

ALMA Capability

Atacama Large Millimeter/submillimeter Array



Chile



50 x 12m

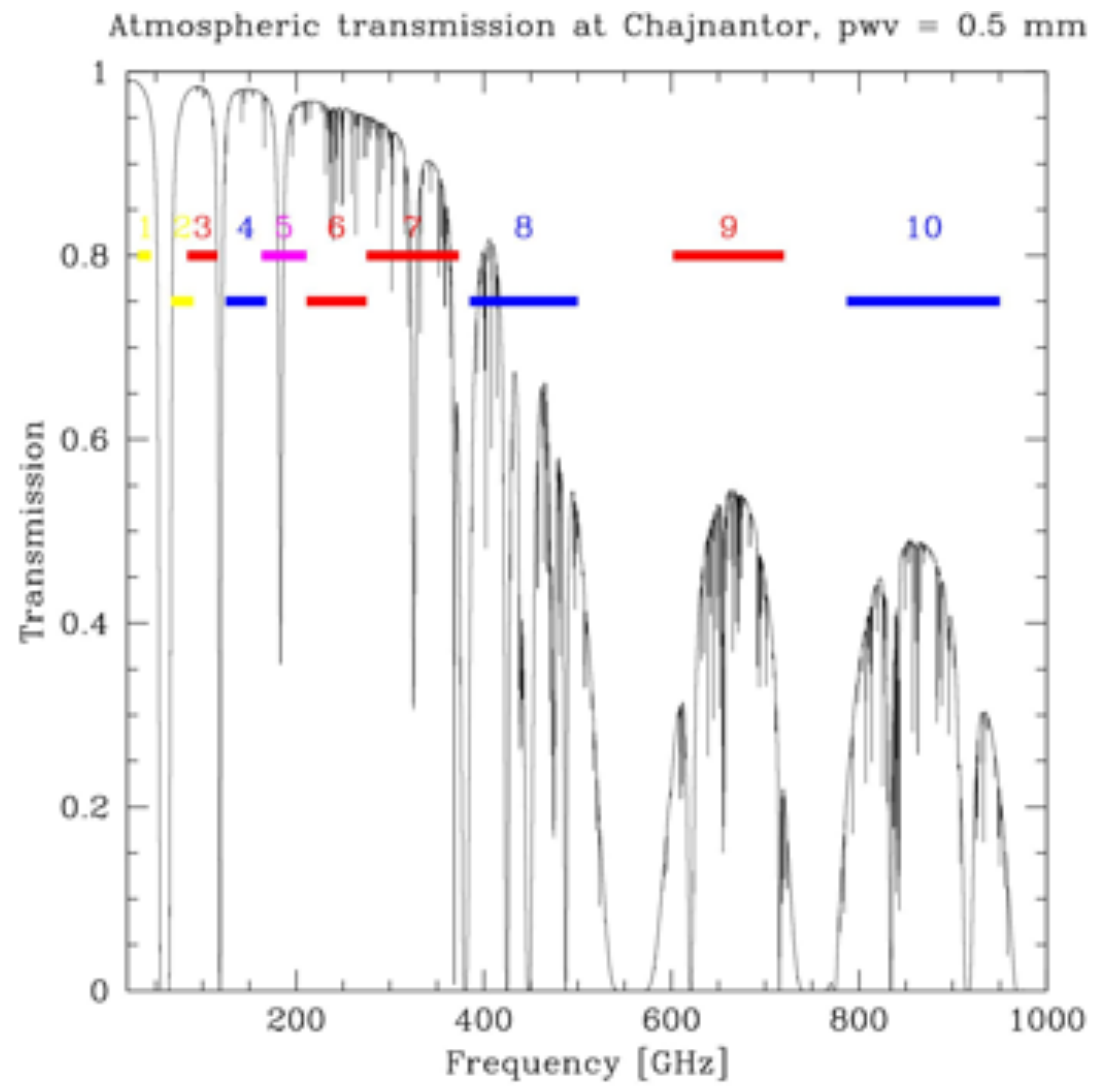
12 x 7m

4 x 12m TP

ALMA antennas on the Chajnantor Plateau at 5000m
latitude = -23° (upper declination limit for ALMA = $+47^\circ$)

