Cycle 10 ALMA proposal

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Figure 1.1: ALMA antennas on the Chajnantor Plateau.

Cycle 10 call for proposals

- JAO expects allocating 4300 hours on the 12-m Array and the ACA. Proposals must be prepared and submitted using the ALMA OT, available in Science Portal.
- Proposal reviews will be conducted via a dual-anonymous process. The PI is responsible for the anonymity of their proposal.
- Distributed peer review for proposals requesting < 50 hours on the 12-m Array and, for the ACA stand-alone proposals, requesting < 150h hours on the 7-m Array. The PI/co-PIs will review and rank 10 submitted proposals, for each proposal submitted.
- Submission deadline : 15:00 UTC (= 24 KST) on Wednesday, 10 May 2023. PIs are strongly advised to submit proposals early to prevent possible hassles. (e.g., busy OT access.)
- Cycle 10 will not include a Supplemental CfP for stand-alone ACA observations. The community is encouraged to submit ACA projects, especially in the LST range of 20h to 10h.
- ALMA provides continuum and spectral-line capabilities for wavelengths from 0.32 mm to 8.5 mm, and angular resolutions down to 0.011” in Cycle 10. Proposals with observations in the highest frequencies (B8 - B10) are strongly encouraged.

What's new in Cycle 10

Technical and observing capabilities

- **Band 1 on the 12-m Array**. Observations will be available for Stokes I only (no Stokes Q/U/V) and are anticipated to be available from March 2024. Band 1 will not be available in configurations C-7 and C-8.
- **Spectral scans that include Total Power observations**.
- **4x4-bit spectral mode for improved sensitivity on the 12-m Array (dual polarization)**. 4x4 mode significantly reduces the time required for specific spectral-line observations. However, 4x4 mode is not recommended for continuum observations because it reduces the available bandwidth, compared to the standard 2x2 bit mode (see Section A.6.1).
- **Solar observations in full polarization in Band 3 using only the 12-m Array**.
- **Phased array mode in Bands 1, 3, 6 and 7**. The total time available for this mode will be limited to 50 hours.
- **Continuum and spectral line VLBI in Bands 1, 3, 6 and 7, including flexible tuning**.

What's new in Cycle 10

Proposal review

- Joint Proposals with JWST, VLA, and VLT. PI can submit only one proposal to the main observatory to use multiple telescopes. It will be multi-wavelength and/or multi-observatory in nature, and will have to scientifically justified and explicitly specified as Joint Proposals in the ALMA OT.
- Distributed peer review: reviewers participating in DPR can be assigned a maximum of 50 proposals.
- Details will be covered by Aran, next talk.

Proposal types

- Regular proposals : < 50 h on the 12-m Array, < 150 h on the 7-m Array in stand-alone mode. This includes time-critical, multi-epoch, and monitoring observations.
- Target of Opportunity proposals : targets and/or time of observation are not known in advance. Having priority over other proposals.
- Large Programs : The ARCs can provide assistance to LP teams in optimizing the observing strategy.
- mm-VLBI and Phased Array
- Joint proposals
- Director’s Discretionary Time proposals : ToO nature, breakthrough discovery, risky nature but large impact.

