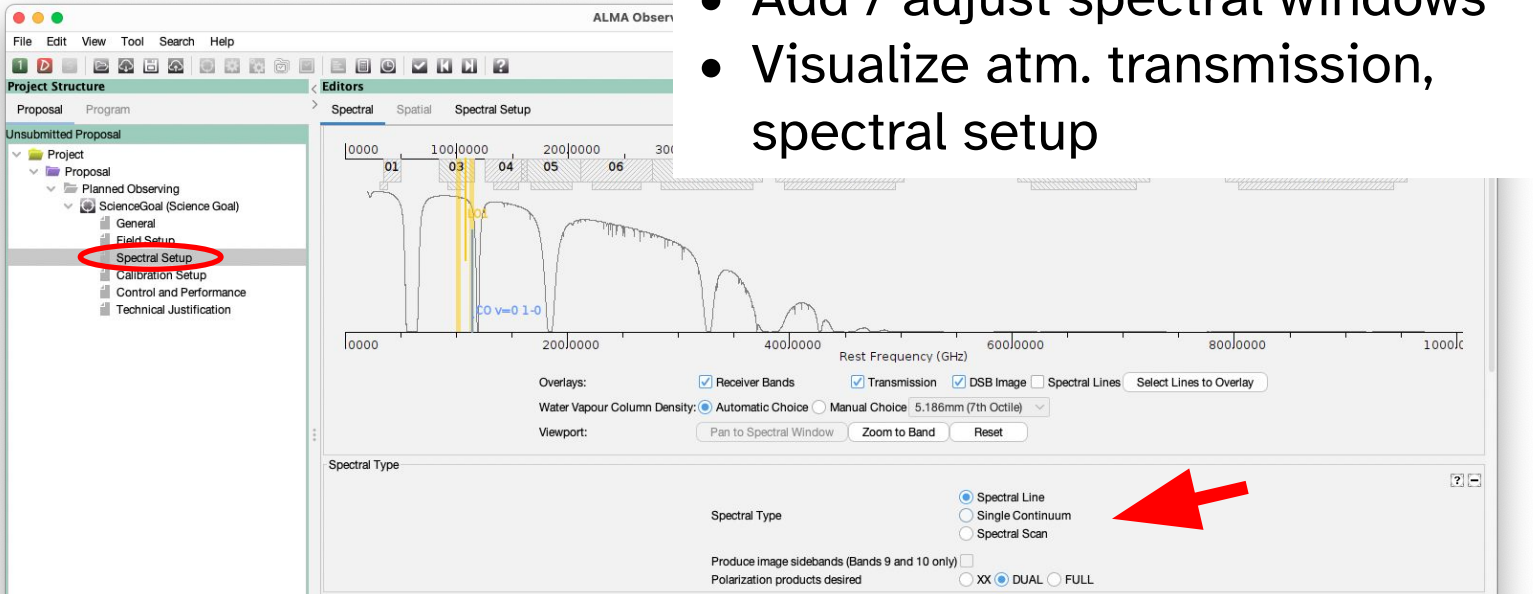
Field Setup

- Input source information
  - Coordinates
  - Source properties
- Adjust pointings / mosaic



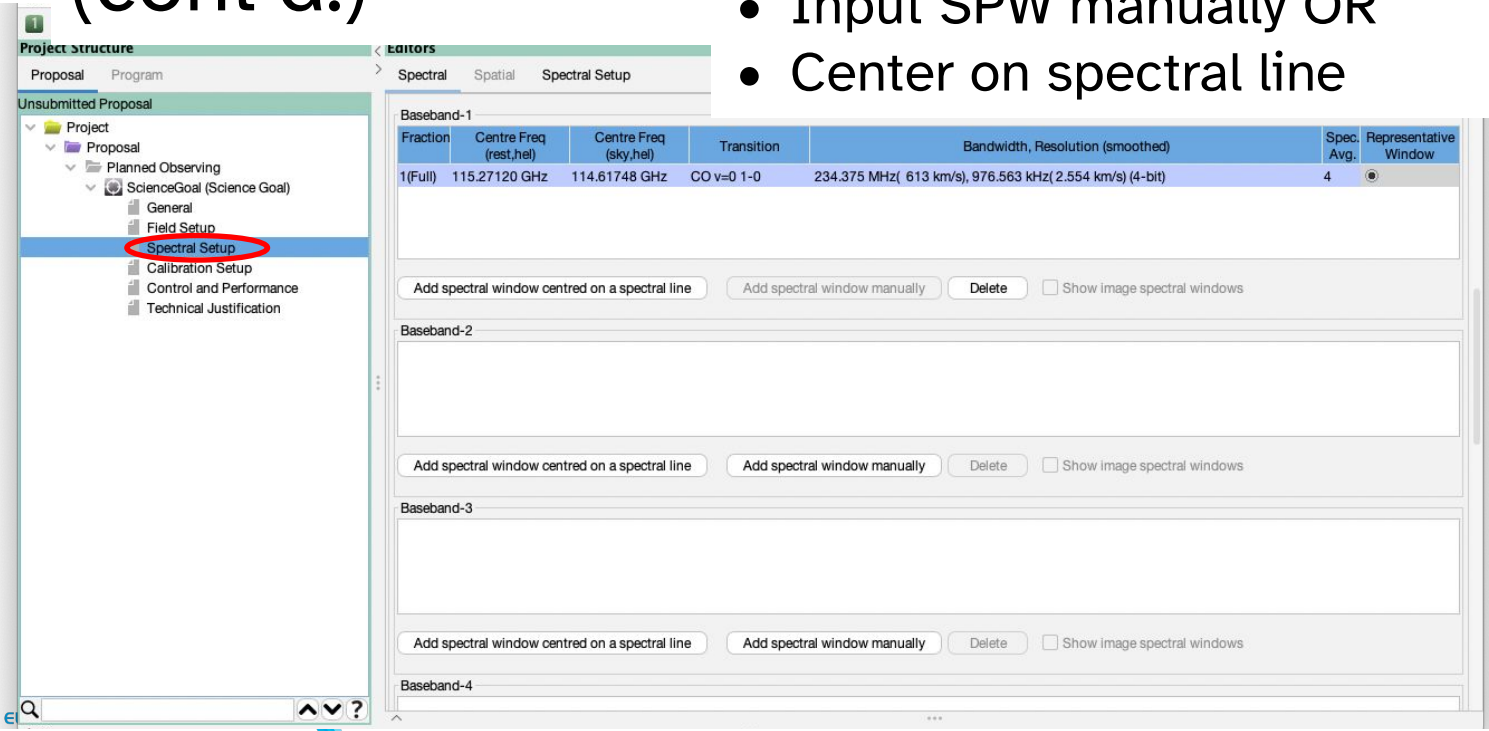
Spectral Setup

- Select Spectral Type
- Polarization
- Add / adjust spectral windows
- Visualize atm. transmission, spectral setup



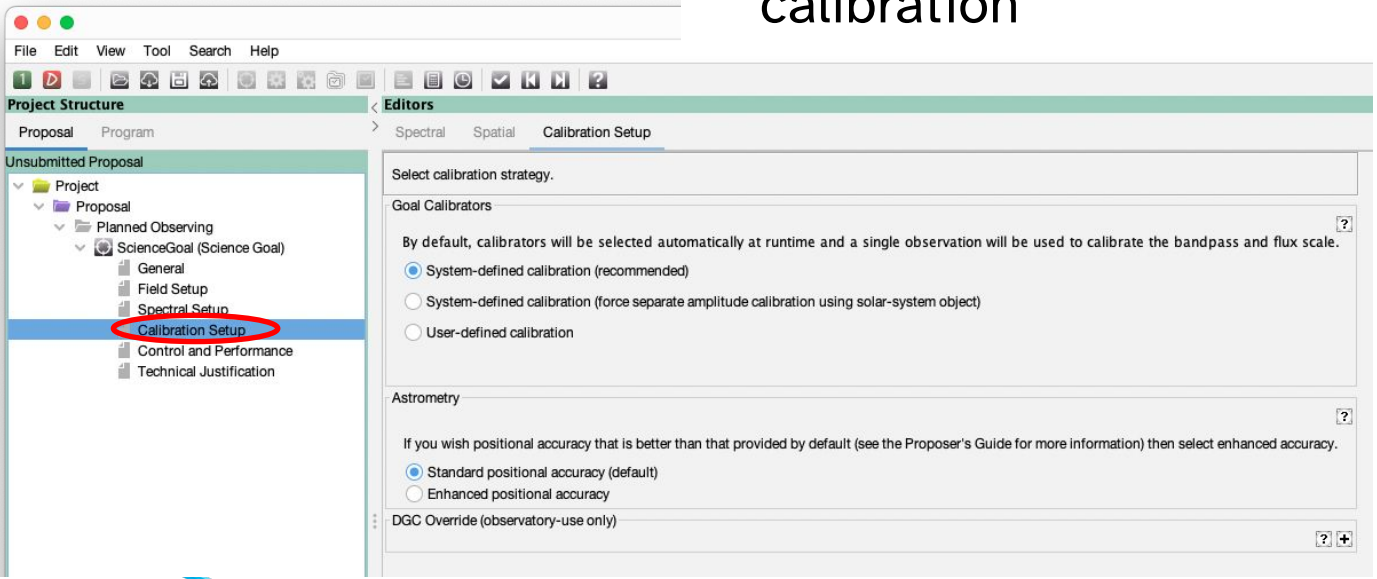
Spectral Setup (cont'd.)

