Call for Proposals 2023A – VLA details

Loránt Sjouwerman (NRAO)

The (Karl G. Jansky) Very Large Array Interferometer in a Nutshell

Located in New Mexico, on San Agustin Plains, 6970 ft (2120m) altitude

- 27(+1) 25-meter diameter dishes
- Arranged in upside-down Y-shape ()
- Reconfigurable: Baseline lengths 35m - 36.4 km in 4 configurations
- Observes North of -48 degrees declination (>8 degrees elevation)
- Frequency coverage (54-86 MHz, 200-500 MHz, 1-50 GHz)

4-band P-band L/S/C/X/Ku/K/Ka/Q

Proposal Deadlines and VLA Configurations

(may be subject to change)

Semester	Observing Period	Configuration	Proposal Deadline
2023B	2023 Oct 27 – 2024 Jan 22	D	2023 Feb 01
2023A	**2023 Jun 30 – 2023 Oct 09**	**A**	**2022 Aug 01**
--	2023 Jun 02 – 2023 Jun 19	BnA	(VLASS only)
2023A	**2023 Jan 18 – 2023 May 29**	**B**	**2022 Aug 01**
2022B	2022 Oct 06 – 2023 Jan 03	C	2022 Feb 01

2023A corresponds to **B and A** configurations of the VLA:

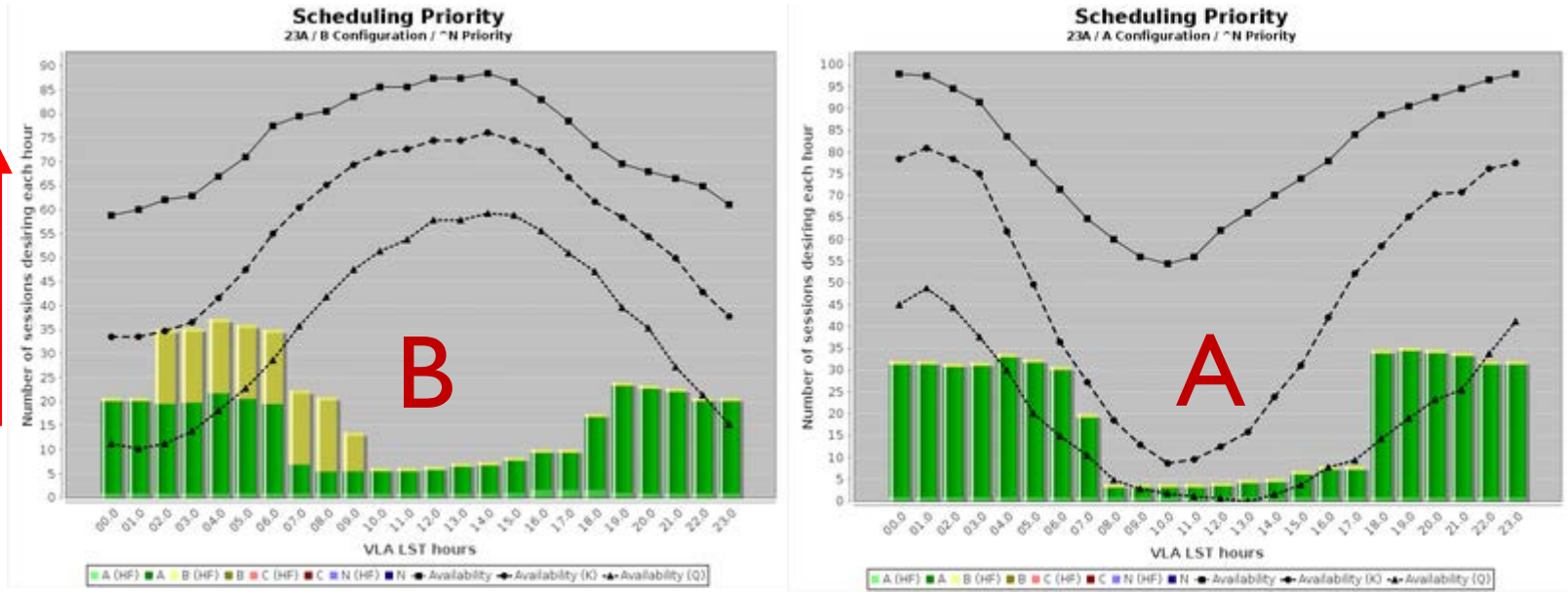
Max. baseline: 11.1 km – 36.4 km / HPBW: 80"-0.043" (4/B–Q/A)

