

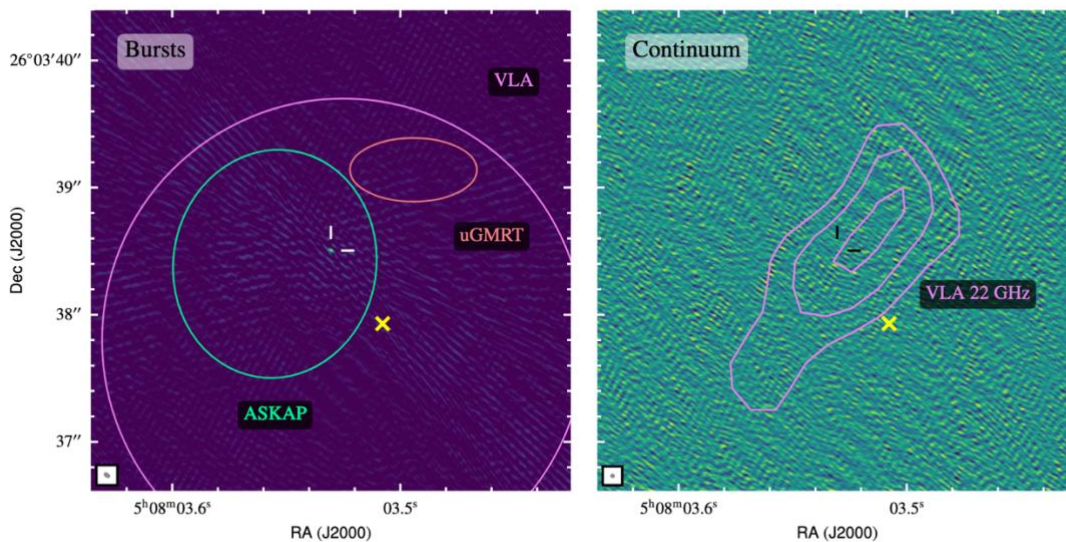
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**European VLBI Network  
Call for Proposals  
Deadline: 1 February 2022 16:00 UTC**

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Observing proposals are invited for the European VLBI Network (EVN). The EVN facility is open to all astronomers. Astronomers with limited or no VLBI experience are particularly encouraged to apply for observing time. Student proposals are judged favorably.

Support with proposal preparation, scheduling, correlation, data reduction and analysis can be requested from the [Joint Institute for VLBI ERIC \(JIVE\)](#).



Left panel: EVN 1.4-GHz map of FRB 20201124A (18 bursts; white ticks). Right panel: Dirty EVN map of all continuum target data to search for persistent radio emission. The position of FRB 20201124A is indicated by the black ticks. Overplotted are the 3, 4 and 5- $\sigma$  contours of the resolved radio emission detected by the VLA at 22 GHz (Piro et al. 2021). In both panels, the optical centre of the host galaxy is indicated by the yellow cross (Fong et al. 2021). From Nimmo et al. 2021, arXiv:2111.01600.

### EVN Support+ program

**JIVE/EVN initiates a pilot program to provide extended support to teams new to the EVN, with little or no direct VLBI experience.** This includes the scheduling of the VLBI run and the VLBI-specific parts of the data reduction (including a-priori amplitude calibration and fringe-fitting). Imaging, and the interpretation of the data remains the responsibility of the proposing team. We aim to support some standard continuum/phase-referencing VLBI projects either for an e-VLBI or a regular EVN session, evaluated by the EVN Program Committee with the highest grades. See the call for proposals below. For further questions please contact the Chair of the EVN PC, Zsolt Paragi ([evnpc@jive.eu](mailto:evnpc@jive.eu))

The EVN is a Very Long Baseline Interferometry (VLBI) network of radio telescopes operated by an international consortium of institutes. It is located primarily in Europe and Asia, with additional antennas in South Africa and Puerto Rico. The EVN provides very high sensitivity images at angular scales of (sub-)milliarcseconds in the radio domain. EVN proposals may also request **joint e-MERLIN and EVN observations** for an improved uv-coverage at short spacings, significantly increasing the largest detectable angular size to arcsecond scales. Further improvement of the uv-coverage may be achieved in **global VLBI observations**, in which the EVN observes jointly with NRAO/GBO telescopes (VLBA/GBT/VLA) or with the Australian Long Baseline Array.