- Four basebands
- Can have 4 SPWS each
- Input SPW manually OR
- Center on spectral line

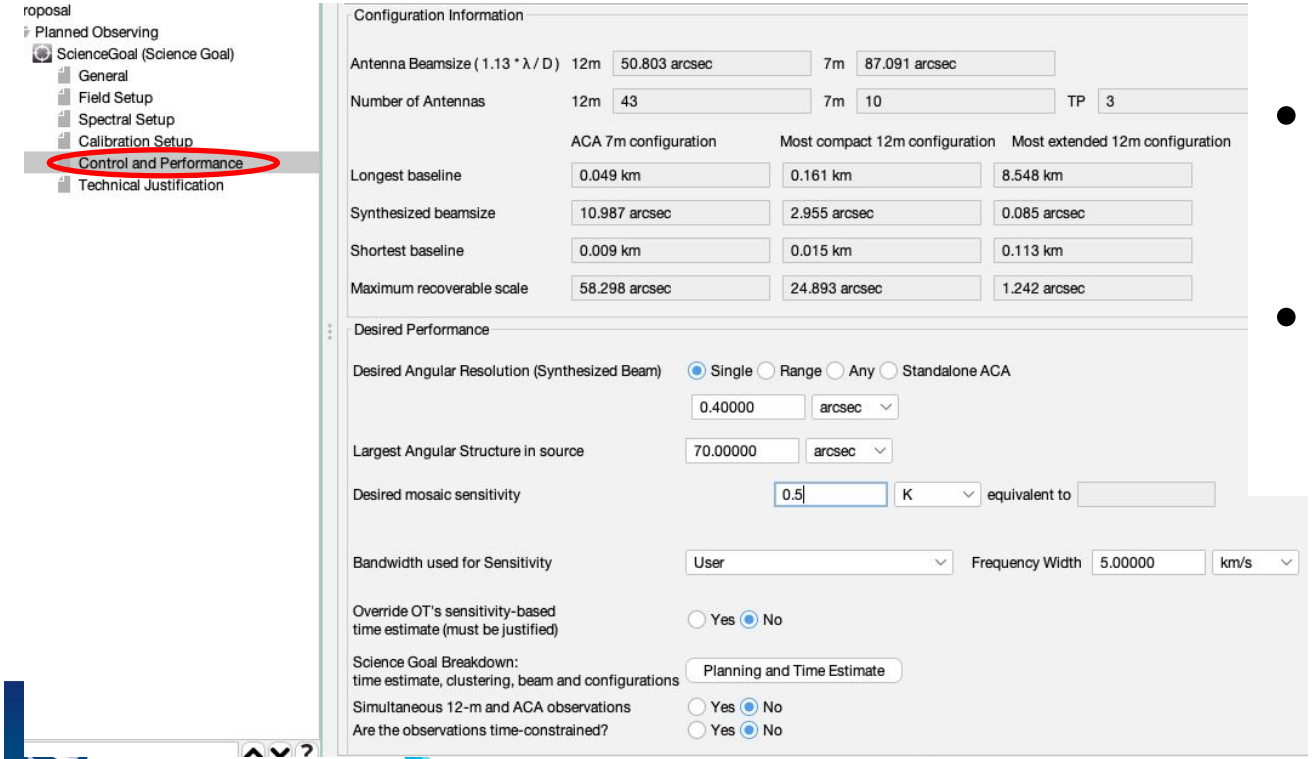


Calibration Setup

- In most cases, keep default calibration
- Must justify user-defined calibration