Proposals are accepted for:

- 2023A observing period
- Multi-configuration that include B and/or A configuration
- Configurations that fall in semester 2023B (or later) may be submitted by a graduate student PI

2023A Available Observing Hours

Time available / pre-committed



LST-hour intervals

Upper curve: total available time as function of LST (all frequency bands)

Dip: daytime unavailable due to maintenance and testing

Lower curves: high-frequency time available (18 GHz and up; K/Ka/Q)

high-frequency requires better "observing weather" conditions

Green and yellow: pre-committed time (i.e. allocated in previous semesters)

VLA Capabilities for 2023A (1/2)

- Up to two independently tunable 1 GHz basebands (8-bit samplers):
  - Standard full polarization default setups:
    - 2 GHz bandwidth continuum 2-50 GHz, S- through Q-bands (16x128 MHz)
    - 1 GHz bandwidth continuum at L-band (16x64 MHz)
    - 256 MHz bandwidth at P-band (16x16 MHz)
    - 12 MHz bandwidth for Stokes I continuum at 4-band (3x4 MHz)
    - Dual 4/P-band for Stokes I continuum observations only
  - Flexibility for spectroscopy (up to 32 subbands/1GHz baseband)
- Up to two independently tunable 2 GHz baseband *pairs* (3-bit samplers):
  - 8 GHz bandwidth continuum observations at 18+ GHz, K/Ka/Q-bands
  - 6 GHz bandwidth continuum observations at 12-18 GHz, Ku-band
  - 4 GHz bandwidth continuum observations at 4-12 GHz, C/X-bands
  - Flexibility for spectroscopy (up to 16 subbands/2GHz baseband)

VLA Capabilities for 2023A (2/2)

Less frequently used capabilities:

- Mixed: one 2 GHz and one 1 GHz baseband (a 3-bit and an 8-bit sampler): Allows for simultaneous line-free continuum and high-resolution spectral line observing
- Subarrays: Up to 3 independent subarrays using 8-bit continuum, single instrument configuration in each subarray; anything else is R/SRO (next slides)
- On-The-Fly Mosaicing (OTF): 0.2-8 GHz using single array, 8-50 GHz is SRO
- Pulsar: Phase-binned and coherent-dedispersion (YUPPI) pulsar observing, except 4-band YUPPI (RSRO)
- Solar observing: Except L-band reverse-coupled system
- Data Rates up to 60 MB/s (216 GB/hours); 60-100 MB/s is SRO, 100+ RSRO

- (VLBI proposals) Y27 or Y1: 27-antenna phased array or a single VLA antenna

VLA Shared Risk Observing (SRO)

- Subarrays (up to 3) using any default continuum 3-bit setup, any form of switching between default continuum (3-bit and/or 8-bit) correlator setups
  - Thus excluding any specific spectral line setup (RSRO)

- On-the-Fly mosaicking at 8-50 GHz (X-, Ku-, Ka-, and Q-bands)
  - Only in single array mode (i.e., not using subarrays)

- eLWA: Joint Long Wavelength Array (LWA) and VLA 4-band cross-baseline observations covering 72-80 MHz (using 4-bit VDIF output)

VLA Resident Shared Risk Observing (RSRO)