ALMA Basic

- Antenna:
 - 50 x 12-m array : baseline length 160m ~ 1.6km (configuration C1 to C10)
 - 12 x 7-m array : fixed baseline length 45m
 - 4 x 12m Total Power
- Interferometry: samples the visibility function (Fourier transform of the sky brightness distribution)
- Imaging process: CASA (Common Astronomy Software Applications package)
- Covering extended feature $> 0.6 (\lambda/b_{\min})$: add 7m array, TP, or shorter configuration of 12m
- Frequency coverage: 35 ~ 950 GHz
- Spectral resolution: 7680 channels (ex, 0.01 km/s at 110 GHz)
- Field-of-view: antenna size + frequency (\Rightarrow mosaic observational mode with Nyquist sampling)
FWHM $\approx 1.13 (\lambda/D)$ (ex, 19" at 300 GHz for 12m, 33" for 7m)
- Spatial resolution (synthesized beam size) : baseline length + frequency
 $\theta \approx 1.13 (\lambda/\text{baseline_length})$ (ex, 0.02" at 230GHz, 0.04" at 100GHz for 1.6km (C-10))



Atmospheric Transmission at Chajnantor

ALMA Receiver Bands

ALMA Band	Wavelength coverage (mm)	Noise Temperature (K) Specification	Frequency (GHz)	Produced by	Receiver Technology	First light
1	6–8.6	32	35 – 50	ASIAA (Taiwan) / NAOJ (Japan)	HEMT	2021
2	2.6–4.5	47	67 – 116	OSO (Sweden) / NOVA (Netherlands) / INAF (Italy) / NAOJ (Japan)	HEMT	2023
3	2.6–3.6	60	84 – 116	HIA (Canada)	SIS	2009
4	1.8–2.4	82	125 – 163	NAOJ (Japan)	SIS	2013
5	1.4–1.8	105	163 – 211	OSO (Sweden) / NOVA (Netherlands)	SIS	2016
6	1.1–1.4	136	211 – 275	NRAO (US)	SIS	2009
7	0.8–1.1	219	275 – 373	IRAM (France)	SIS	2009
8	0.6–0.8	292	385 – 500	NAOJ (Japan)	SIS	2013
9	0.4–0.5	261	602 – 720	NOVA (Netherlands)	SIS	2011
10	0.3–0.4	344	787 – 950	NAOJ (Japan)	SIS	2012

Cycle-13 Configuration Schedule

Start date	Configuration	Longest baseline	LST: Best conditions
1-Oct-2026	C-3	0.50 km	22-10
20-Oct-2026	C-2	0.31 km	23-11
10-Nov-2026	C-1	0.16 km	1-13
30-Nov-2026	C-2	0.31 km	2-14
20-Dec-2026	C-3	0.50 km	4-15
10-Jan-2027	C-4	0.78 km	5-17
1-Feb-2027	No observations due to maintenance		
1-Mar-2027	C-4	0.78 km	8-21
20-Mar-2027	C-5	1.4 km	9-23
20-Apr-2027	C-6	2.5 km	11-1
20-May-2027	C-7	3.6 km	13-3
20-Jun-2027	C-8	8.5 km	14-5
11-Jul-2027	C-9	13.9 km	16-6
30-Jul-2027	C-10	16.2 km	17-7
20-Aug-2027	C-9	13.9 km	19-8
10-Sep-2027	C-8	8.5 km	20-9

- Key dates (anticipated) for Cycle 13
 - **19 March 2026**: Release of the ALMA **Cycle 13 Call for Proposals** and Observing Tool, and opening of the archive for proposal submission
 - **23 April 2026**: Proposal submission **deadline**
 - October 2026: Start of Cycle 13 observations, spanning 12 months
- New in Cycle 13
 - Availability of **Band 2** capabilities on the 12-m Array will be confirmed by early February.
- Observing modes for Large Programs
 - Large Programs are proposals with an estimated execution time of **greater than 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**. Large Programs should not involve time-critical or ToO observations, and may **not include observations in full polarization measurements, solar observations, VLBI, Phased Array mode, Astrometric observations or observations requiring bandwidth switching calibration**.
- Other relevant information
 - We remind users that EHT monitoring mode outside of the usual VLBI campaign window was only offered in Cycle 12 and therefore will not be available in Cycle 13.
 - Further information on the impact of WSU work on Cycle 14 and 15 will be announced with the Call for Proposals.

Cycle 13 (expected) Call for Proposals

- ALMA Cycle 13 proposal submission will open at **15:00 UT on Thursday, 19 March 2026**. The submission deadline is **15:00 UT on Thursday, 23 April 2026**
- The JAO anticipates allocating 4300 hours on the 12-m Array and 4300 hours on the Atacama Compact Array (ACA).
- The ACA allocation includes 4300 hours each on the 7-m Array and the Total Power (TP) Array.
- In Cycle 13, Bands 1 through 10 are offered in configurations **C-1** through **C-10**.
- ALMA provides continuum and spectral-line capabilities for wavelengths from **0.32 mm to 8.5 mm**, and angular resolutions from **0.01" to 8.5"** on the 12-m Array
- VLBI and DDT projects are limited to a maximum of 5% each of the available time
- Proposal reviews will be conducted via a **dual-anonymous** process

Summary of capabilities offered in Cycle 12

Number of antennas:

- At least forty-three antennas in the 12-m Array.
- At least ten 7-m antennas (for short baselines) and three 12-m antennas (for single-dish maps) in the ACA.