Proposal types

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- mm-VLBI and
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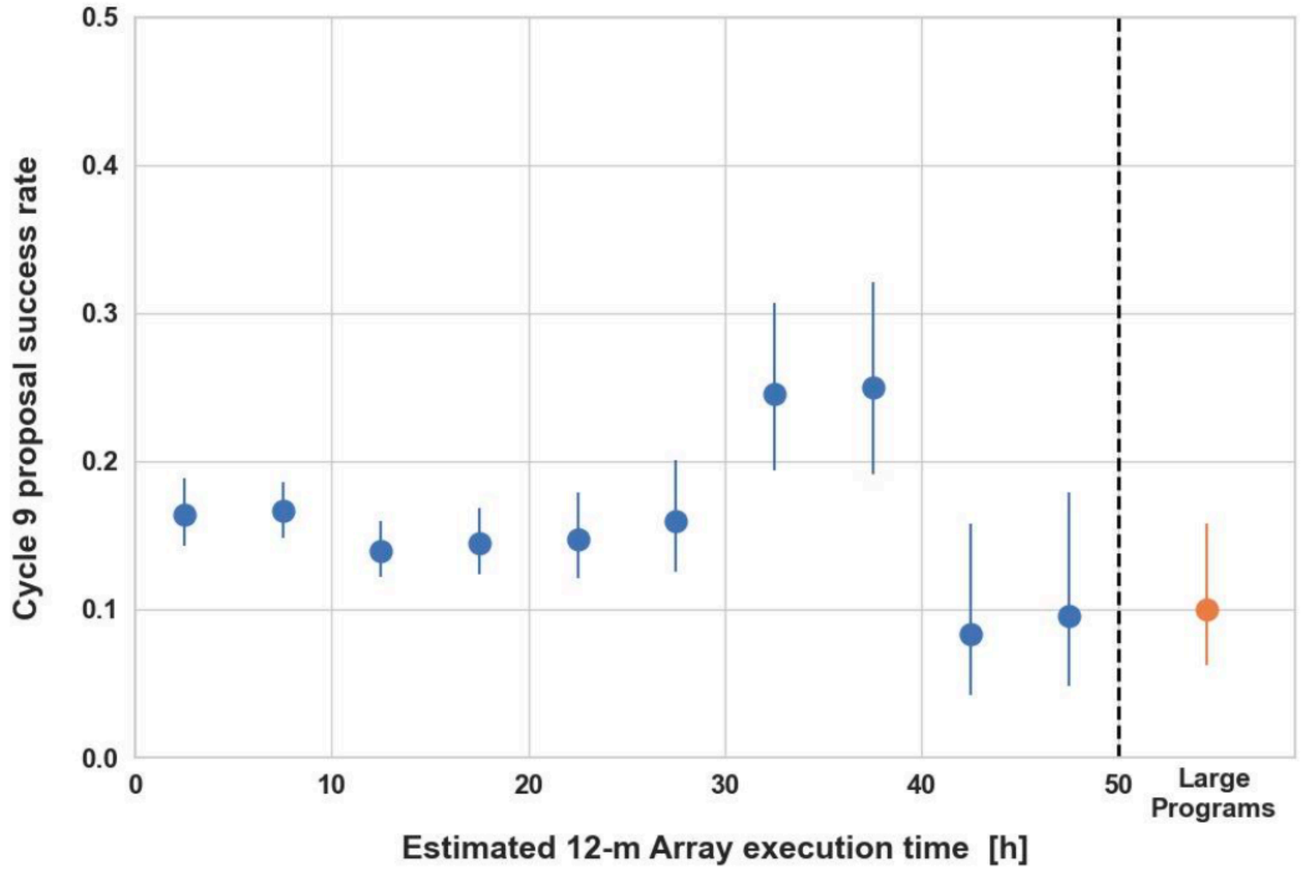

DDT proposals must belo

- Proposals of Target
- Proposals that urge
- Proposals of a risky

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Summary of capabilities in Cycle 10

- Anetennas : > 43 in the 12-m Array, > 10 in 7-m, and > 3 for TP in the ACA
- Receiver bands : 1,3 - 10 (wavelengths, 7 - 0.35 mm)
- Band 1 observations will N(science will begin in in March 2024.
- Configuration: C-1 to C-8 f d 1.
- Spectral-line, continuum, a
  - Spectral-line and contin e 7-m Array in Band 3 to 10.
  - Spectral-line and contin lable only with the 12-m Array
  - Single-field interferomet o 9) with the 12-m and the 7-m Arrays. In Band 1, single- ıly available with the 12-m Array.
  - Single-dish spectral-line

Band	Frequency range (GHz)	Wavelength range (mm)
1	35 – 50	8.5 – 6
3	84 – 116	3.6 – 2.6
4	125 – 163	2.4 – 1.8
5	158 – 211	1.9 – 1.4
6	211 – 275	1.4 – 1.1
7	275 – 373	1.1 – 0.8
8	385 – 500	0.78 – 0.60
9	602 – 720	0.50 – 0.42
10	787 – 950	0.38 – 0.32

