

Proposal planning and observing

❖ Ruta Kale

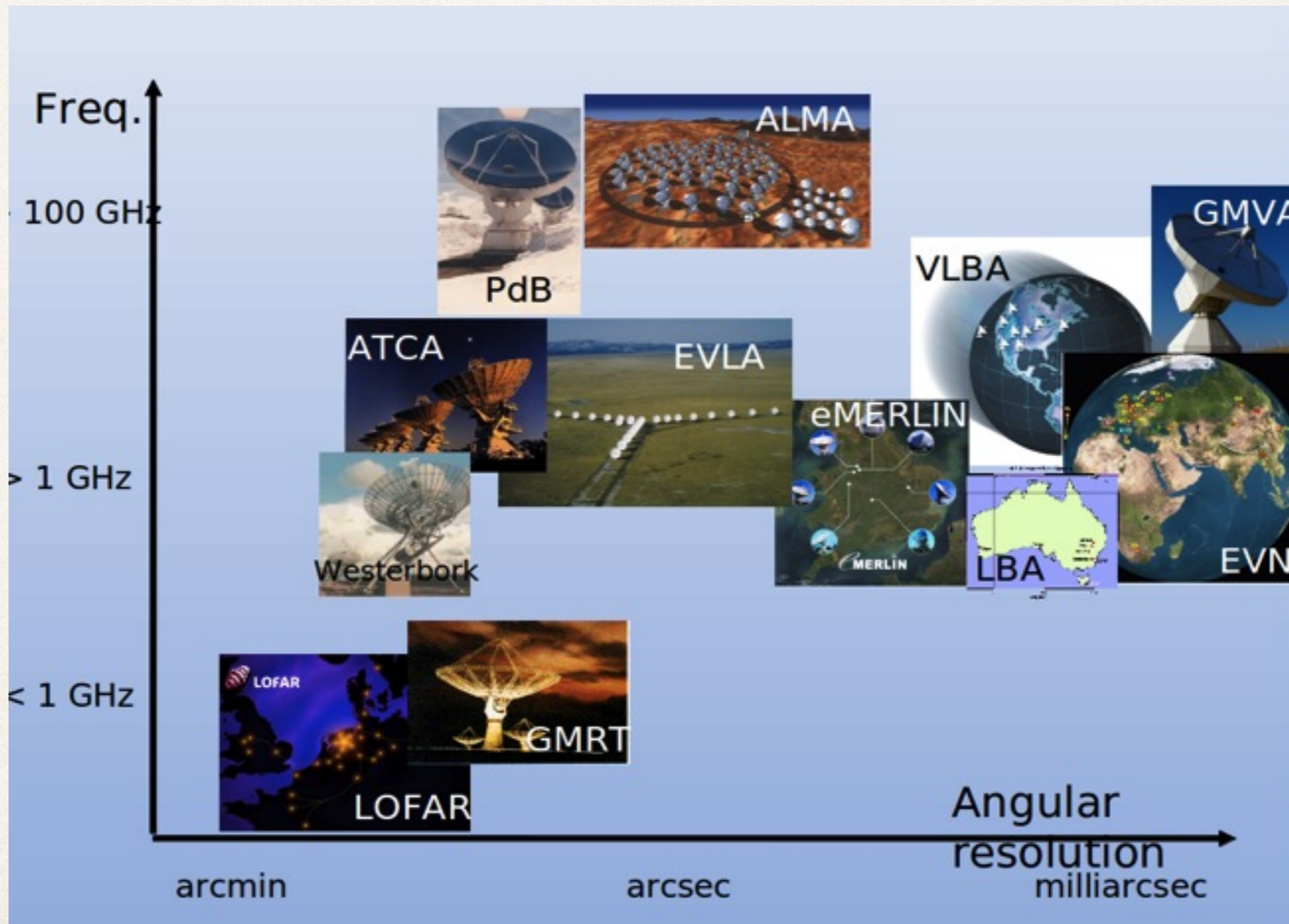
❖ NCRA-TIFR

❖ Thanks to Preeti Kharb (NCRA-TIFR) and Poonam Chandra (NCRA-TIFR/NRAO)

Why a Proposal?