Receiver bands:

- Receiver Bands 1, 3, 4, 5, 6, 7, 8, 9, and 10 (wavelengths of 7.0, 3.0, 2.0, 1.6, 1.3, 0.85, 0.65, 0.45, and 0.35 mm, respectively).

12-m Array Configurations:

- Cycle 12 includes 12-m Array configurations C-1 through C-8.
- Maximum baselines between 0.16 km and km depending on array configuration. Configurations with maximum baselines equal to or longer than 3.6 km (i.e., C-7 and C-8, as offered in Cycle 12) are considered “long-baseline configurations”.

Spectral-line, continuum, and mosaic observations:

- Spectral-line and continuum observations with the 12-m Array and the 7-m Array in Bands 1 and 3 through 10.
- Single-field interferometry (Bands 1 and 3 through 10) and mosaics (Bands 1 and 3 through 9) with the 12-m Array and the 7-m Array.
- Single-dish spectral-line observations in Bands 3 through 8.

Polarization

- Single-pointing, on-axis, full linear and circular polarization for both continuum and full spectral resolution observations in Bands 1 and 3 through 7 on the 12-m Array. The field of view of linear and circular polarization observations is limited to the inner one third and the inner one tenth of the primary beam, respectively. The minimum detectable degree of circular polarization is 1.8% of the peak flux for both continuum and full spectral resolution observations.
- Mosaics for continuum linear polarization observations for the 12-m Array in Bands 1 and 3 through 7.
- Single-pointing, on-axis linear polarization on the stand-alone 7-m Array in Bands 1 and 3 through 7. The field of view is limited to the inner one third of the primary beam.

Band-to-band calibration

- Observations in Bands 7 through 10 for the ACA or any 12-m Array configuration may require B2B calibration in order to find a suitably nearby and sufficiently bright phase calibrator to ensure phase calibration quality. The ALMA OT will automatically check the availability of suitable phase calibrators during proposal validation and will automatically trigger the B2B mode where required.
- B2B observations are subject to the availability of suitable calibrators as checked by the ALMA OT. Some science targets, particularly at the highest frequencies (Bands 9 and 10) and longest baselines (C-8 in Cycle 12), where the constraints are most strict, may not be observable even with B2B. The ALMA OT will indicate an error if a source does not have a suitable calibrator. PIs are advised to begin preparing their high-frequency proposals early to ensure that a suitable calibrator is available for their targets.

Proposal

Preparation,

Submission,

and Review

AI

Proposal preparation

Generative Artificial Intelligence (GAI) to assist with proposal preparation tasks, such as refining and organizing text. Investigators are fully responsible for ensuring that any content produced with GAI is scientifically accurate, original, and free from plagiarism. Properly citing all original source material referenced in content created using GAI, in accordance with academic standards.

Proposal review

To maintain fairness, confidentiality, and reliability in the review process, reviewers must adhere to the following guidelines. Reviewers have sole responsibility for assessing proposals. **GAI tools must not be used to recommend rankings, assess scientific strengths or weaknesses, or perform any evaluative tasks.** Proposals assigned to reviewers are strictly confidential. Reviewers and mentors must **not input any part of their assigned proposals into GAI or machine learning tools.** GAI may only be used to correct grammar or improve readability of their reviews. If GAI tools are used, reviewers must ensure that no proposal-specific or sensitive information entered into a GAI tool. Reviewers are fully responsible for ensuring their reviews are accurate and comply with ALMA's guidelines.

