e-MERLIN/VLBI National Radio Astronomy Facility

www.e-merlin.ac.uk

# Invitation for proposals: Cycle-15

**Deadline for Receipt of Proposals: 13:59:59 UT on 3rd November 2022**

e-MERLIN requests proposals from the international astronomical community for observations to be made during *Cycle-15*. Proposals are competitively peer-reviewed under standard STFC rules by the *e*-MERLIN PATT Time Allocation Committee. Awards will be made on the basis of scientific merit and technical feasibility alone.

The ***e****nhanced* ***M****ulti* ***E****lement* ***R****emotely* ***L****inked* ***I****nterferometer* ***N****etwork* provides high resolution (12-150 mas), high sensitivity (microJy) imaging at cm wavelengths as well as spectroscopy, astrometry and polarimetry. *e*-MERLIN is an 'SKA-pathfinder' instrument providing observations with angular resolutions and frequencies comparable to those that will be provided by SKA1-mid.

## Cycle-15 *e*-MERLIN Observations: [February 1st to July 31st, 2023]

Continuum observing frequencies available: -

L-Band: Continuous 512 MHz Band: 1.25 GHz to 1.75 GHz (RFI notch filtering fitted)
C-Band: Continuous 512 MHz Band distributed between: 4.3 GHz to 7.5 GHz
K-Band: Continuous 512 MHz Band distributed between: 19 GHz to 25 GHz

System parameters for observations of a continuum source in optimum conditions: -

| **Observing Bands** | **1.25 - 1.75 GHz (L-band)** | **4.3 - 7.5 GHz (C-band)** | **19 - 25 GHz (K-band)** | |
|---|---|---|---|---|
| **Maximum angular resolution** | ~150 | ~40 | ~12 | (milliarcsec) |
| **§RMS level for 8 hours on-source (Briggs robust=0.5 CASA weighting)** | ~24/12* | ~17/10* | ~130** | (μJy/beam) |
| **Elapsed time includes phase-calibration overheads–typically 12-hr elapsed results in ~8-hr on-source** | | | | |
| **Maximum bandwidth/polarisation** | 512 | 512† | 512† | (MHz) |

§ L-Band operations have recently been affected by additional legal transmissions (including 4G+ signals) within the e-MERLIN observing band. Additional flag-masks and in-line filters have been deployed to address these issues. The quoted sensitivities at L-Band in this call and in the e-MERLIN Sensitivity Calculator, reflect changes resulting from the filter/flag-mask installation.
*Briggs robust=0 CASA weighting* has an optimal mix of resolution and sensitivity. *Natural* has greater sensitivity, but with lower resolution

* The use of the Lovell telescope at L-Band, and at C-Band with updated receiver systems reduces the r.m.s. noise levels in the central part of the field of view by ~50% compared with the array not including the Lovell Telescope.

** The sensitivity of e-MERLIN K-band observations is weather and elevation dependent. K-band observations will be dynamically scheduled to optimise for the most ideal weather conditions.

† Frequency flexibility allows the positioning a number of 512MHz sub-bands within the frequency ranges shown for C- and K-Band. This may be used to observe with increased fractional bandwidth and/or spectral coverage at the expense of required observing times since only a single 512 MHz sub-band may be observed at any one time.

**For Detailed Observation Planning** - See The *e*-MERLIN Sensitivity Calculator & Observing Page: https://www.e-merlin.ac.uk/calc.html

Proposals should be submitted via the **updated** *e*-MERLIN web-based *NorthStar* proposal tool from **7th October 2022** See https://www.e-merlin.ac.uk/observe.html for details on **access changes**.

- Proposers must make a detailed case for the inclusion of the Lovell telescope in their proposal.
- Proposers should consult the allocated *e*-MERLIN Legacy Programmes to avoid conflicts. In cases where PATT proposals directly replicate portions of allocated legacy projects, legacy projects will normally be given priority. For details, please contact emerlin.support@jb.man.ac.uk
- Spectral line configuration details are available at https://www.e-merlin.ac.uk/observe.html
- ***e*-MERLIN user support:** Support is available throughout the full lifecycle (proposal to publication) of projects for all users via both face-to-face and remote assistance; and online tools. The *e*-MERLIN science support team is happy to tailor levels of assistance dependent on the requirements of individual users or projects.
- **Access and financial support for e-MERLIN Scientists and Users:** *e*-MERLIN is one of the participating infrastructures in the European Union's Horizon 2020 research and innovation programme, and the OPTICON-RadioNet PILOT support project was launched on March 1st 2021. This programme will provide facility access and financial support for users from eligible projects. If your project is eligible, you will be contacted by the e-MERLIN support team. For further information please contact emerlin.support@jb.man.ac.uk.

**e-MERLIN Science:** e-MERLIN observations address a broad range of scientific questions. Its unique combination of angular resolution and micro-Jansky sensitivity provide crucial insights in multiple science areas. See https://www.e-merlin.ac.uk/science.html for further details.

**e-MERLIN Transient Science:** Enhanced ToO availability has been introduced to provide additional ToO programmes which may not require all antennas or have more relaxed trigger cadences. A new RRT (Rapid-Response Time) category is now available for urgent transient programmes not suitable for ToO submission. For any direct clashes between RRT & ToO programmes, ToO take precedence.

**e-MERLIN+EVN Observations:**

The full integration of *e*-MERLIN telescopes within the European VLBI Network (EVN) is also available for proposals. This mode of observations provides a shorter spacing (10-200 km) component to the EVN which allows imaging of a wider range of spatial scales. Proposals for EVN+e-MERLIN observations should be submitted via the EVN-Programme Committee. https://www.evlbi.org

- During Cycle-15 the VLBI disk-recording sessions are from 23rd February – 16th March and from 25th May – 15th June 2023, during which time e-MERLIN is available for joint EVN/e-MERLIN observations. *e*-MERLIN + EVN proposals should be submitted to the EVN Programme Committee. Details can be found via the EVN web pages (https://www.evlbi.org).
- The current EVN Call for Proposals (including combined e-MERLIN + EVN observations) is at https://www.evlbi.org/. The current deadlines for upcoming EVN+e-MERLIN proposals are **1st February, 1st June, and 1st October 2023.**

For assistance or you have any queries please contact emerlin.support@jb.man.ac.uk.

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