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

Invitation for proposals: Cycle-12

Deadline for Receipt of Proposals: 23:59:59 UT on 13th May 2021

e-MERLIN requests proposals from the international astronomical community for observations to be made during *Cycle-12*. 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 *enhanced Multi Element Remotely Linked Interferometer Network* 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-12 *e*-MERLIN Observations: August 1st 2021 to January 31st 2022

Continuum Observing frequencies available:-

L-Band :	Contiguous 512 MHz bandwidth: 1.25 GHz to 1.75 GHz (usable range)
C-Band:	Contiguous 512 MHz bandwidth distributed between 4.3 GHz to 7.5 GHz
K-Band:	Contiguous 512 MHz bandwidth 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 noise level for 8 hrs on-source** (**Briggs robust=0.5 CASA weighting**)	~24/12*	~17/10*	~130**	(*μ*Jy/beam)
Proposals should request *elapsed time* which includes phase-calibration overheads - typically 8 hrs on-source requires ~12 hrs elapsed time to include the necessary phase referencing scans ††				
Maximum bandwidth/polarisation	512	512†	512†	(MHz)

§ L-Band operations have been affected recently by additional legal transmissions (including powerful 4G+ signals) within the e-MERLIN observing band. Additional flag-masks and in-line filters are being deployed to address these issues. The quoted sensitivities at L-Band in this call, and in the e-MERLIN Sensitivity Calculator, assume the filter/flag-mask installation is complete by the start of Cycle-12.
The *Briggs robust=0 CASA* weighting gives an optimal mixture of resolution and sensitivity. *Natural* weighting gives greater sensitivity, but lower angular resolution.

* The use of the Lovell telescope at L-Band, and at C-Band with updated receiver systems reduces the rms 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* at:
http://www.e-merlin.ac.uk/calc.html, and the observing page at:
http://www.e-merlin.ac.uk/observe.html.

Proposals should be submitted via the *e*-MERLIN web-based *NorthStar* Proposal Tool:
http://proposal.merlin.ac.uk

The proposal tool will be opened for proposal submission from **24th March 2021**.

- Proposers must make a detailed case for the inclusion of the Lovell telescope in their proposed observations.
- 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.
- Spectral line configuration details are available at http://www.e-merlin.ac.uk/observe.html
- **e-MERLIN user support:** Support is available throughout the full life-cycle (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 1st March 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 http://www.e-merlin.ac.uk/science.html for further details.

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 'short-spacing' (10-200 km spacing) component to the EVN. This allows imaging of a wider range of spatial scales. Proposals for EVN+e-MERLIN observations should be made via the EVN-Programme Committee.

- During Cycle-12 the VLBI disk-recording session is 21st October – 11th November 2021 during which time e-MERLIN is available for joint EVN/e-MERLIN observations. These *e*-MERLIN+EVN proposals should be submitted to the EVN Programme Committee. Details for proposing for e-MERLIN+EVN can be found via the EVN web pages (http://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 2021**.

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

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