- ❖ To test a scientific hypothesis
- ❖ Telescopes like the GMRT are open to the worldwide scientific community
- ❖ Compete for observing time
- ❖ Proposal writing skills are essential for funding


Telescopes & Frequencies



Proposal Submission

- ❖ GMRT Time Allocation Committee (GTAC) invites proposals for 2 Cycles (April to September and October to March).
- ❖ **Deadlines** 15 January and 15 July
- ❖ Proposals must be submitted online via NCRA Archive & Proposal System, NAPS
- ❖ Proposals must be submitted by the Principal Investigator (PI)
- ❖ Co-Investigators (Co-Is) need to be registered users
- ❖ All proposals processed by GTAC with external refereeing and inputs from the GMRT Observatory on technical issues

NCRA Archive and Proposal System



NCRA • TIFR

User ID

Password

Login

[Create Account](#)

[Reset Password](#)

[Help on creating proposal](#)

GMRT Online Archive search is available [here](#). User's can use their current credentials to login archive.

GMRT Coversheets finder tool is available [here](#).

❖ <https://naps.ncra.tifr.res.in/naps/login>

3 Components of a Proposal

- 1. Cover sheet:** Title, Abstract, Affiliation, Collaborators, Targets & Observing time
- 2. Scientific Justification:** Science case for your observations
- 3. Technical Justification:** Details of time request, Bands, Exposure Time Calculator (ETC)

Proposal Components

- ❖ **Abstract:** Short summary of the science, time request and frequency(ies)
- ❖ **Scientific Justification:** (1) Introduction + (2) Previous work/Proposed targets + (3) How the science goals stated in the Introduction will be met
- ❖ **Introduction:** What is the big picture? What are the open questions? Why is the proposed science essential for answering the open questions?
- ❖ **(1)+(2)+(3):** Make it understandable to an undergraduate student or a non-expert. Make it quantitative. Include explanatory figures
- ❖ **Technical Feasibility:** Show that with the proposed time request, you will be able to achieve your science goals (detect features at $>5\sigma$ level?)

Some more on Scientific Justification

- ❖ Highlight previous observations at radio and other wavelengths, to put things in perspective
- ❖ If data exist, explain why you need more observations
- ❖ Demonstrate by numbers/figures that existing data are inadequate

Archival Data Search

- ❖ GMRT Data Archive (<https://naps.ncra.tifr.res.in/goa/data/search>)
- ❖ TIFR GMRT Sky Survey, TGSS archive @150 MHz (<http://tgssadr.strw.leidenuniv.nl>)
- ❖ VLA NVSS archive @1.4 GHz, 45 arcsec (<https://www.cv.nrao.edu/nvss/>)
- ❖ VLA FIRST archive @1.4 GHz, 5 arcsec (<https://www.cv.nrao.edu/first/>)
- ❖ ATNF archive for ATCA @1-2 GHz, <9 arcsec (<https://atoa.atnf.csiro.au>)

GMRT Data Archive



GMRT Online Archive

This interface allows one to view the data. In order to download the data you have to log in.

[Help](#) | [Log In](#)

GOA is under maintenance till 28th August 2019 1800 IST

Q Search

Proposal Level Search

Proposal Code:

Principal Investigator:

Proposal Title:

Proposal Submission Year: Start Year End Year

Time Allocated: Less than Time hrs

Scientific Category: Select Category

Observation Type: Select Observation Type

Observation Level Search

Observation Number:

Observation Date: Start Date End Date
(dd/mm/yyyy)

Scan Level Search

Proposal code:

Principal Investigator:

Near Object:

Near Co-ordinates: RA (J2000)
DEC (J2000)

Search Radius: arcmin

Frequency Band: Select

Frequency Value: Less than Value MHz

Channel Spacing: Select

Time On Source: Less than Time Mins.