Summary of capabilities in Cycle 10

- Anetennas : > 43 in the 12-m Array, > 10 in 7-m, and > 3 for TP in the ACA
- Receiver bands : 1,3 - 10 (wavelengths, 7 - 0.35 mm)
- Band 1 observations will NOT be offered at the beginning. Band 1 science will begin in March 2024.
- Configuration: C-1 to C-8 for all except Band 1. C-1 to C-6 for Band 1.
- Spectral-line, continuum, and mosaic observation:
  - Spectral-line and continuum observations with the 12-m and the 7-m Array in Band 3 to 10.
  - Spectral-line and continuum observations in Band 1 will be available only with the 12-m Array
  - Single-field interferometer (Band 3 to 10) and mosaics (Band 3 to 9) with the 12-m and the 7-m Arrays. In Band 1, single-field interferometry and mosaics are only available with the 12-m Array.
  - Single-dish spectral-line observations in Band 3 to 8

Summary of capabilities in Cycle 10

- Polarization:
  - Single-pointing, on-axis, full linear and circular polarization for both continuum and full spectral resolution observations in Bands 3 to 7 on the 12-m Array. The field of view of linear and circular polarization is limited to the inner 1/3 and 1/10 for 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. Polarizations are not available in Band 1.
  - Mosaics for continuum linear polarization observations for the 12-m Array in Bands 3 to 7.
  - Single-pointing, on-axis linear polarization on the stand-alone 7-m Array in Bands 3 to 7. The field of view is limited to the inter 1/3 of the primary beam. (75 hours in maximum)
- Band-to-band calibration:
  - HF observations in Bands 7-10 for the 7-m and any 12-m array configuration may require B2B calibration for phase calibrator. The ALMA OT will automatically tigger the B2B mode where required.
  - At the highest frequencies (Band 10) and longest baselines (C-8 in Cycle 10) may not be observable even with B2B. PIs are advised to begin preparing there HF proposals early to ensure a stable calibrator is available for their targets.

Scheduling considerations

Weather

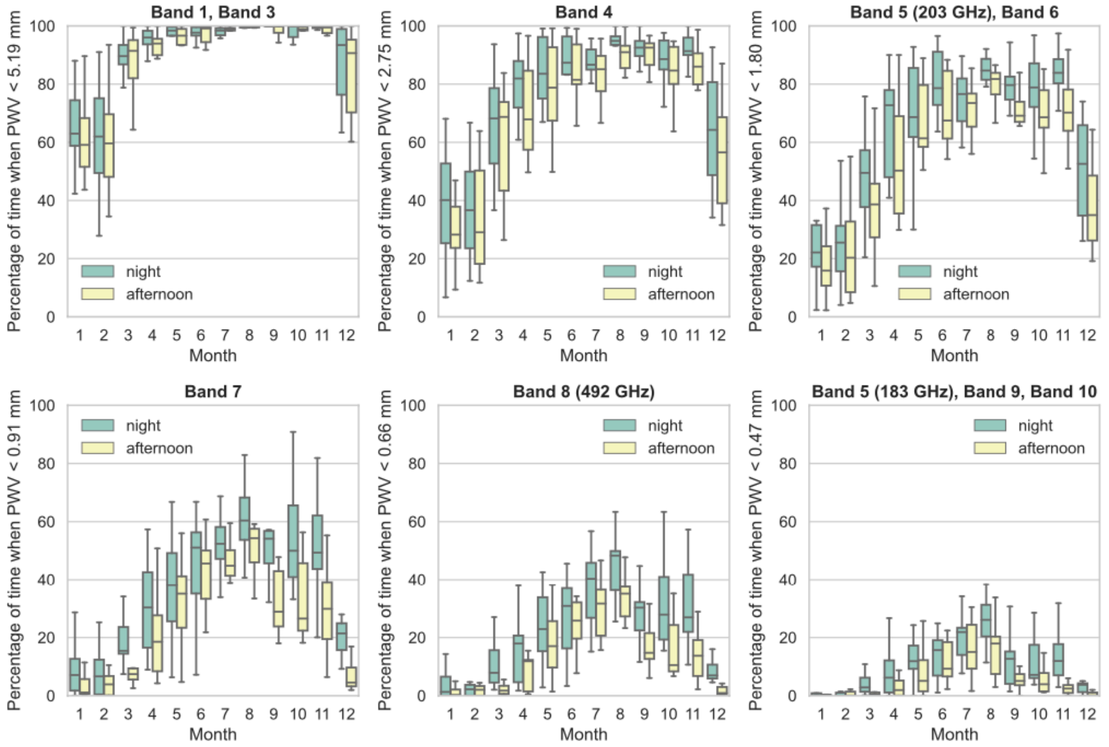

Figure 3: The percentage of time when the PWV is below the observing thresholds adopted for the various ALMA bands for afternoon (green; based on 01:00–05:00 UT) and night (yellow; based on 17:00–21:00 UT)