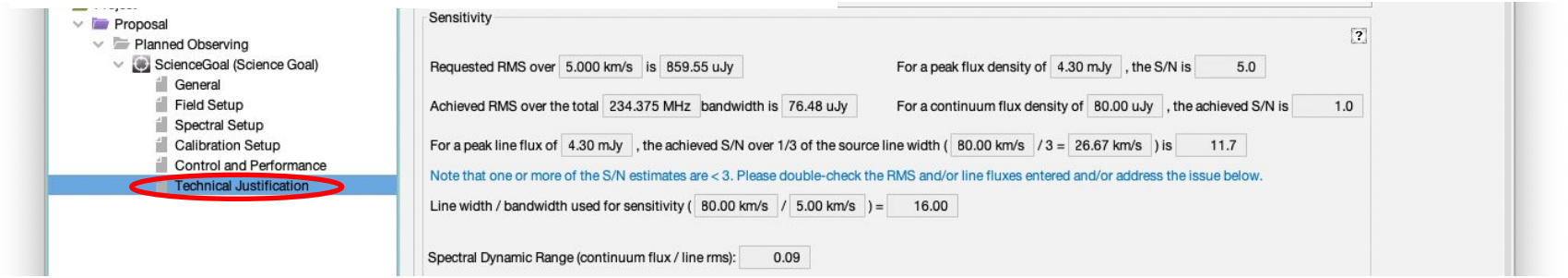


Control and Performance

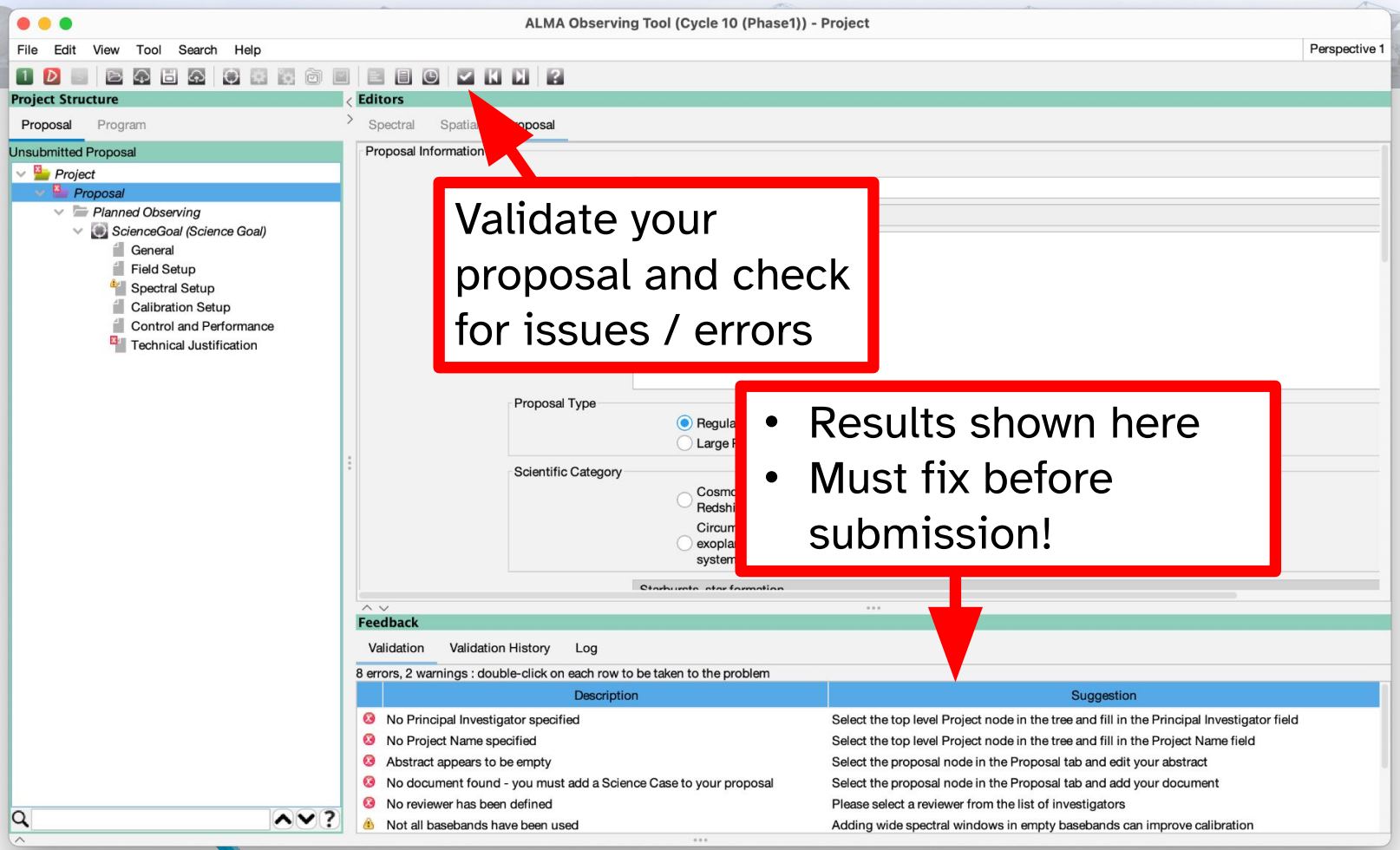


- Choose Resolution + LAS
- Specify sensitivity per specified bandwidth
- Get time estimate + required array configs.

Technical Justification

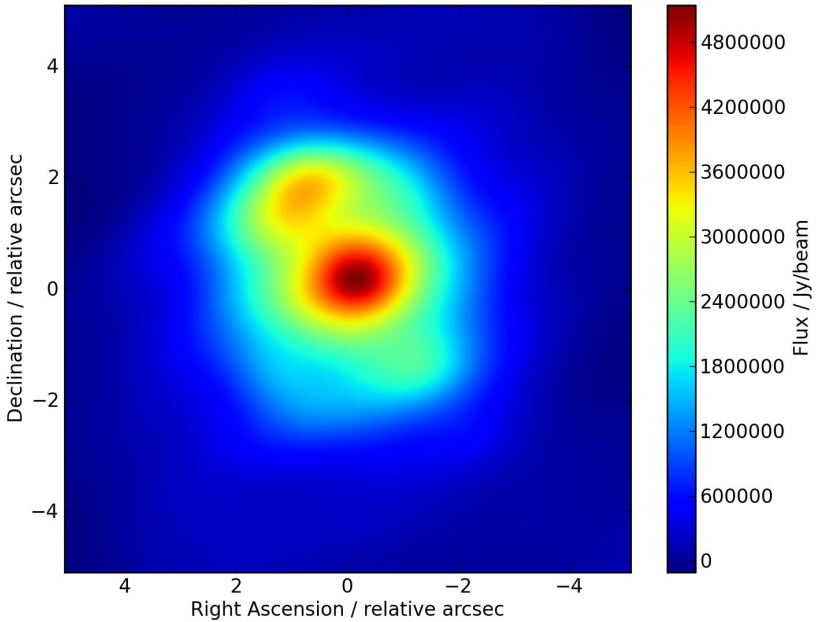


- Justify RMS and requested S/N
  - Explain how you determined required sensivity
  - Do you achieve your science goals with this?
- Justify angular resolution and LAS
  - What spatial scale do you need to resolve in your source?
  - Is there large scale emission?
- Justify correlator setup + spectral resolution


ALMA Observing Tool (Cycle 10 (Phase1)) - Project
File Edit View Tool Search Help
Perspective 1
Project Structure
Proposal Program
Unsubmitted Proposal
Project
Proposal
Planned Observing
ScienceGoal (Science Goal)
General
Field Setup
Spectral Setup
Calibration Setup
Control and Performance
Technical Justification
Editors
Spectral
Proposal Information
Validate your proposal and check for issues / errors
Proposal Type
Scientific Category
• Results shown here
• Must fix before submission!
Feedback
Validation
Validation History
Log
8 errors, 2 warnings : double-click on each row to be taken to the problem
Description
Suggestion
No Principal Investigator specified
Select the top level Project node in the tree and fill in the Principal Investigator field
No Project Name specified
Select the top level Project node in the tree and fill in the Project Name field
Abstract appears to be empty
Select the proposal node in the Proposal tab and edit your abstract
No document found - you must add a Science Case to your proposal
Select the proposal node in the Proposal tab and add your document
No reviewer has been defined
Please select a reviewer from the list of investigators
Not all basebands have been used
Adding wide spectral windows in empty basebands can improve calibration

ALMA simulations

Alex Hygate



Why simulate your proposed observations?

- Determine proposal feasibility
- Investigate different observing setups
- Improve proposal quality

What you need to simulate

- Basic source properties
  - Flux
  - Sky position
- A source model
- Observing setup
  - Desired resolution
  - Observing frequency
  - Desired sensitivity
  - Observing time
  - Atmospheric pwv

Intrinsic to the source

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Intrinsic to the source

E.g. a simulation, model or image of a similar source

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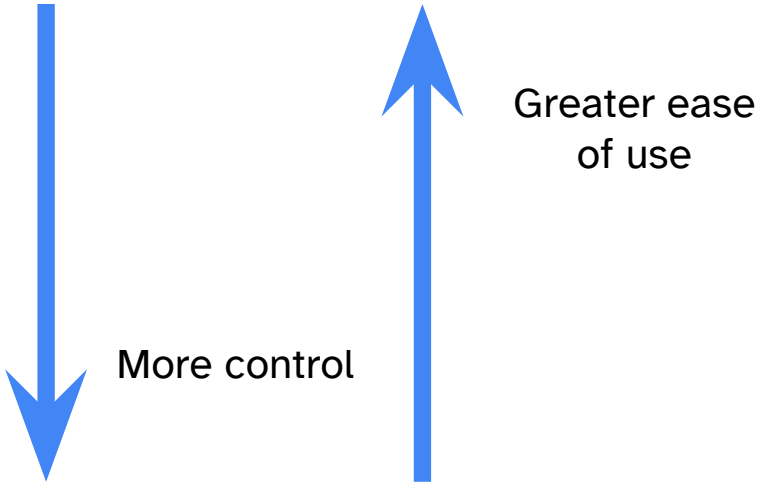
Intrinsic to the source

E.g. a simulation, model or image of a similar source

Enter **these** into the ALMA sensitivity calculator or the observing tool to get **these**

Simulation tools

- 3 options:
  1) Observation Support Tool (website)
  2) simalma (CASA task)
  3) simobserve + simanalyze (CASA tasks)