EVN observations may be conducted with disk recording (standard) or in **real-time correlation (e-VLBI), which guarantees a rapid turnaround**. Standard EVN observations are available at wavelengths 92, 21/18, 13, 6, 5, 3.6, 1.3 and 0.7 cm. e-VLBI observations can be performed at 21/18, 6, 5, and 1.3 cm. e-MERLIN can be combined with the EVN in both standard and e-VLBI observations. Global observations can only be performed with standard observations. Every year standard EVN observations occur during three sessions of approximately 21 days each. Further ten separate days are available for e-VLBI observations. Proposals can be submitted for the following main classes of observations:

- **Regular proposals:** standard EVN (disk recording), e-VLBI and Out-of-Session observations, which may include large proposals, trigger proposals, global proposals, and proposals involving additional EVN/non-EVN antennas (including integrated e-MERLIN observations), and correlator-only proposals
- **Target of Opportunity (ToO) proposals:** for time-critical projects targeting e.g. transient phenomena
- **Short Observation requests:** these are primarily for checking calibrators or testing a calibration strategy

The deadlines for proposal submission are on 1 February, 1 June and 1 October each year, except for ToO and Short Observation requests, which can be submitted any time. More information regarding the EVN capabilities, observing sessions, proposal guidelines, and user support can be found at the [EVN website](#).

Trigger proposals are for a type of rapid response science observations in which a (class of) source(s) is expected to become active in the radio in the foreseeable future, and requires immediate attention if this happens. The triggering conditions (e.g., radio flux density level, entering to a specific X-ray spectral state etc.) must be clearly stated in the proposal. Trigger observations are primarily intended for e-VLBI days which guarantee rapid correlation, but activating proposals in EVN Sessions is possible if the proposing team request it and it is judged favorably by the PC. For details, see the **'Trigger observations'** section in the description of [Regular proposals](#).

Large EVN observation proposals (>48 hrs) are encouraged by the EVN Programme Committee (PC). These will be subject to more detailed scrutiny on the feasibility of the proposal: the EVN PC may, in some cases, grant the observing time in tranches or attach conditions on the release of the data. There is no upper limit on the amount of time that may be requested by an EVN large proposal (projects of more than one hundred hours have been granted). Large proposals can also be proposed as global programmes (although note the different availability levels of VLBA, versus VLA and GBT, see 'Global VLBI proposals' below) and with the integration of e-MERLIN. Large projects involving several observing epochs will be asked for progress reports by the PC.

## Proposal guidelines

All regular proposals should be submitted through the [Northstar submission tool](#). For more information, please consult the [Using the EVN](#) page.

Proposals must include a Science & Technical justification (2 pages), and optionally, figures, tables and references (2 pages, but these may be interleaved with the text). These sections shall be submitted as a single PDF document. The total length of this document is limited to 4 pages (A4 or US Letter format), with a font size no smaller than 11 pt.

See specific guidelines for [Regular proposals](#), [ToO proposals](#) and [Short requests](#).

Questions regarding the proposal preparation can be sent to JIVE user support at [usersupport@jive.eu](mailto:usersupport@jive.eu). If you need assistance, please indicate that well in advance of the deadline.

## Recording capabilities for the next standard EVN and e-VLBI Sessions

Disk recording at 2 Gbps is available at 6, 3.6, 1.3 and 0.7 cm; telescopes that cannot usefully reach this will use the highest possible bit-rate (mixed-mode observation). See the [EVN 2 Gbps recording status](#) page for up-to-date information.

Disk recording at 4 Gbps is now available at 6, 3.6, 1.3 and 0.7 cm for a subset of antennas for a limited amount of time and, on a best-effort basis for projects that may need it. Telescopes that cannot usefully reach this data rate will use the highest possible bit-rate (mixed-mode observation). See the [EVN 4 Gbps recording status](#) page for the latest updates.

e-VLBI at 2 Gbps is available at 6 cm and 1.3 cm; telescopes that cannot usefully reach this will use the highest possible bit-rate (mixed-mode observation). Network traffic or outages might also impose total bit-rate limitations on a particular e-VLBI day. The current status is given in the 'Operational modes' section in the [EVN capabilities](#) page.