Source Name: (as listed in scan)

Correlator Type: GHB GSB GWB

Some more on Technical Justification

- ❖ Clear justification of Technical choices: Receiver frequencies, RFI considerations, special requests. Talk about Resolution
- ❖ Demonstrate that you will reach the required signal-to-noise ratio in the time requested. Note the expected r.m.s. noise. Talk about Sensitivity
- ❖ Include expected overheads (setup time, slew time, calibration time, position switching time etc.) in total time request
- ❖ Now, ETC. Attach ETC page to proposal.
- ❖ If non-standard setups or a very stringent scheduling is needed, then consult the GMRT observatory staff before submitting the proposal
- ❖ **COMPLETE** consistency between the Cover sheet and Technical justification

Submit your proposal online via NAPS

If your proposal does not get accepted

Incorporate the GTAC comments and submit again for the next cycle


If your proposal gets accepted

Preparing for your observations


The screenshot shows the website for the National Centre for Radio Astrophysics (NCRA) at Tata Institute of Fundamental Research (TIFR), Pune. The page is titled "GMRT Users" and is part of the GMRT (Giant Metrewave Radio Telescope) section. The header includes the NCRA-TIFR logo and the text "NATIONAL CENTRE FOR RADIO ASTROPHYSICS Tata Institute of Fundamental Research, Pune". The navigation menu includes links for NCRA, GMRT, ORT, SKA-India, Research, People, Students, Jobs, Events, Outreach, and Contact Us. The main content area is divided into two columns. The left column contains a "GMRT" menu with links to "About GMRT", "GTAC", "GMRT Users", "Observing Help", "GMRT Data Archive", "GMRT Exposure Time Calculator", "Low Frequency Radio Astronomy a.k.a. blue-book", "White Slot Form", "Monitoring Tools", "AIPS Help", "CASA Help", "GMRT News", "Feedback Form", "Noise Cal Values at different Frequencies", "Facilities", "Recent GMRT results", "Sub Systems", "Plan Meetings", and "Local Information". The right column, titled "GMRT Users", contains links to "Observing Help", "GMRT Data Archive", "GMRT Exposure Time Calculator", "Low Frequency Radio Astronomy a.k.a. blue-book", "White Slot Form", "Monitoring Tools", "AIPS Help", "CASA Help", "GMRT News", "Feedback Form", and "Noise Cal Values at different Frequencies". A "Print this" button is located at the bottom of the right column. The footer includes a "Site Map" link, a search bar, and links for "Accessibility", "Miscellaneous", "Library", "Intranet", "Webmail", "People Finder", and "Log in". The footer also contains the NCRA-TIFR logo, the text "National Centre for Radio Astrophysics - Tata Institute of Fundamental Research, Pune Pune University Campus, Post Bag 3, Ganeshkhind Pune 411007, INDIA Tel - +91 20 2571 9000/9111 Fax - +91 20 25692149", and the TIFR logo.

<http://www.ncra.tifr.res.in/ncra/gmrt/gmrt-users>

Observing Help



NATIONAL CENTRE FOR RADIO ASTROPHYSICS
Tata Institute of Fundamental Research, Pune



[NCRA](#) [GMRT](#) [ORT](#) [SKA-India](#) [Research](#) [People](#) [Students](#) [Jobs](#) [Events](#) [Outreach](#) [Contact Us](#)

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GMRT

- About GMRT
- GTAC
- GMRT Users
- Observing Help**
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Observing Help

This web-page contains information, which users require for their GMRT observations.