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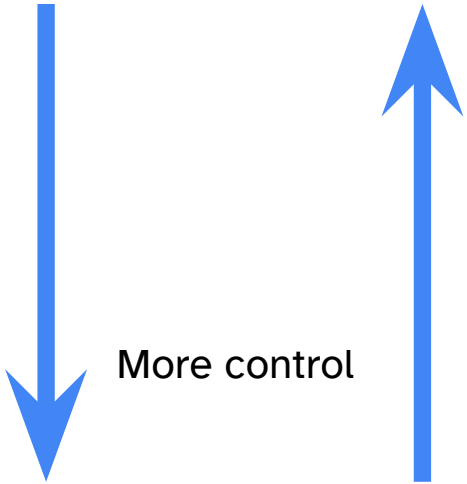
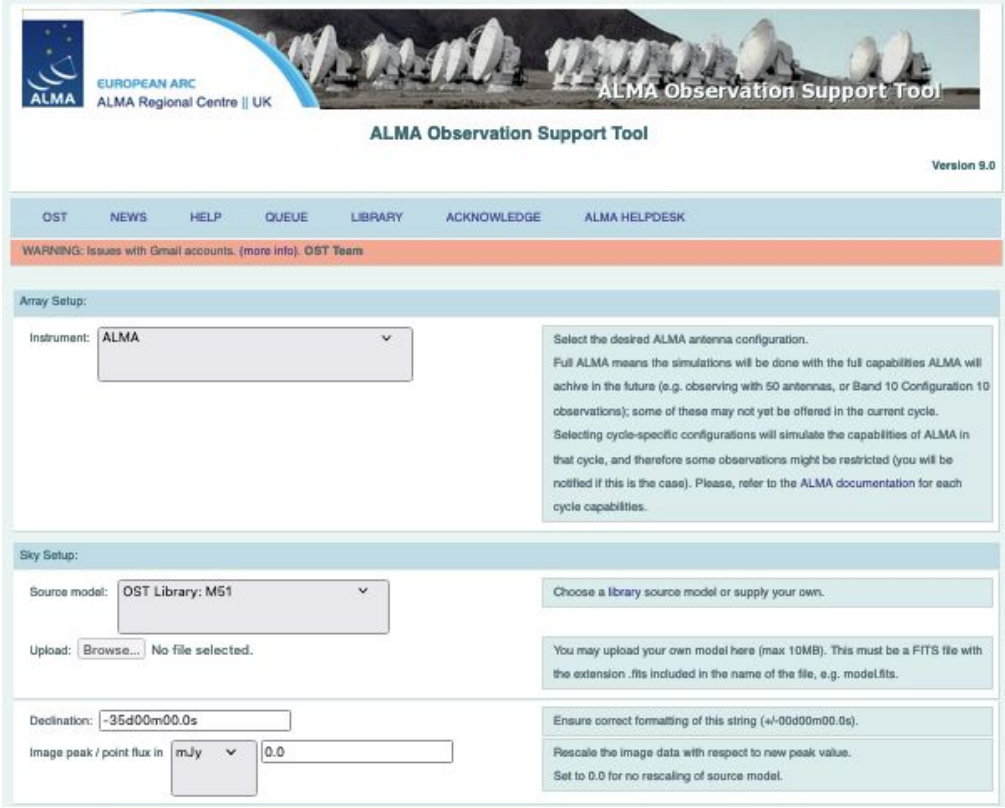


Observation Support Tool (OST)

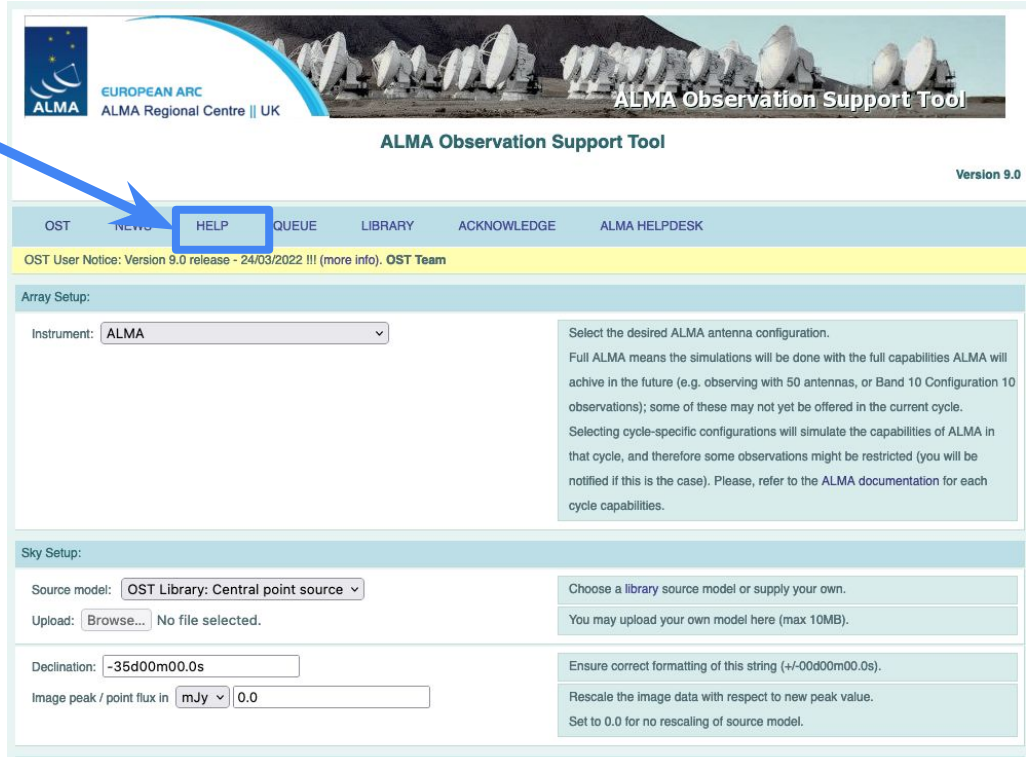
Web tool http://almaost.jb.man.ac.uk/

- Easy to use
- Minimal computing needs (only needs a web browser)
- Requires internet access
- Reliant on website availability
- May need to wait in the queue… http://almaost.jb.man.ac.uk/cgi-bin/almaost/aa_status_v3



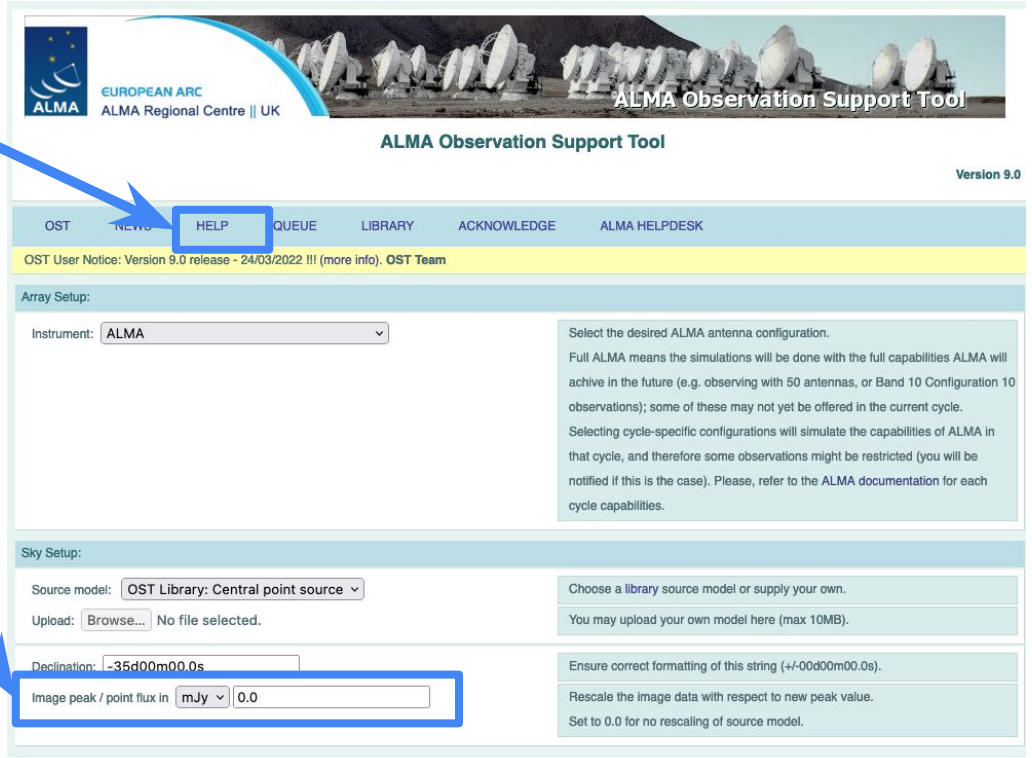
Observation Support Tool (OST)

- Detailed help pages: http://almaost.jb.man.ac.uk/help/



Observation Support Tool (OST)

- Detailed help pages: http://almaost.jb.man.ac.uk/help/
- E.g. what is image peak flux? http://almaost.jb.man.ac.uk/help/#impeak