Examples of capabilities under RSRO

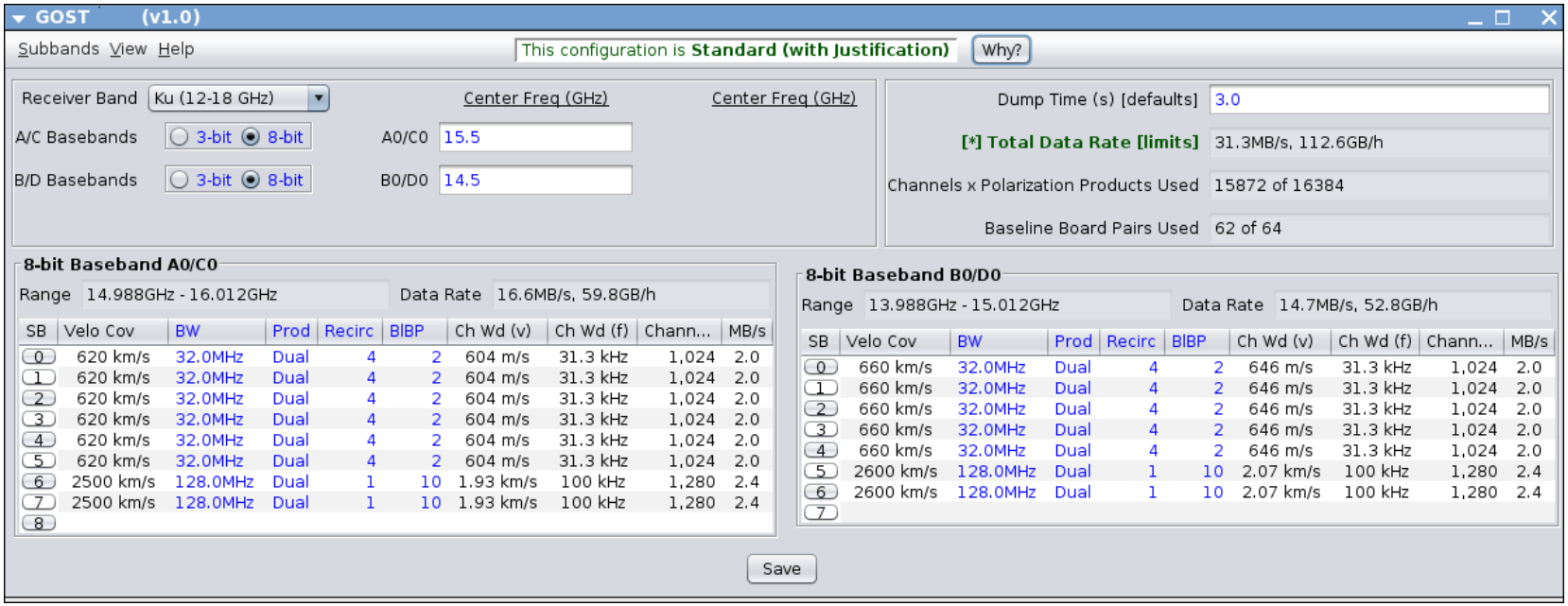
- Correlator dump times <50 ms (down to 5 ms)
- data rates above 100 MB/s
- recirculation in the correlator beyond a factor of 64
- 4-band polarization or spectral line
- 4-band coherent-dedispersion (YUPPI) pulsar observing
- complex phased array observations such as pulsar and complex VLBI observing modes
- Any frequency averaging in the correlator
- Rapid response capabilities
- eLWA with other options than under SRO; e.g. 16 MHz bandwidth, and/or 8-bit VDIF

2023A-Active Commensal Observing Systems

- VLA Low Band Ionospheric and Transient Experiment (VLITE) (https://vlite.nrao.edu)
  - 64 MHz of bandwidth 320 – 384 MHz (P-band); ~15-18 antennas
  - Pipelines for Imaging, Ionosphere, and real-time transients
  - Always-on, except when observing at P-band itself
- real-time fast transients at the VLA: realfast (https://realfast.io)
  - enabled for default setups between 1-12 GHz (L/S/C/X-bands)
  - blind search for fast transients, like FRBs, for arcsec localization
- Search for Extra-Terrestrial Intelligence: COSMIC-SETI
  - Standard enabled for all observing/bands (with a PI opt-out option)
  - Planned to be implemented as soon as the start of semester 2023A (https://go.nrao.edu/cosmic-seti)

Line observations: GOST (https://go.nrao.edu/gost)

For spectral line observation setups you will need to use the General Observing Setup Tool (or the Resource Catalog Tool) and upload your screenshot to the PST.



Note: Please review the documentation and known issues. If you encounter issues, please consult with the science helpdesk, and contact the helpdesk as early as you can, especially for complex setups.

Some notes on the Technical Justification

- **Explain reason for the array configuration requested:** Consult https://go.nrao.edu/vla-res, is the offered resolution sufficient, is the largest angular scale compatible?