Observations at 18/21 cm in either disk-recording or e-VLBI are limited to a data rate of 1 Gbps due to bandwidth limitations.

The choice of data rate should be clearly justified in the proposal.

## Proposing for standard EVN observing sessions (disk recording)

Proposals received by 1 February 2022 will be considered for scheduling in Session 2, 2022 or later. Finalisation of the planned observing wavelengths will depend on proposal pressure and grade.

Upcoming standard EVN Sessions

Year	Session	Dates
2022	Session 1	24 February – 17 March
2022	Session 2	26 May – 16 June
2022	Session 3	20 October – 10 November

## Proposing for e-VLBI observing days (real-time correlation)

e-VLBI experiments are carried out in 10 days spread over the year, outside of the regular EVN sessions. The correlation is done real-time, and the data are delivered to the proposers rapidly, which may be an advantage for rapid response science or science with temporal constraints (e.g., transients, astrometry). Also projects that can justify the need for rapid data delivery, e.g., student projects, or other cases of urgency, are eligible.

e-VLBI projects are centrally scheduled at JIVE (using inputs from the PI) because several projects may be observed in a single session. Such an advanced user support makes e-VLBI ideal for less experienced users. Note that some observing modes, such as multi-phase centre observing and multi-pass correlation are not available in e-VLBI. Please contact the JIVE support scientists at [usersupport@jive.eu](mailto:usersupport@jive.eu) in advance if you plan to request a non-standard observing mode for e-VLBI.

■ The request for real-time e-VLBI correlation should be clearly justified in the proposal. If multi-epoch e-VLBI is requested, proposals should also indicate the range of temporal cadence the proposal could sustain. Further details (e.g., on the available array) are given in the 'Operational modes' section in the [EVN capabilities](#) page.

Successful proposals with an e-VLBI component submitted by the February 1 deadline will be considered for scheduling on the e-VLBI days starting from May 2022. Note that e-VLBI days are limited to a single observing frequency which will be based on the *highest graded proposal*. The schedule (including observing frequency and the participating antennas) can be modified up to 08:00 UT on the day before the e-VLBI run starts.

### Upcoming e-VLBI days

Year	Begin Science Time 13:00 UTC	End Science Time 13:00 UTC
2022	18 January	19 January
2022	15 February	16 February
2022	22 March	23 March
2022	12 April	13 April
2022	10 May	11 May
2022	21 June	22 June
2022	20 September	21 September
2022	13 October	14 October
2022	15 November	16 November
2022	6 December	7 December

## Out-of-Session Observing

Out-of-Session observing time on user-specified dates (up to a maximum of 144 hours/year), is available for both disk recording and e-VLBI modes. Proposals requesting Out-of-Session observing time must provide full scientific (and technical if appropriate) justification as to why observations must be made outside standard sessions.

Out-of-session observing will be scheduled in blocks of no less than 12 hours in duration (although proposals may request shorter observations), and occur no more than 10 times per year. Proposals should specify which dates/GST ranges are being requested and indicate the minimum requirement in terms of numbers of telescopes (and any particular telescopes).

Proposals will only be considered for dates occurring after the regular EVN session that follows the EVN proposal review.

**Urgent observations requiring much shorter lead times should be submitted as [Target-of-Opportunity](#) proposals.**

## Availability of EVN antennas

The latest status of the EVN antennas can be found on <http://www.evlbi.org/capabilities>.

The **Sardinia Radio Telescope** will not be offered in the first and second semesters of 2022 due to the planned upgrade at higher frequencies. When more information is available, this will be published at <https://www.radiotelesopes.inaf.it/info.html>.

The **12m antenna at Arecibo Observatory** will be available for EVN observations starting January 2022, see <http://www.naic.edu/>.

The three **Quasar antennas of the Russian VLBI Network** (Badary, Svetloe and Zelenchukskaya) are also available for e-VLBI.

The **Tianma 65m telescope** (Tm65) is located about 6 km away from the 25 m Seshan Telescope (Sh). The 2-letter abbreviation for Tm65 telescope is T6. Both of these telescopes can observe at 18, 13, 6, 5 and 3.6 cm. Tm65 can also observe at 21, 1.3 and 0.7 cm. Tm65 is the default telescope; Sh will be used if Tm65 is not available for some reason. If you select both, you should also discuss the motivation for the very short baseline in the proposal.