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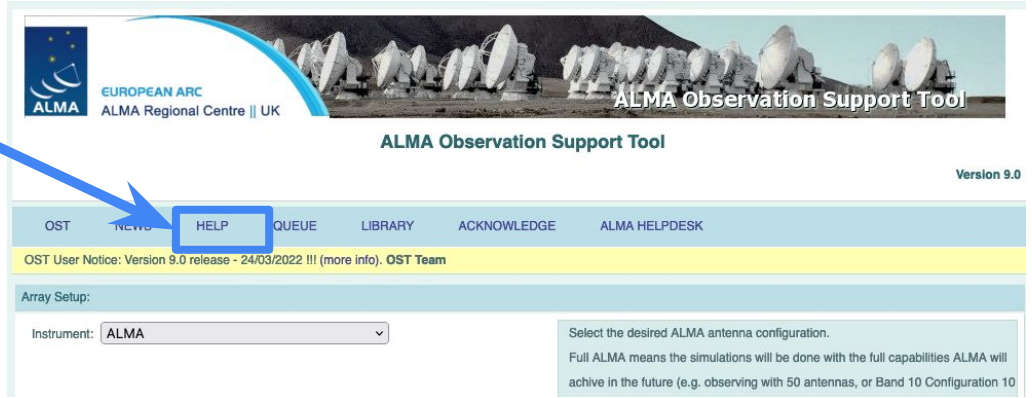


Image Peak / Point Flux

The user can arbitrarily scale the brightness of the source model by entering a non-zero value in this field. The original image $I_{x,y}$ is scaled according to:

$$I'_{x,y} = P \times \frac{I_{x,y}}{M}$$

Eqn. 1

where P is the value entered in the field and M is the original maximum value of the image. Entering a value of zero means that no image scaling will be applied. It is therefore not possible to scale an image such that all pixels are zero. The value entered in this field also controls the brightness of the point source if the user selects that particular source model. If a simulation of a pure noise field is required then this can be accomplished by selecting the point source model and applying a flux of zero. There is also a small drop down menu which selects the unit of the value entered: Jy, mJy or μJy.

Set to 0.0 for no rescaling of source model.

Observation Support Tool (OST)

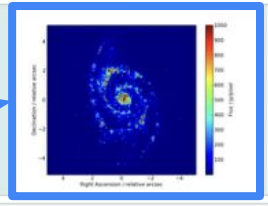
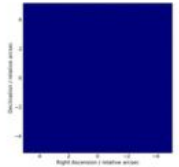
Warning: gmail accounts don't currently work

-> use a different e-mail!

OST results

Overview

Click thumbnails to view full-size images. Left: linear colour scale, right: with histogram equalization.

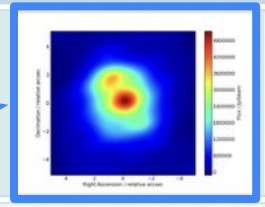
Array configuration:	ALMA out10
Source model:	M51 originally observed in H_alpha
Input image:	 
Maximum elevation:	77.88 degrees
Central frequency:	93.7 GHz (ALMA Band 3)
Total Bandwidth:	0.032 GHz
Track length:	10 hours x 1.0 visits
Hexagonal mosaic pointings :	1 required to cover requested sky area with uniform sensitivity
System temperature:	Tsys = 67.4355519482 K
PWV :	0.475 mm
Theoretical RMS noise:	4.14386310874e-05 Jy (in naturally-weighted map)
Restoring beam (resolution):	Major axis = 1.483 arcsec, minor axis = 1.037 arcsec, PA = -85.683 deg

Model

Data products

Your simulated image:

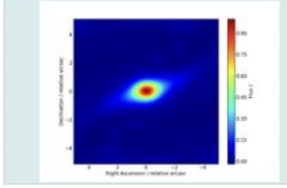
Download FITS file



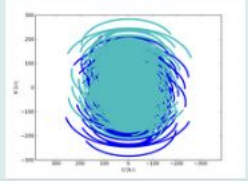
Simulation

Dirty Beam

(Point Spread Function):



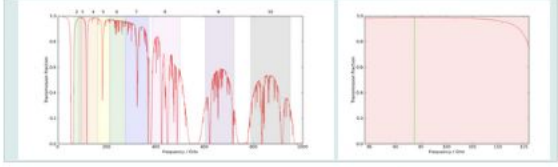
Coverage in the *uv*-plane:



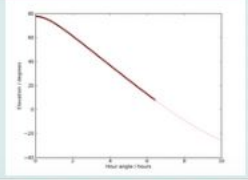
Atmospheric transmission for

all bands (left) and

the selected band (right)



Elevation vs time:



Diagnostics

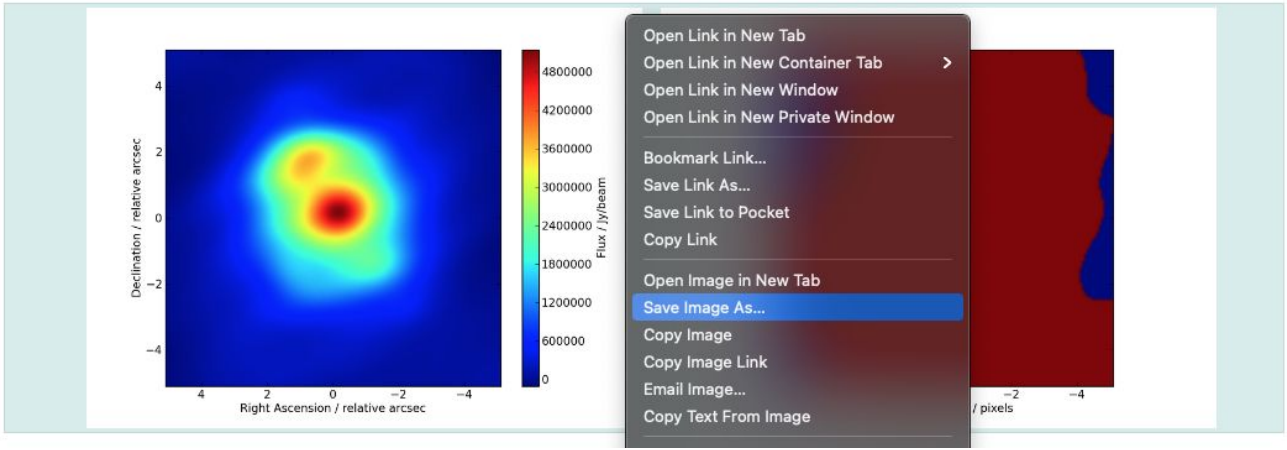
Processing time: 176 seconds

OST results

Data products

Your simulated image:

Download FITS file



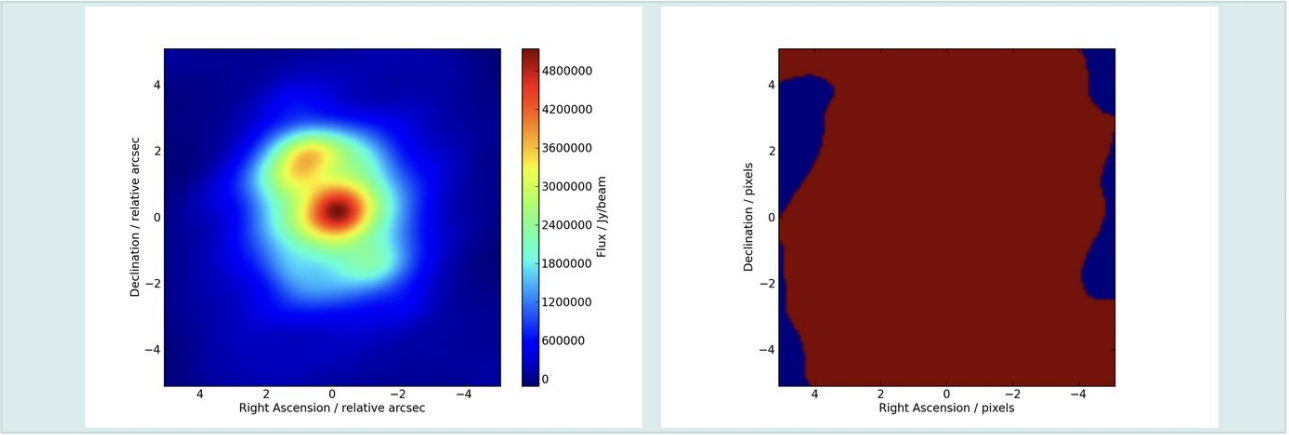
A plot of your simulated image is ready to download and include in your proposal!