- **Scheduling constraints:** Make sure you review the listed scheduling constraints and address those. Also good to check whether observing close to the sun or other celestial bodies (e.g. https://go.nrao.edu/suncheck)
  Also review: https://go.nrao.edu/opt-suncheck

VLA LST at Midnight Mountain Time (hours)

Jan 1	Feb 1	Mar 1	Apr 1	May 1	Jun 1
6.4	8.4	10.4	11.4	13.4	15.4
Jul 1	**Aug 1**	**Sep 1**	**Oct 1**	**Nov 1**	**Dec 1**
17.4	19.4	21.4	23.4	1.4	4.4

National Radio Astronomy Observatory

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Monday 11 July 2022

Validate | Print | Submit

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TECHNICAL JUSTIFICATION *(changes will auto-save in 10 minutes)*

« ‹ Technical Justification › »

Options

- My Proposals
  - VLA/2021-04-006
    - General
    - Authors
    - Science Justification
    - Technical Justification
    - Sources
    - Resources
    - Sessions
    - Disposition Letter
  - VLA/2020-00-003
  - VLBA/2019-05-004
  - VLA/2018-08-001
  - VLA/2013-06-007

VLA Technical Justification

Use this page to specify how the technical set-up requested for your proposal enables the scientific goals to be met. Input is required for all fields. If a field is not relevant for your proposal then enter "NA" into the textbox. The links within each box provide information concerning these technical questions.

Are the data to be combined with those from other configurations or radio telescopes, if so, please specify: http://go.nrao.edu/combine	1
Explain the reason for the array configuration(s) requested. Include the angular extent of the source and the largest angular size (LAS) to be measured: http://go.nrao.edu/vla-res	2
Describe the use of subarrays: • the number of subarrays and distribution of antennas between them, • a summary of the frequency bands and correlator configuration (as you will explain and detail further below) and observing modes used in each of the subarrays, • as well as any other specific details that would be of interest related to the subarray observing. http://go.nrao.edu/vla-subs	3
If you are requesting observations in a future semester (beyond the one explicitly in this call), please explain why those observations are needed. Include information on how critical they are to the success of the overall project, and why a proposal for observations in that future semester cannot be submitted at the time of the call for proposals for that semester.	4
Give possible scheduling constraints. Issues that should be addressed: 1. Are targets nighttime/daytime for the configurations proposed (possibly important for low-frequency interference or high frequency phase stability)? 2. What will be the target elevation (possibly important for high-frequency calibration and overhead)? 3. What is the required date for coordinated or fixed-date observations? 4. Are there dates that should be excluded, and what are they? 5. For Large projects, what is the total number of passes required at a given LST?	5

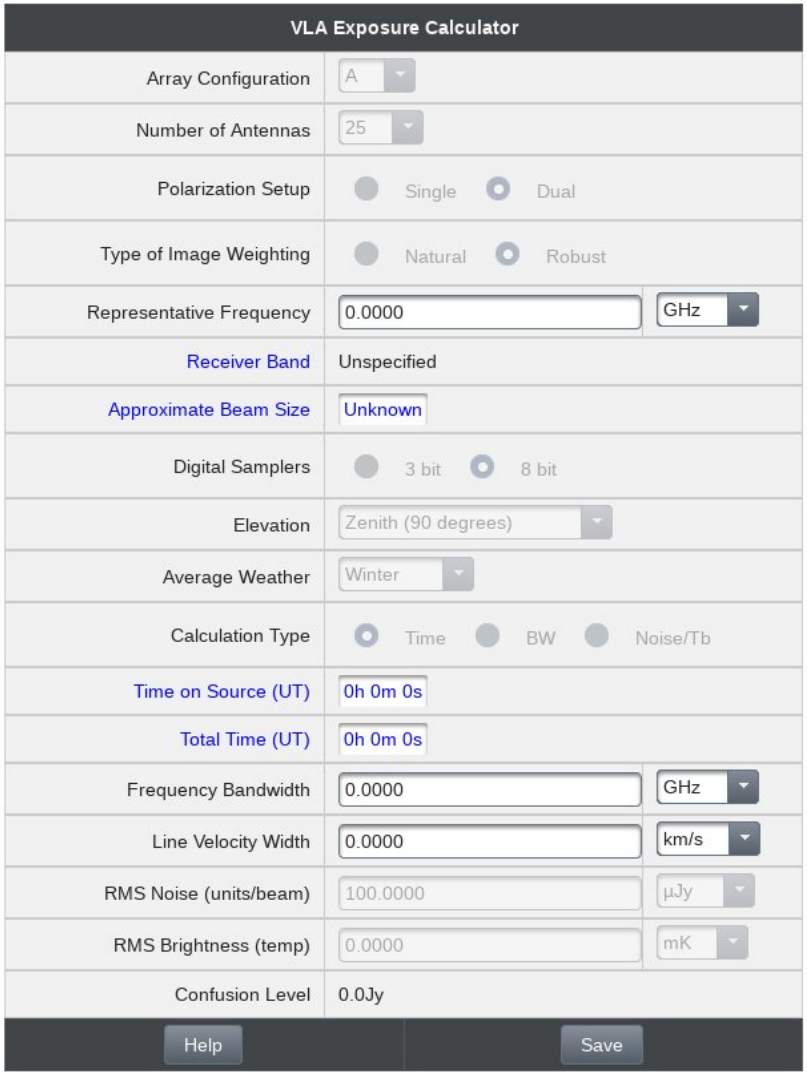
Some notes on the Technical Justification