Documents

- Low Frequency Radio Astronomy
 - Notes from a school on low frequency radio astronomy held at NCRA, Pune from June 21 to July 17, 1999.
- GMRT User's Manual
- Pulsar Observing Guide (Last Updated : 4th May 2009)

News

- News for GMRT Users

Mirror Sites

- NVSS - GMRT Mirror Site

For GMRT Observations


- Observing Schedules
- GMRT Exposure Time Calculator
- GDDP (GMRT Data Diagnostic Package)
- Rise, Transit and Set time of Source(s) [NCRA Link] | [GMRT Link]
- Observation Command File Creator
- AIPS mapping for GMRT antennas.
- Noise calibration values at different frequencies.

While acknowledging us in your publication, kindly use the following phrase:


"We thank the staff of the GMRT who have made these observations possible. The GMRT is run by the National Centre for Radio Astrophysics of the Tata Institute of Fundamental Research."

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Monitoring Tools

Observing Help & Monitoring Tools

[home](#)

For Astronomers	For Engineers
<p>User Documents GMRT Observer's Manual System Parameters and Current Status Manual for observations in beam-former mode Polarisation observations with GMRT (V2) Dual band multi-pointing with GMRT (V2) GMRT Software Backend Documents uGMRT upgrade status</p> <p>Before Observations GTAC Schedule [NCRA] [GMRT] White Slot Request[NCRA] [GMRT] Command file Creator(GSB) Command file Creator (GWB) Line Observations Setup (GSB tune) Source(s) Rise and Set [NCRA] [GMRT] GMRT Exposure Time Calculator Online RFI excision VLA Calibrator Search Dual band multi-pointing coordinates Online Archive (GOA)</p> <p>During Observations Antenna Tracking Status (NEW) Antenna Tracking Status (OLD) Corr band shapes and Project State (GSB) Corr band shapes and Project State (GWB) Gain-amplitude and Phase (rantsol) Visibility - amplitude and phase (xtract) Antenna Wind Status Satellite passes</p> <p>After Observations LTA to FITS conversion: AIPS help: RFI Counter Analysis Scripts: RFI Plots: GDDP summary:</p> <p>Contact gmrtoptions@ncra.tifr.res.in snk@gmrt.ncra.tifr.res.in</p>	<p>Antenna Systems Antenna Tracking Status (NEW) Antenna Tracking Status (OLD) Ondisplay History Feed position status Pointing Offsets Wind Monitoring Station Antenna Wind Status Temperature Status Servo data Sentinel and Power Supply(OLD) Antenna Sentinel, Power Supply & Link</p> <p>Analog Backend GAB Status, Band-Shapes, Temperature IF Band-Shapes and Deflection data</p> <p>Digital Backend GSB band-shapes, Fringe Status GSB Amp-Phs(rantsol), Amp-Phs(xtract) Temperature</p> <p>Hydrogen Maser</p> <p>Gmon Tools, Logs</p> <p>Test Results, Callsheets and Schedules Useful scripts Recent Callsheets GMRT Upgrade Status Results of Weekly PMQC tests GDDP, RFI status gray plots Antenna Beam Width Plots Schedules and white slot request Satellite tools</p> <p>Contact astro supp@gmrt.ncra.tifr.res.in snk@gmrt.ncra.tifr.res.in</p>

<http://gmrt.ncra.tifr.res.in/~astro supp/>

Preparing the Command File

GTAC observing inputs (Command file, 1.4)

Fill the inputs below OR upload the previous setup file No file chosen

Project information:

User's name(s)..... User's email id(s).....
GTAC code..... Project title (in short)...
Observing slot start(IST) Slot length (hours).....
Observing type..... Continuum/Imaging Line/Spectroscopy Pulsar/Beam

Receiver and Backend setup(GWB):

Array Mode	Band Width(MHz)	Spectral Chan	Resolution(kHz)	Stokes Para	STA Cycle	RFI Filter	PFB
<input type="text" value="One Sub-array"/>	<input type="text" value="200 [200]"/>	<input type="text" value="2K"/>	<input type="text" value="195.3125"/>	<input type="text" value="Total_Intensity(2)"/>	<input type="text" value="4"/>	<input type="text" value="OFF"/>	<input type="text" value="OFF"/>