OST results

Data products

Your simulated image:

Download FITS file



Or download the FITS file for custom plotting

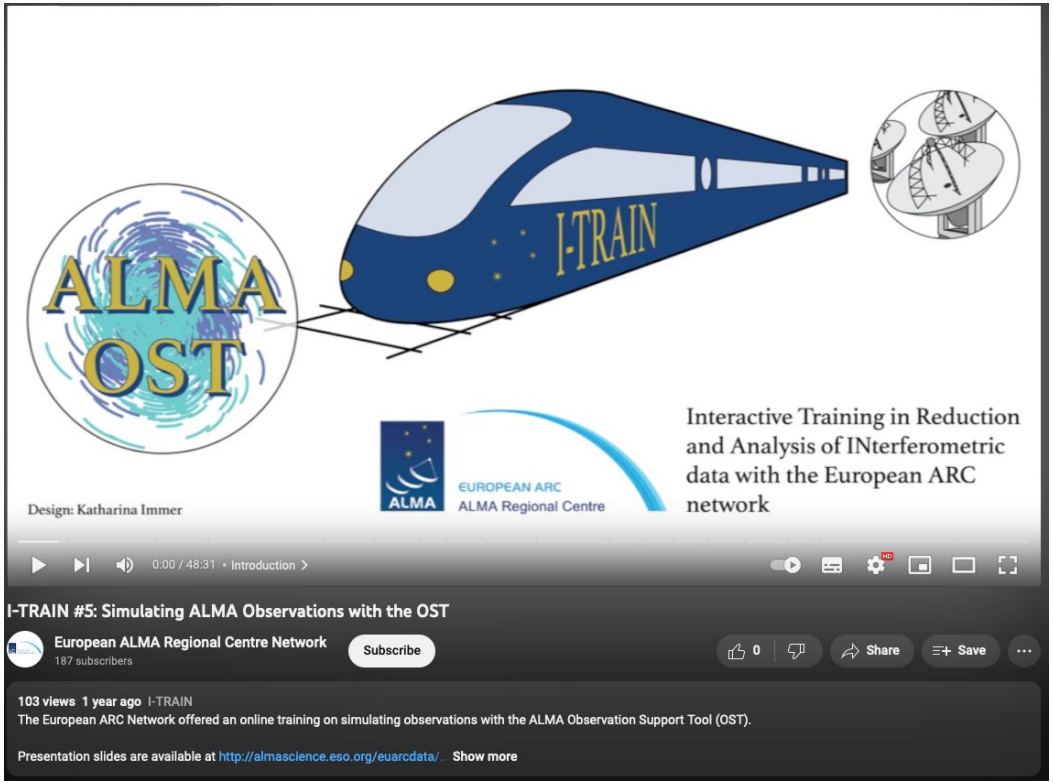
OST video tutorial

Video:

- https://www.youtube.com/watch?v=nXqIj2_JYEk

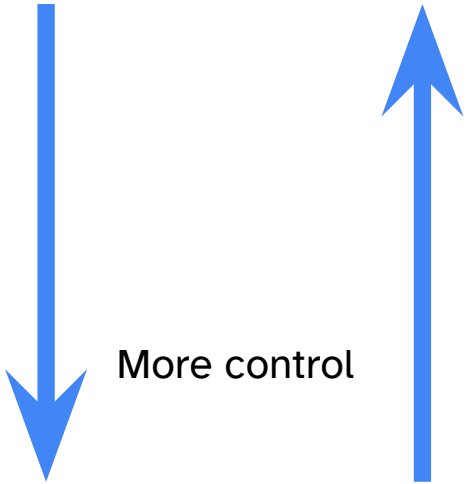
Slides:

- https://almascience.eso.org/euarcdata/itrain05/OST_iTRAIN.pdf



Simulation tools

- 3 options:
  1) Observation Support Tool (website)
  2) **simalma (CASA task)**
  3) simobserve + simanalyze (CASA tasks)



Simalma

- Simulate on your own computer
- Some limitations (but should cover most cases)

- Casaguide tutorial: https://casaguides.nrao.edu/index.php?title=Simalma_(CASA_6.4.1)
- See full details of the task: https://casadocs.readthedocs.io/en/stable/api/tt/casatasks.simulation.simalma.html

Simulation tools

- 3 options:
  1) Observation Support Tool (website)
  2) simalma (CASA task)
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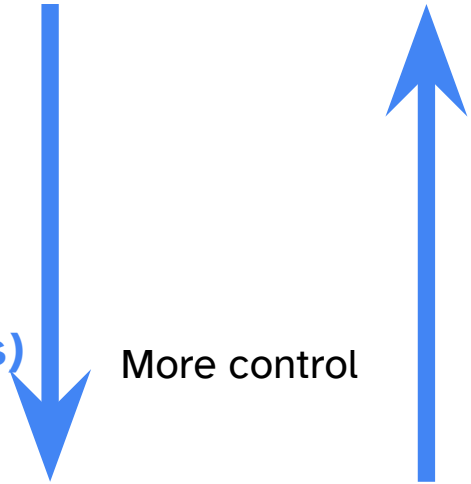


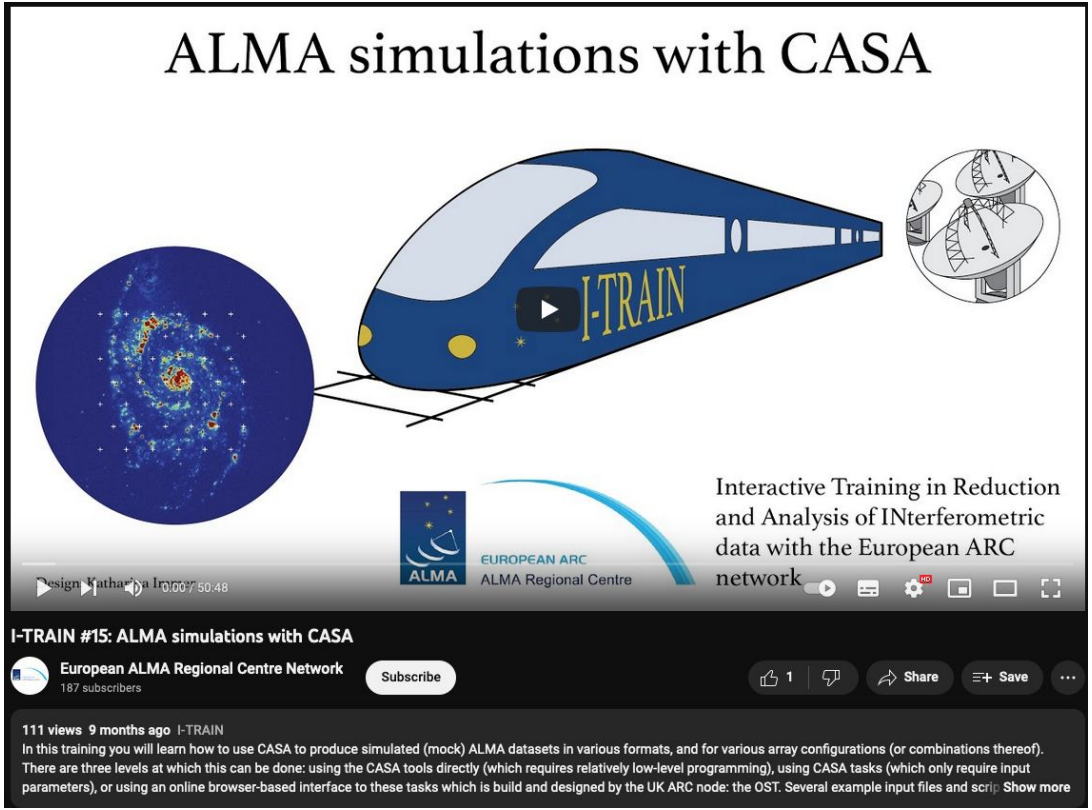
Simobserve + Simanalyze

- More flexibility :
  - Not limited to ALMA - e.g. simulate the VLA (for dual proposals!)
  - Control more settings of atmospheric noise corruption
- More effort to simulate
  - More settings that you can get wrong!
  - **If you want quick results the OST or simalma may be a better choice!**
- Worked tutorial (only available for CASA 5): https://casaguides.nrao.edu/index.php?title=Protoplanetary_Disk_Simulation_(CASA_5.4)