- **Image/point source or brightness temperature sensitivity calculation required! Give required on-source integration time, which <u>should connect to the proposal science goals</u>**
  VLA Exposure Calculator: https://go.nrao.edu/ect

- **Polarimetric observations requirements:** In case you plan polarimetry, here you should explain your calibration strategy. Will you need good parallactic angle coverage? Did you identify a good unpolarized calibrator, etc

- **Etcetera,** let the technical justification page cues and links for each text box guide you through the requested information

Exposure Calculator

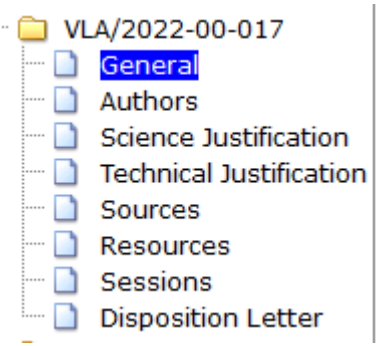


Carefully review the documentation:
https://go.nrao.edu/ect

Some specific notes:

- Make sure you account for RFI when selecting the bandwidth
- The overhead calculation does not account for initial slew and setups for short observing blocks
  - The overhead calculation assumes a 2-hour long scheduling block
- At very low frequencies, one needs to adjust for observing at low Galactic latitudes
- Note the special case for 54-86 MHz (4-band), use single polarization selection only

Sessions



After you specify your targets and observing setups (resources), you need to define sessions.

Important: sessions are not observing blocks!

SESSIONS

Important advice on information for creating VLA Sessions can be found here.

« ‹ Sessions › »

Session	Number of Sessions	Separation	Min. Start LST	Max. End LST	Min. Elevation
Session1	2 X 3.0	30 day	21:53:55	10:43:02	15
Scheduling Constraints:			Comments:		Edit

Source Groups	Resources	Time/Session (hrs)	Add
GroupA - LST4	C	1.50	
GroupA - LST4	X	1.50	

Session2	1 X 2.0	0 day	10:06:45	23:19:12	15

To get the best determination of scheduling priority it is recommended to

- Put each group of nearby targets in a separate session
- Keep multiple bands together in a given session, unless they are of value alone.
- Carefully consider minimum elevation and optimize LST request to pressure.