1. Dual-Anonymous proposal review

: the proposal team does not know the identity of the reviewers and the reviewers do not know the identity of the proposal team

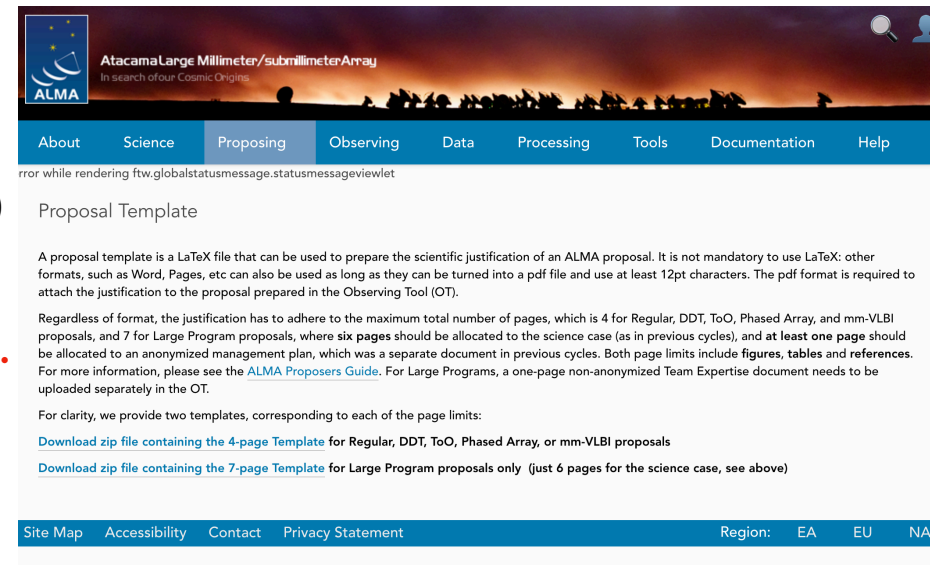
Proposals that do not follow the dual-anonymous guidelines may be subject to disqualification

General Guidelines pertaining to all Programs

<https://almascience.nao.ac.jp/proposing/alma-proposal-review/dual-anonymous>

2. Scientific Justification

- **one single PDF**, English, maximum file size is 20MB (including figures, tables, and references)
-
- Proposal Latex format (<https://almascience.nrao.edu/proposing/proposal-template>)
-
- **Font size: no more than 15% of the text is smaller than 12 points.**
The proposal will be rejected
- **4 pages** : Regular, ToO, Solar, VLBI, Phased Array and DDT
- **6 pages** : Large Programs
- Large Program management plan (a separated 1-page PDF)
 - include the description of the computing resources available to the team to reduce and analyze ALMA data



The screenshot shows the ALMA website's 'Proposing' page. The header features the ALMA logo and the text 'Atacama Large Millimeter/submillimeter Array' with the tagline 'In search of our Cosmic Origins'. A navigation menu includes 'About', 'Science', 'Proposing', 'Observing', 'Data', 'Processing', 'Tools', 'Documentation', and 'Help'. The main content area is titled 'Proposal Template' and contains the following text: 'A proposal template is a LaTeX file that can be used to prepare the scientific justification of an ALMA proposal. It is not mandatory to use LaTeX: other formats, such as Word, Pages, etc can also be used as long as they can be turned into a pdf file and use at least 12pt characters. The pdf format is required to attach the justification to the proposal prepared in the Observing Tool (OT). Regardless of format, the justification has to adhere to the maximum total number of pages, which is 4 for Regular, DDT, ToO, Phased Array, and mm-VLBI proposals, and 7 for Large Program proposals, where six pages should be allocated to the science case (as in previous cycles), and at least one page should be allocated to an anonymized management plan, which was a separate document in previous cycles. Both page limits include figures, tables and references. For more information, please see the [ALMA Proposers Guide](#). For Large Programs, a one-page non-anonymized Team Expertise document needs to be uploaded separately in the OT. For clarity, we provide two templates, corresponding to each of the page limits: [Download zip file containing the 4-page Template](#) for Regular, DDT, ToO, Phased Array, or mm-VLBI proposals [Download zip file containing the 7-page Template](#) for Large Program proposals only (just 6 pages for the science case, see above)'. The footer contains 'Site Map', 'Accessibility', 'Contact', 'Privacy Statement', and 'Region: EA EU NA'.

Science Case

- a brief justification of the requested sensitivity and angular resolution (full details in the Technical Justification)
- a knowledgeable but broad-based audience

Large Program

- An assessment of the scheduling feasibility: it should be completed within one cycle.
So the program must satisfy the configuration/LST restriction.
- A description of the data products (including any non-ALMA products) that will be delivered by the team for ingestion into the ALMA archive
- A publication plan

3. Technical Justification

- Sensitivity – source brightness, the requested sensitivity and S/N ratio
- Imaging and correlator configuration – angular resolution, maximum recoverable scale
- Spectral setup

If a proposal does not conform to the advertised capability, it can be declared technically infeasible either during the proposal review process or during the Phase 2.