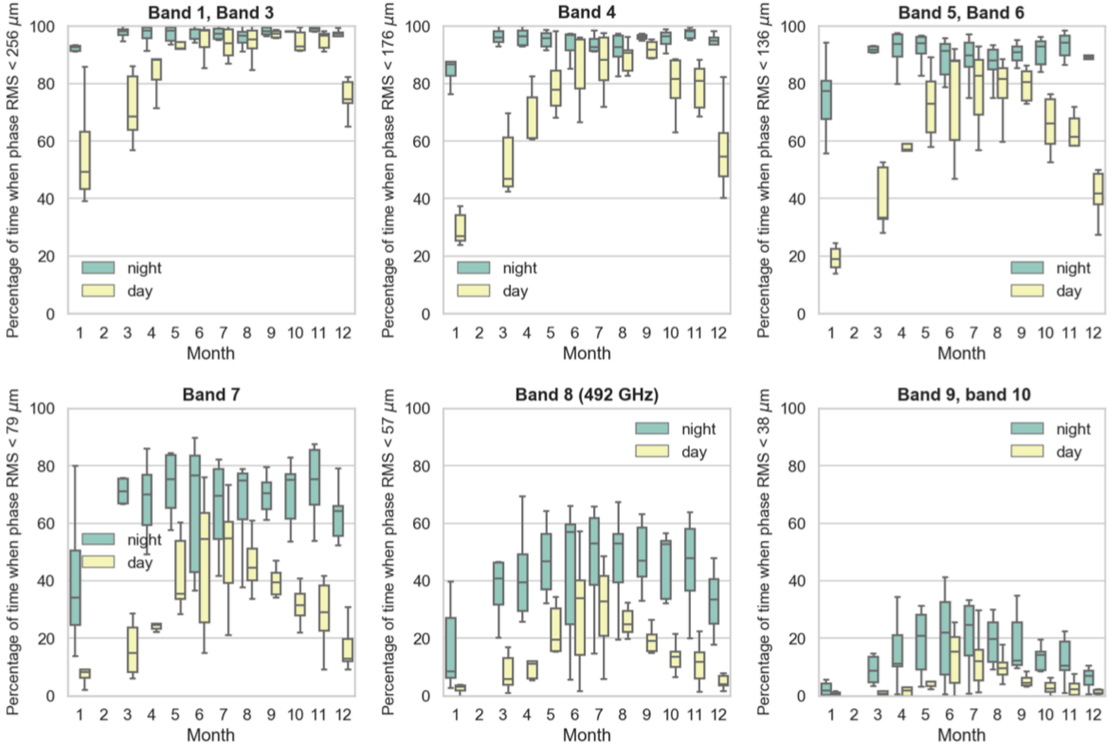

Figure 4: The percentage of time when the phase RMS variability is $\lesssim 30$ degrees at the various bands for a fiducial 1000 meter baseline, as measured over a 120 second timescale and with WVR correction applied. Note