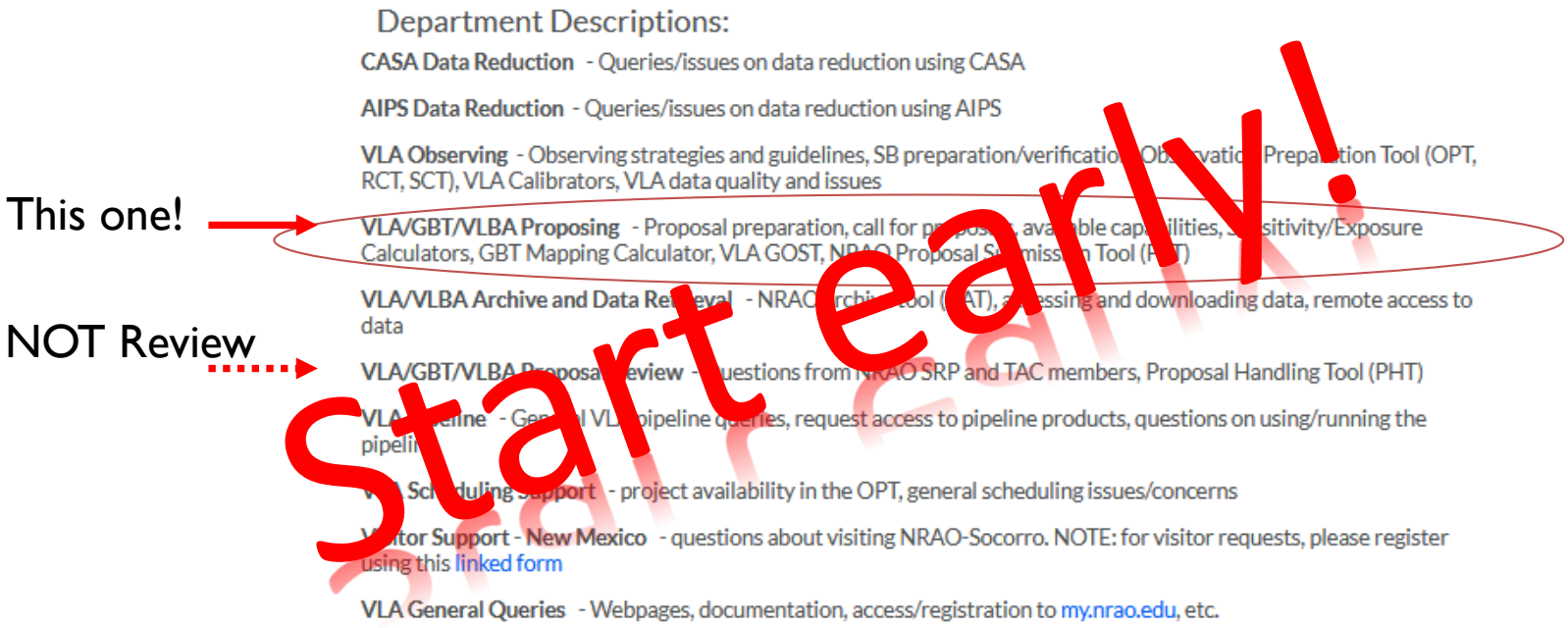
Resources

- NRAO helpdesk: help.nrao.edu
- The VLA and VLBA Call for Proposals: go.nrao.edu/cfp
  - Includes further information and tips for success
- The VLA and VLBA Observational Status Summaries:
  - VLA: go.nrao.edu/vla-oss
  - VLBA: go.nrao.edu/vlba-oss
- Proposing Guides:
  - VLA: go.nrao.edu/vla-prop
  - VLBA (and HSA & Global VLBI): go.nrao.edu/vlba-prop-doc

- 2023A Proposal Deadline: August 1, 2022 21:00UTC (5pm EDT)

Helpdesk

If you need help for any reason, you can get in touch with scientific staff through the NRAO helpdesk using your my.nrao.edu account credentials to log in at https://help.nrao.edu/.



This one!

NOT Review

Start early!

Please submit your questions well before the deadline. We attempt to respond as quickly as we can, especially before a proposal deadline.

New for 2023A

- Split of the Active Galactic Nuclei review panel:

Change to the Science Categories

The AGN science category will be split into two in order to manage the increasing number of proposals received in this science area. The new categories will be

→ HLA - High-Luminosity AGN: AGN, high-luminosity: FR II radio galaxies, quasars, QSOs, blazars, BL Lacs

→ LLA - Low-Luminosity AGN: AGN, low-luminosity: FR I radio galaxies, FR 0 radio galaxies, Seyfert galaxies, quiescent SMBH, Sgr A*

All proposals submitted on or after 1 July 2022 will need to specify one of the following ten science categories: SSP, GWT, PCO, SFM, ISM, NGA, EGS, HLA, LLA, or HIZ.

- New VLA commensal system: COSMIC-SETI

https://go.nrao.edu/cfp

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