The **Korean VLBI Network** (KVN) is an Associate Member of the EVN. KVN telescopes may be requested for EVN observations at 1.3 cm and 7 mm wavelengths. For more details regarding the KVN, see: [http://radio.kasi.re.kr/kvn/main\\_kvn.php](http://radio.kasi.re.kr/kvn/main_kvn.php).



Image by Paul Boven (boven@jive.eu). Satellite image: Blue Marble Next Generation, courtesy of Nasa Visible Earth (visibleearth.nasa.gov).

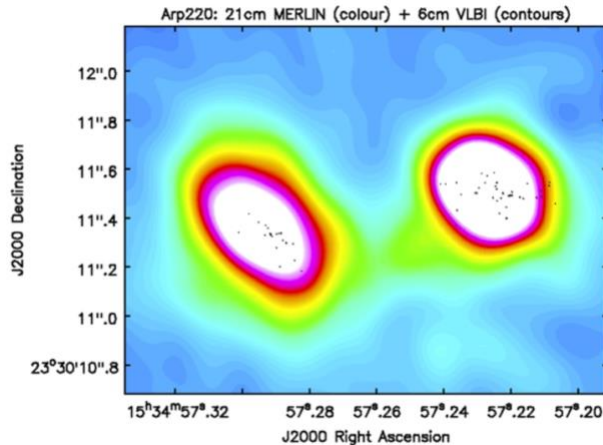
## Integration of e-MERLIN Telescopes into the EVN

Integrated **e-MERLIN + EVN** observations are now available using up to 5 e-MERLIN outstations at 512 Mbps; in addition to the selected Jodrell Bank Observatory (JBO) home station. This additional capability provides short-spacing coverage between 11 and 220 km within e-MERLIN, together with intermediate and long baselines between e-MERLIN and EVN antennas in both disk-recording and e-VLBI mode. Principal Investigators (PIs) can request multiple e-MERLIN outstation antennas (all, or a subset of Pi, Da, Kn, De, Cm) in addition to an EVN homestation antenna at JBO (Jb1 or Jb2).

It is essential that e-MERLIN+EVN proposals provide clear scientific/technical justification for the inclusion of e-MERLIN outstation telescopes, **including why e-MERLIN outstation antennas are required for the delivery of the scientific goal**. This is because in addition to EVN PC approval, the e-MERLIN outstation contribution has to be approved by the e-MERLIN Time Allocation Group (TAG). For e-MERLIN TAG approved projects e-MERLIN outstation data will then be available for full correlation with other EVN antennas at JIVE. Note that EVN proposals requesting only Jb1 or Jb2 are still considered as standard EVN proposals and will only require approval by the EVN PC.

**For e-MERLIN outstations correlated within the EVN, the maximum bitrate available for each outstation correlation at JIVE (both disk and e-VLBI) is 512 Mbps** – equivalent to 2 polarizations at 64 MHz bandwidth at 2-bit Nyquist sampling. Proposals including e-MERLIN should take this reduced data rate into account when estimating the sensitivity.

For further enquiries regarding e-MERLIN + EVN observations please see the [e-MERLIN Contact Webpage](#), or alternatively email: [vlbi@jb.man.ac.uk](mailto:vlbi@jb.man.ac.uk).



*Radio emission from the starburst galaxy Arp 220, illustrating the angular scales covered by EVN+e-MERLIN. The two nuclei are prominent on e-MERLIN scales (color image), they are dominated by free-free emission due to star formation. On VLBI scales (contours, visible as dots) a large population of young supernovae and supernova remnants emerges. Varenius et al. (2014, 2019).*

## Global VLBI Proposals

Global VLBI proposals can be proposed for a data rate of up to 2 Gbps including VLBA, JVLA and the GBT. Global proposals will be forwarded to the NRAO and GBO Time Allocation Committees automatically and should not be submitted to NRAO and GBO separately.

Proposers are asked to **clearly justify the need for and illustrate the plan of use of the NRAO/GBO antennas**, in particular for the GBT and JVLA due to their limited availability.