CASA simulations video tutorial

Video:

- https://www.youtube.com/watch?v=XlKH8XMDmHI



A note about noise & time calculations

- Noise can differ between the ALMA Sensitivity Calculator/observing tool the OST and casa simulations.
- You should use the observing tool noise for your technical justification, not the simulated noise
  - https://almascience.eso.org/proposing/sensitivity-calculator

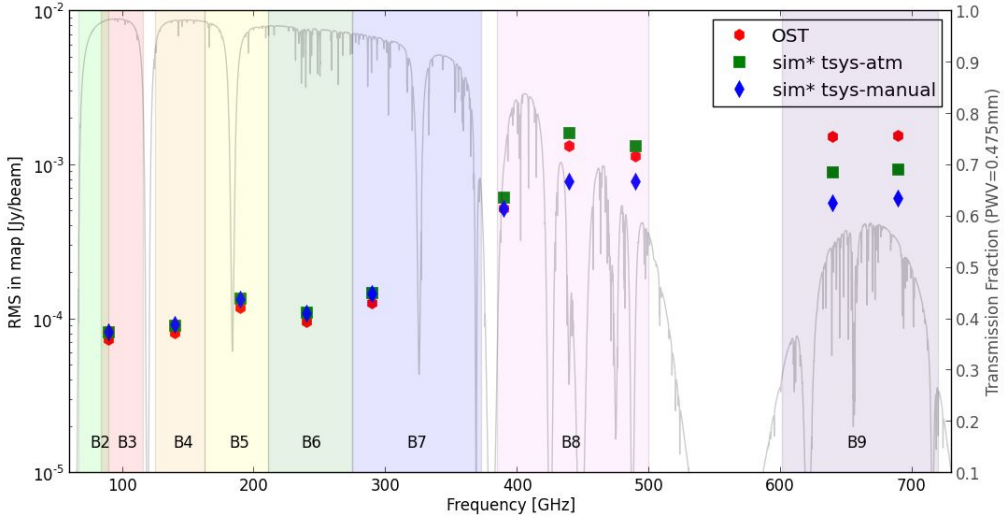


Image from: https://almaost.jb.man.ac.uk/help/#noise

ALMA Simulations Resources

- Observation Support Tool (OST) http://almaost.jb.man.ac.uk/
  - Help pages: http://almaost.jb.man.ac.uk/help/
  - Extended video tutorial: https://www.youtube.com/watch?v=nXqIj2_JYEk
- CASA documentation: https://casa.nrao.edu/casadocs/latest/
  - CASA simulations in general: https://casadocs.readthedocs.io/en/stable/notebooks/simulation.html
  - simalma: https://casa.nrao.edu/casadocs/latest/global-task-list/task_simalma/about
  - simobserve: https://casa.nrao.edu/casadocs/latest/global-task-list/task_simobserve/about
  - simanalyze: https://casa.nrao.edu/casadocs/latest/global-task-list/task_simanalyze/about
- CASA guides: https://casaguides.nrao.edu/index.php?title=Simulating_Observations_in_CASA_5.4
  - (some guides available in CASA 6 versions, others are only available in CASA 5 versions)
  - simalma: https://casaguides.nrao.edu/index.php?title=Simalma_(CASA_6.4.1)
  - simobserve+ simanalyze https://casaguides.nrao.edu/index.php?title=Protoplanetary_Disk_Simulation_(CASA_5.4)
- CASA simulations video tutorial: https://www.youtube.com/watch?v=XlKH8XMDmHI
- Download CASA: https://casa.nrao.edu/casa_obtaining.shtml

➔ **Allegro maintains CASA installations on our computers, which can be used for simulations**

Contact us at alma@strw.leidenuniv.nl with questions or requests for assistance with simulating your proposed ALMA observations

Distributed peer review

Alex Hygate

Reviewer assignment rules

- Each proposal must designate someone (usually the PI) to review 1 proposal set (10 proposals) for all proposals except large programmes
    - A large programme is >50 hours 12m time (regardless of 7m time) or 150 hours of standalone 7m time

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- You can review a maximum of 5 proposal sets (50 proposals), but the recommended maximum is 3 proposal sets (30 proposals)
  - If you have more than 5 proposals you must designate (willing!) co-Is as the reviewer
- If you don't have a PhD, you must either:
  - Designate a mentor with a PhD (e.g. your PhD supervisor).
  - Designate a (willing!) co-I to do the reviews.

Mentor guidelines

Reviewers participating in the distributed review process who do not have a PhD are required to have a mentor who will assist with the proposal review. The mentors are specified in the OT when preparing the proposal. In general, the role of the mentor is to provide whatever guidance is necessary for the reviewer during the review process. They have access to the proposals and the reviews of their mentees through the Reviewer Tool in read-only mode.

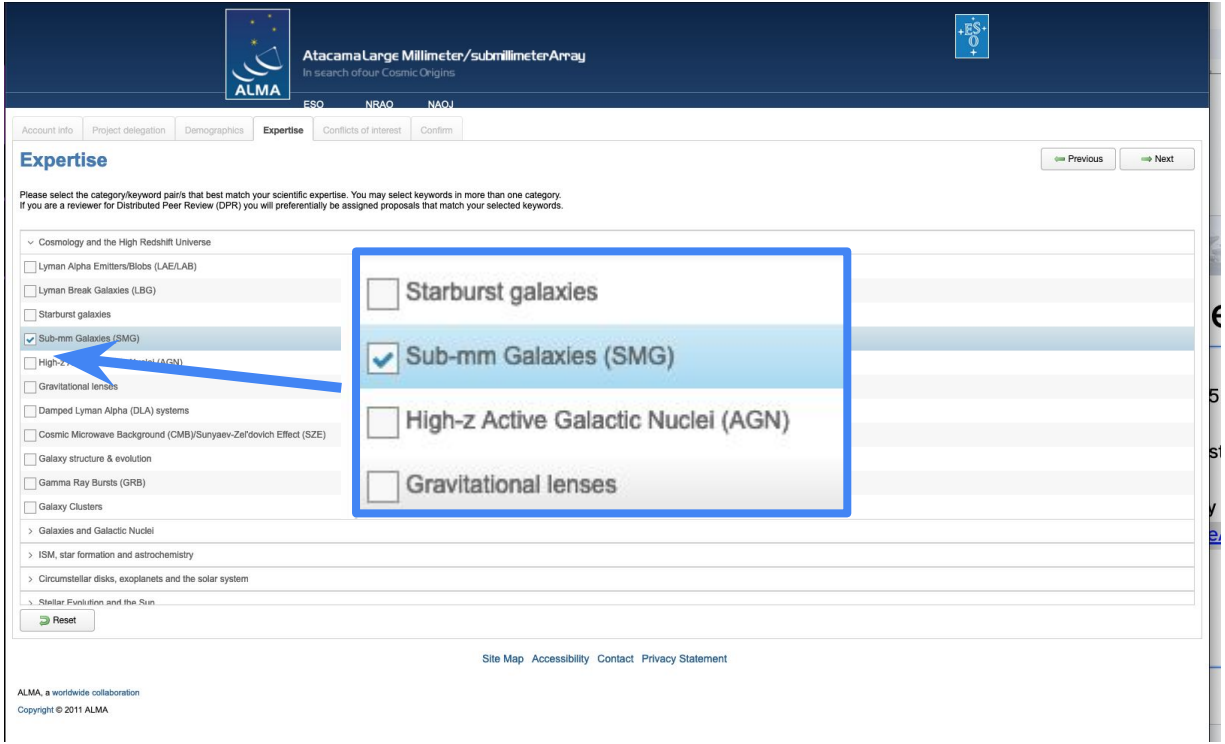
Specific roles of a mentor include:

