e-MERLIN/VLBI National Radio Astronomy Facility
www.e-merlin.ac.uk

Invitation for proposals: Cycle 16

Deadline for Receipt of Proposals: 13:59:59 UT on 18th May 2023

e-MERLIN requests proposals from the international astronomical community for observations to be made during *Cycle-16*. Proposals are competitively peer-reviewed under standard STFC rules by the *e*-MERLIN Time Allocation Committee. Awards will be made on the basis of scientific merit and technical feasibility.

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 SKA-mid.

Cycle-16 *e*-MERLIN Observations: [August 1st 2023 to January 31st 2024]

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 been affected by additional legal transmissions 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 sensitivity changes due to the installation of such RFI mitigation filters.
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 are weather and elevation dependent. K-band observations will be dynamically scheduled to optimise for suitable weather conditions.
† Frequency flexibility allows the positioning several 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 **25th April 2023.** See the e-MERLIN Proposal Tool link on https://www.e-merlin.ac.uk/observe.html

- Proposers requesting inclusion of the Lovell telescope must provide a detailed supporting case.
- Proposers should consult the allocated *e*-MERLIN Legacy Programmes to avoid conflicts. In cases where Cycle proposals directly replicate portions of allocated legacy projects, legacy projects will normally be given priority. For details, please consult Science with e-MERLIN or 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. The OPTICON-RadioNet PILOT programme provides 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.
- **Russian Affiliated Scientists:** STFC strongly condemn the Russian government's invasion of Ukraine. In line with the UK government's response e-MERLIN is unable to accept proposals from projects including researchers affiliated with Russian Institutes at this time.

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. An 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-16 the VLBI disk-recording sessions are from 19th October – 9th November 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 June, and 1st October 2023.**

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

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