Proposal validation, submission and withdrawal

- A proposal can be updated and submitted again to the ALMA Archive many times as needed by the PI before the proposal deadline.
- DDT proposals are not overwritten, only be submitted once

4. Proposal evaluation

DPR (Distributed Peer Review)

- PI proposals
- Maximum number of Proposals sets : 3
- If the PI does not have a Ph.D. at the time of proposal submission, the PI can still be the reviewer, but a mentor must be identified at the time of the proposal submission

APRC (ALMA Proposal Review Committee)

- Large Program
- 16-18 members of the scientific community drawn from the five ALMA science categories
- External reviews

5. Proposal Selection (22.5% EA)

Grade A: 33 %

Grade B: 67%

Proposal Type

1. Regular proposal (“S”)

estimated execution time does **not exceed 50 hours on the 12-m Array** or **150 hours on the 7-m Array** in stand-alone mode

2. Target of Opportunity proposal (“T”)

Targets and/or time of observation are not known in advance.

(Note: **Regular proposals wrongly submitted by the PI as ToO proposals may be rejected** on technical grounds)

PIs should specify the number of triggers needed

: to use a first epoch of observations to assess target properties (e.g., suitability for monitoring), it is recommended that PIs create single-visit Science Goals (SGs) for this purpose, separate from multi-visit SGs for any subsequent monitoring.

Trigger: the Project Trigger Submission Page available at the ALMA [Helpdesk](#)

3. Large program

estimated execution time of greater than 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.

Large Programs cannot include

- time-critical or ToO observations,
- full polarization measurements,
- solar observations,
- VLBI, Phased Array mode,
- Astrometric observations or
- observations requiring bandwidth switching calibration

Scheduling feasibility (in the OT): Large Programs should be designed to be completed within one cycle given the configuration schedule and weather constraints, and the program must satisfy the configuration/LST restrictions applicable to Large Programs (up to 50% of the time in the Cycle 12 configurations (i.e., the ACA and C-1 through C-8)).

4. mm-VLBI and Phased Array proposal

VLBI

- 7 mm (Band 1) or 3 mm (Band 3) for Global Millimeter VLBI Array (GMVA)
- 1.3 mm (Band 6) or 0.87 mm (Band 7) for the Event Horizon Telescope (EHT) network

ALMA observation will likely be carried out in **March–May 2027 (?)**

Given that the outcome of Cycle 12 VLBI proposals may not be known before the ALMA Cycle 13 proposal deadline, PIs of such proposals may wish to [resubmit their proposals in Cycle 13](#) in case the Cycle 12 observations are unsuccessful. No resubmission to the GMVA call for proposals is needed in such cases.

EHT Band 6 Monitoring: In Cycle 12 there is the opportunity to propose for multi-epoch monitoring observations, including epochs outside of the traditional 12-night window² of the EHT campaign. The spectral tuning for monitoring is limited to the standard Band 6 VLBI tuning. The LST of targets should ideally be between 10 to 16h. Each monitoring epoch will last 4–5 hours and epochs will be separated by a minimum of three days. Monitoring observations may occur in March–April 2026, with a potential extension to May. The EHT may also consider one visit before the February shut-down on a shared-risk basis. EHT monitoring proposals are limited to less than 50 hours. This monitoring capability is not currently planned for future cycles.

[A maximum of 50 hours of Cycle 12 time will be available for Phased Array mode](#) observations. These observations will take place during the VLBI time blocks, anticipated to be in March–May 2026

5. Joint proposals (Joint Proposals accepted by ALMA will be assigned **Grade A**)

- PIs must submit their Joint Proposals to the observatory that requires the most observing time. In the case of ALMA, the relevant time request will be the amount of time requested for the 12-m Array, or the 7-m Array in case of ACA stand-alone proposals.
- However, a Joint Proposal in which ALMA is a partner observatory cannot request ALMA time for VLBI or Phased Array observing modes. Requests for ALMA Large Programs are not allowed for Joint Proposals when ALMA is a partner observatory, and therefore the amount of ALMA time requested must be less than that of the ALMA Large Program threshold.
- Each observatory will follow their technical criteria for acceptance.
- Project IDs for the individual partner observatories will be generated only after acceptance of a Joint Proposal.

Partner	Maximum time ALMA can allocate on partner observatory	Maximum time partner observatory can allocate on each ALMA array
JWST	115 hours	115 hours
VLA	5% of available time	50 hours
VLT	50 hours	50 hours

6. Director's Discretionary Time proposal *(they should only be submitted once)*

- Can be submitted at any time
- DDT proposals will be considered for approval by the ALMA Director based on the advice of a **Standing Review Committee**, with members from the JAO and the four regions, appointed by the Executive Directors and the ALMA Director
- **no proprietary period.**

**Thank you
for your attention**