The **Green Bank Telescope (GBT)** is operated by the Green Bank Observatory (GBO). Time available for global VLBI on the GBT is small (VLBI typically accounts for 10% of Open Skies observing), and only the most highly rated proposals across all GBT observation types will be awarded time. Additionally, proposers should be aware that long scheduling blocks (>6 hours) will be very difficult to schedule owing to constraints coming from non-NSF GBO partners. In the Technical Justification, proposers are encouraged to clarify any constraints about how observing time could be broken into smaller pieces without adversely affecting the proposed science and include relevant information regarding maximum elapsed time of a split schedule and minimum scheduling block lengths. Observations using the GBT 6 cm receiver must be taken, correlated, and calibrated in full Stokes mode. Due to the large cross talk between polarisations, only total intensity (Stokes I) data will be usable.

The NRAO's **Very Long Baseline Array (VLBA)** has no limit to hours spent performing global VLBI. Use of VLBA for Open Skies observing is guided by the scientific merit of the proposal.

The NRAO's **Karl G. Jansky Very Large Array (JVLA)** follows the same observing model as the VLBA, in that there are no restrictions on total hours of joint observing time, although telescope time access is quite competitive, and a strong justification for its use is thus required. Note that phasing of the array at high frequencies ( $\leq 1.3$  cm) is done only in the compact antenna configurations (C and D) of the JVLA.

Some modes may require different bandwidth channels at different telescopes, which can be handled by the software correlator (SFXC). The support staff at JIVE and NRAO will assist you during the scheduling process of such observations. Global observations will be correlated either at the SFXC correlator at JIVE (default) or at the DiFX correlator in Bonn.

For further inquiries regarding the GBT, VLBA and JVLA in global observations please contact the JIVE User Support at [usersupport@jive.eu](mailto:usersupport@jive.eu).

## Use of Australian VLBI Network Antennas

Some Australian **Long Baseline Array** (LBA) time will be made available for simultaneous scheduling with the EVN, thus enabling the possibility of joint LBA/EVN observations. The easternmost stations of the EVN are in a similar longitude range to the LBA telescopes, and for sources in equatorial regions, baselines to western European stations are achievable for a brief period of time. Joint EVN-LBA time is likely to be heavily oversubscribed, and authors are requested to note whether they are prepared to accept scheduling without the LBA antennas. EVN+LBA observations should be possible at all principal EVN wavebands from 21 cm to 1.3 cm. When specifying requested antennas from the LBA in the Northstar Proposal tool, please specify 'LBA' under the "other" row in the telescope-selection box - this selects all antennas that are available for joint observations.

Any proposals for joint EVN+LBA observations submitted to the EVN by its 1 February 2022 deadline should also be submitted to the LBA by their (provisional) 15 June 2022 deadline and will first be eligible for scheduling in EVN Session 3/2022. For more details regarding proposing time on the LBA, see: <https://www.atnf.csiro.au/observers/index.html> .

## Joint observations with other facilities

For joint observations with other (non-radio) facilities, e.g., EVN+XMM, separate proposals should be submitted to the EVN and to the other facility. Such proposals will be considered by the EVN PC on a case-by-case basis.

## EVN Travel support through the Transnational Access Programme

Travel support through the Trans-National Access Programme returns starting on 1 March 2021 through the new OPTICON RadioNet Pilot project, funded by the EU's Horizon 2020 Research and Innovation Programme under grant agreement No 101004719. For eligible projects, this trans-national access support would include travel reimbursement for visiting JIVE to analyse and process your EVN, EVN+e-MERLIN, or global VLBI data.

See the [EVN Travel support](#) pages or contact [campbell@jive.eu](mailto:campbell@jive.eu) for further information.



JIVE support scientists at work



## Additional information

The EVN Archive, containing correlation products, pipeline-calibrated uvfits data and fits files, as well as calibration metadata can be queried at <http://archive.jive.nl/scripts/avo/fitsfinder.php> .

A selection of recent highlights related to the Network and the science it produces can be found in the [EVN web pages](#), and in the [EVN newsletter](#). See also the list of recent [EVN publications](#).

### 'EVN ideas mailbox'

Please share your ideas, comments and suggestions for improvement regarding, for example, the EVN programme possibilities, the observing capabilities, the availability of information online, and the utility of the EVN tools such as Northstar with the EVN PC Chair through this [webform](#).