Scheduling considerations

Angular resolution

		Band	1	3	4	5	6	7	8	9	10
Config.	**L_{max}**	**Freq. (GHz)**	**40**	**100**	**150**	**185**	**230**	**345**	**460**	**650**	**870**
	L_{min}										
7-m	**45 m**	θ_{res} (arcsec)	31.5	12.5	8.35	6.77	5.45	3.63	2.72	1.93	1.44
	9 m	θ_{MRS} (arcsec)	167	66.7	44.5	36.1	29.0	19.3	14.5	10.3	7.67
C-1	**161 m**	θ_{res} (arcsec)	8.45	3.38	2.25	1.83	1.47	0.98	0.74	0.52	0.39
	15 m	θ_{MRS} (arcsec)	71.2	28.5	19.0	15.4	12.4	8.25	6.19	4.38	3.27
C-2	**314 m**	θ_{res} (arcsec)	5.75	2.30	1.53	1.24	1.00	0.67	0.50	0.35	0.26
	15 m	θ_{MRS} (arcsec)	56.5	22.6	15.0	12.2	9.81	6.54	4.90	3.47	2.59
C-3	**500 m**	θ_{res} (arcsec)	3.55	1.42	0.94	0.77	0.62	0.41	0.31	0.22	0.16
	15 m	θ_{MRS} (arcsec)	40.5	16.2	10.8	8.73	7.02	4.68	3.51	2.48	1.86
C-4	**784 m**	θ_{res} (arcsec)	2.30	0.92	0.61	0.50	0.40	0.27	0.20	0.14	0.11
	15 m	θ_{MRS} (arcsec)	28.0	11.2	7.50	6.08	4.89	3.26	2.44	1.73	1.29
C-5	**1.4 km**	θ_{res} (arcsec)	1.38	0.55	0.36	0.30	0.24	0.16	0.12	0.084	0.063
	15 m	θ_{MRS} (arcsec)	16.8	6.70	4.47	3.62	2.91	1.94	1.46	1.03	0.77
C-6	**2.5 km**	θ_{res} (arcsec)	0.78	0.31	0.20	0.17	0.13	0.089	0.067	0.047	0.035
	15 m	θ_{MRS} (arcsec)	10.3	4.11	2.74	2.22	1.78	1.19	0.89	0.63	0.47
C-7	**3.6 km**	θ_{res} (arcsec)		0.21	0.14	0.11	0.092	0.061	0.046	0.033	0.024
	64 m	θ_{MRS} (arcsec)		2.58	1.72	1.40	1.12	0.75	0.56	0.40	0.30
C-8	**8.5 km**	θ_{res} (arcsec)		0.096	0.064	0.052	0.042	0.028	0.021	0.015	0.011
	110 m	θ_{MRS} (arcsec)		1.42	0.95	0.77	0.62	0.41	0.31	0.22	0.16

- PIs can enter a single value or a range of AR for a given SG. Whenever feasible, PIs are encouraged to enter a range spanning more than one configuration.

Scheduling considerations

Configuration

Start date	Configuration	Longest baseline	LST for best observing conditions
2023 October 1	C-8	8.5 km	~ 22—10 h
2023 October 20	C-7	3.6 km	~ 23—11 h
2023 November 10	C-6	2.5 km	~ 1—13 h
2023 December 1	C-5	1.4 km	~ 2—14 h
2023 December 20	C-4	0.78 km	~ 4—15 h
2024 January 10	C-3	0.50 km	~ 5—17 h
2024 February 1	*No observations due to maintenance*		
2024 March 1	C-1	0.16 km	~ 8—21 h
2024 March 26	C-2	0.31 km	~ 9—23 h
2024 April 20	C-3	0.50 km	~ 11—0 h
2024 May 10	C-4	0.78 km	~ 12—2 h
2024 May 31	C-5	1.4 km	~ 13—4 h
2024 June 23	C-6	2.5 km	~ 15—6 h
2024 July 28	C-5	1.4 km	~ 17—7 h
2024 August 18	C-4	0.78 km	~ 19—8 h
2024 September 10	C-3	0.50 km	~ 20—9 h

- In Cycle 10, 8 configurations will be offered.
- Starting date may be changed, (e.x, weather and observing pressure)
- Band 9 and 10 observations will be scheduled during the best LST range. The amount of time with stable atmospheric conditions suitable for B7 and 8 outside those LST is limited. Those will have priority in the observing queue.
- HF projects (B7 - 10) and Band 5 observations at 183 GHz are not recommended during December to March at any LST.

User's Policies update

- Valid email: JAO reserves the right to refuse any complaint about not receiving email notifications from users.
- Users are responsible for ensuring that their profile is correct and up to date . This is important for proper observing time accounting across the Executives. It is strongly encouraged to de-activate duplicate profiles. The deliberate use of an incorrect affiliation or Executive may result in sanctions against the scientific projects of that user.
- Major change policies become a bit strict. Major changes to increase the observing window of an SB, (ex, by changing angular solution or configuration) will not be accepted.
- Proprietary period: PIs cannot voluntarily waive their proprietary period in their proposal.

References

- ALMA Cycle 10 Proposer's Guide
- ALMA Cycle 10 Technical Handbook
- ALMA Cycle 10 User's polices

- Any changes, clarifications, or bugs that are discovered ill be documented in the Knowledgeable Article.
- What Cycle 10 proposal issues and clarifications should I be aware of before submitting my propels? Proposers should check the article regularly, especially just before submitting their proposals.