1. Work with the reviewer to declare any conflicts of interest on the assigned proposals. The conflicts of interest criteria apply to both the reviewer and the mentor.
2. Provide advice to the reviewer as needed on the scientific assessment of the proposals.
3. Provide guidance to the reviewer on providing constructive feedback to the PIs.
4. Review the comments to the PI before they are submitted.

https://almascience.eso.org/proposing/alma-proposal-review/guidelines-for-reviewers#guidementors

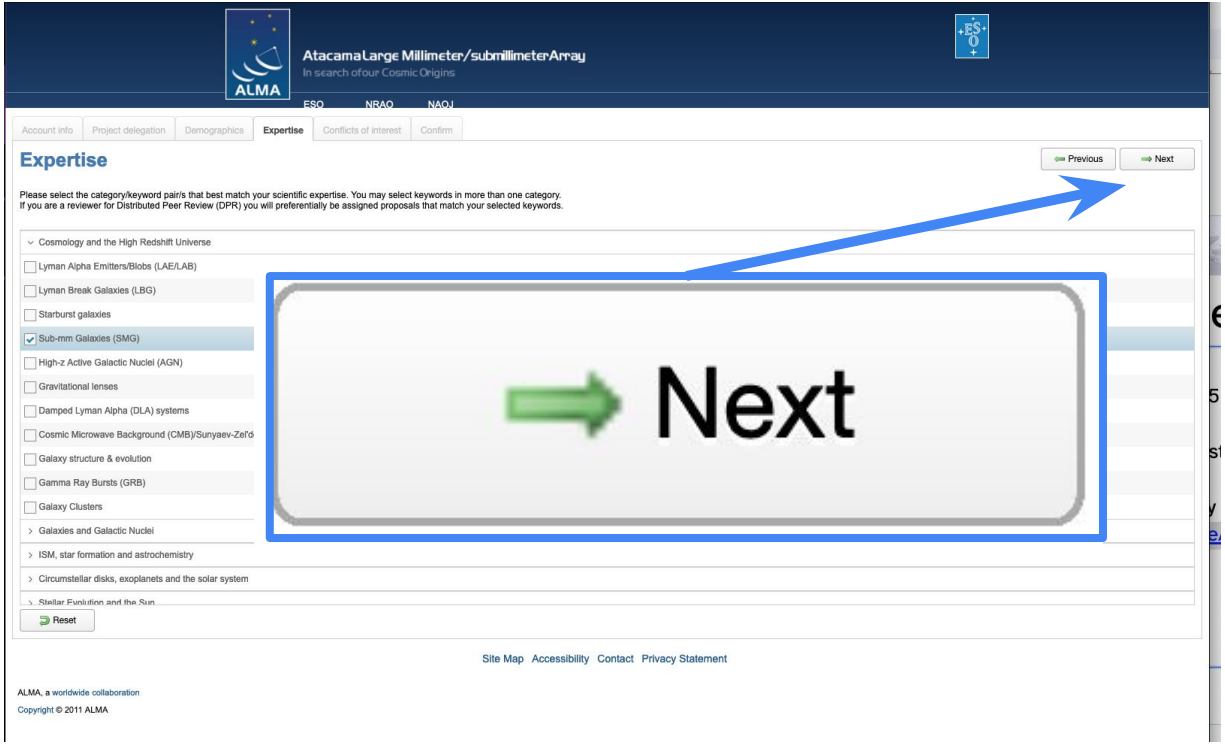
Expertise areas

- ALMA account page: https://asa.alma.cl/UserRegistration/secure/updateAccount.jsp
- Select your expertise areas so that you get appropriate proposals
- Set your expertise areas by 16 May 2023, 15:00 UTC



Expertise areas

- ALMA account page: https://asa.alma.cl/UserRegistration/secure/updateAccount.jsp
- You cannot use the tabs to navigate the webpage, only the arrows in the top right



Date	Milestone
12 April 2023 (15:00 UT)	Release of Cycle 10 Call for Proposals, Observing Tool, and supporting documents, and opening of the Archive for proposal submission
10 May 2023 (15:00 UT)	Proposal submission deadline for Cycle 10 Call for Proposals
01 June 2023, (15:00 UTC)	**Deadline to submit list of proposals with a conflict of interest**
28 June 2023 (15:00 UT)	**Deadline to submit reviews for the distributed peer review system**
August 2023	Announcement of the outcome of the proposal review process
1 October 2023	Start of ALMA Cycle 10 Science Observations (anticipated)

Don't forget the review deadline - it is mandatory!

Not submitting your reviews = rejected proposal!

https://almascience.eso.org/proposing/proposers-guide#tab:cycletimeline

Distributed peer review webinars

ALMA will offer webinars presenting the distributed peer review and with Q&A session

- Session 1: Thursday May 25, 17:00 UTC
- Session 2: Friday May 26, 13:00 UTC
- Session 3: Wednesday May 31, 2:00 UTC
- Attend whichever is convenient for you
- Details will be e-mailed to you and posted here: https://almascience.eso.org/proposing/alma-proposal-review/alma-proposal-review

Guidelines also available in text form here:

https://almascience.eso.org/proposing/alma-proposal-review/guidelines-for-reviewers#guidementors

Code of conduct and confidentiality

All participants in the review process are expected to behave in an ethical manner.

- Reviewers will judge proposals solely on their scientific merit.
- Reviewers will be mindful of bias in all contexts.
- Reviewers will declare all major conflicts of interest.
- The proposal reviews will be constructive and avoid any inappropriate language.

All proposal materials related to the review process are strictly confidential.

- The assigned proposals may not be distributed or used in any manner not directly related to the review process.
- Any data, intellectual property, and non-public information shown in the proposals may be used only for the purpose of carrying out the requested proposal review.
- The assigned proposals and the reviews may not be discussed with anyone other than the Proposal Handling Team, the APRC, or the assigned mentor when applicable.
- All electronic and paper copies of the proposal materials must be destroyed as soon as a reviewer completes the proposal review process.

https://almascience.nrao.edu/proposing/alma-proposal-review/guidelines-for-reviewers#ethics

Distributed Proposal Review Resources

Proposer's guide:

- https://almascience.eso.org/proposing/proposers-guide#autotoc-item-autotoc-51

Explanation:

- https://almascience.eso.org/proposing/alma-proposal-review/distributed-peer-review

FAQ:

- https://almascience.eso.org/proposing/alma-proposal-review/frequently-asked-questions

Guidelines for reviewers:

- https://almascience.eso.org/proposing/alma-proposal-review/guidelines-for-reviewers

ALMA account page:

- https://asa.alma.cl/UserRegistration/secure/updateAccount.jsp

ALMA reviewer tool

- https://almascience.eso.org/proposing/alma-proposal-review/reviewer-tool

How to use the reviewer tool:

- https://almascience.eso.org/proposing/alma-proposal-review/how-to-use-the-reviewer-tool

Network support

- After the successful execution and data delivery of your project, you can ask for face-to-face support for regular or advanced data reduction
- Face-to-face support can also be requested for the purposes of proposal preparation or archival research
- Support: high-performance computing resources; remote or on-site user support
- Helpdesk tickets submitted via the Science Portal are passed to the relevant node
- You may also contact the nodes directly

Want to know more?

- **ALMA Proposer's Guide for Cycle 10**
  https://almascience.eso.org/proposing/proposers-guide
- **ALMA Primer**
  https://almascience.eso.org/proposing/early-science-primer
- **ALMA Primer videos**
  https://almascience.eso.org/tools/alma-primer-videos
- **ALMA explained: a series of 3-minute videos**
  https://www.eso.org/sci/facilities/alma/arc/ALMA_explained_videos.html
- **ALMA Science Archive**
  https://almascience.eso.org/aq/

EUROPEAN ARC
ALMA Regional Centre || Allegro

Contact Allegro!

alma@strw.leidenuniv.nl

Need help?

- E-mail us your questions or request a meeting with the Allegro staff to discuss your proposal
- Contact us on the #Allegro channel in slack
- Dedicated drop-in sessions in our offices (HL-1122) from 14:00-16:00 on:
  - April 24
  - May 1
  - May 8
- If you are planning to submit a Large Programme, contact us early so that we can explore the many ways we can support your project and help optimise your program.

We wish you a relaxed and successful proposal preparation time!

Contact Allegro!

alma@strw.leidenuniv.nl