

## SPOTLIGHT

(Survey for sporadic radio bursts via a commensal multi-beam GPU-powered HPC at the GMRT)

A PetaFlop HPC Facility called *Param Brahmand*, funded by the National Supercomputing Mission (NSM) under MeitY and DST, has been deployed at GMRT. This facility is aimed at conducting real-time commensal searches for Fast Radio Transient sources, namely FRBs (Fast Radio Bursts) and Pulsars, with the GMRT. Though SPOTLIGHT is primarily supporting commensal observations, it is also capable of carrying out targeted observations. The targeted observations are intended to be open-sky, available to GMRT users. Regular updates of the progress in the deployment of the SPOTLIGHT system are available on the SPOTLIGHT webpage (especially the status page, <https://spotlight.ncra.tifr.res.in/status>).

In the commensal mode, SPOTLIGHT will piggy-back any continuum and line GTAC/DDT/test/maintenance observations from 300 - 1460 MHz. For observations in beam mode, the SPOTLIGHT system will piggyback on all phased array (PA) beam observations, excluding beams pointed at the GTAC/DDT targets. For incoherent array (IA) beam and post-correlation (PC) beam observations proposed with the GMRT Wide-band Backend (GWB), the PIs of these proposals can opt to decline permission for commensal use of SPOTLIGHT. An opt-out option for IA and PC beam observations in commensal mode has been incorporated into the NAPS system.

In the open-sky mode, a maximum allocation of 100 hours with the SPOTLIGHT system is available for GMRT Cycle 48. This mode allows recording of up to 160 post-correlation beams (formed by phased addition of cross-visibility) with 1.3 ms time-resolution having 4096 spectral channels from the SPOTLIGHT system optimally covering the central target of a few arc-minutes in size. A trade-off between time and frequency resolution may be possible while maintaining the same aggregate data rate. The open-sky mode of the SPOTLIGHT system in Cycle 48 would be in shared-risk mode. The storage requirement for this open-sky mode of SPOTLIGHT for 160 beams (in SIGPROC filterbank format) at 1.3 ms with 4096 channels for an hour of observing time is ~1.6 TB. The PIs must coordinate with the GMRT operation team to make the necessary arrangements for copying the data from the observatory. A basic pulsar search processing pipeline with default parameter settings is expected to be available for offline execution on these recorded beams, in case PIs are interested in processing the data locally. For this the PIs need to contact with the SPOTLIGHT team. A beam synthesis utility will be used to obtain the optimal number of beams given the field-of-view of interest, frequency of observations and the number of antennas used in beamforming. The PIs need to provide a detailed justification for the use of the SPOTLIGHT system in NAPS (e.g. by uploading a mandatory PDF file) along with these technical specifications.