Sub-array (1) Antennas	RF band/sub-band (MHz)	Start Freq (MHz)	Center Freq (MHz)	Stop Freq (MHz)	GAB LO Freq (MHz)	LTA Integ (sec)	Walsh (modu)	Beam (ON/OFF)
<input type="text" value="C00,C01,C02,C03"/>	<input type="text" value="Select Band"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="0"/>	<input type="text" value="Default"/>	<input type="text" value="10.7"/>	<input type="text" value="OFF"/>

Source co-ordinates-list (J2000):

Enter the co-ordinates below OR upload the source file No file chosen

Source	Ra	Dec	Epoch	*Time(min)	*DM(pc cm ⁻³)	
3C147	05h42m36.13s	+49d51'07.2"	2000.0			
0837-198	08h37m11.18s	-19d51'56.8"	2000.0			
NGC1851	05h14m06.30s	-39d02'50.0"	2000.0	-	2.6	
J0332+5434	03h32m59.40s	+54d34'43.3"	2000.0	5	1.5	
J0820-4114	08h20m15.46s	-41d14'35.2"	2000.0	5		

'' indicates optional field

<http://www.ncra.tifr.res.in/~secr-ops/cmd/cmd.html>

Preparing the Command File

Observing Plan(command file):

A conservative estimate of 2 minutes overhead between two scans is included in the command file

Time Slot (IST): 22Mar2023 08:00 -- 11:00 (3h)

No	Command	Option	Source(target)	Time(min)	Time-line	Insert/Delete	Command
1	setup	▼ --	--	20	08:00 -- 08:20	Insert below	Delete this
2	flux_cal	▼ --	3Cxx	10	08:20 -- 08:32	Insert below	Delete this
3	phase_cal	▼ --	0837-xx	5	08:32 -- 08:39	Insert below	Delete this
4	loop_start	▼ 3	{	0	08:39 -- 08:39	Insert below	Delete this
5	target	▼ --	NGCxx	30	--:-- -- --:--	Insert below	Delete this
6	phase_cal	▼ --	0837-xx	5	--:-- -- --:--	Insert below	Delete this
7	loop_stop	▼ --	}	0	10:36 -- 10:36	Insert below	Delete this
8	flux_cal	▼ --	3Cxx	10	10:36 -- 10:48	Insert below	Delete this

Special requirement or additional info (if any):

e.g
Observe target source if the phase cal is set and take flux cal for 10 min at the end.

GSB parameters (if opted for GSB)

1. GSB_BW (MHz) = 32 / 16 / 4 / 2 / 1 / 0.5
2. GSB_CHAN (nos) = 512 / 256 / 128
3. GSB_LTA (sec) = 16 / 8 / 4 / 2
4. GSB_STOKES = Total_intensity / Full_Stokes

Please email downloaded file to gmrtoptions@ncra.tifr.res.in
For any queries, please write to gmrtoptions@ncra.tifr.res.in

<http://www.ncra.tifr.res.in/~secr-ops/cmd/cmd.html>

Observing Strategy

- ❖ **Calibration Strategy**

- ❖ Amplitude calibrators, Bandpass calibrators

- ❖ Phase Calibrators

- ❖ Polarization Calibrators

- ❖ **Scheduling Constraints**

- ❖ Need quiet ionosphere, night observations (<610 MHz)

- ❖ Coordinated observations with other instruments (say ASTROSAT)

- ❖ Include in **Cover Sheet** of the proposal

Calibrators

- ❖ **Amplitude calibrators**, 3C48 (0137+331), 3C147 (0542+498) and 3C286 (or 1331+305) are used for both, amplitude and bandpass calibration
- ❖ **Phase calibrator** should be nearby, preferably within 15 degrees for 1.4 GHz and within 20 degrees at lower frequencies — Assumption being that sky conditions are the same for target & calibrator
- ❖ It should preferably be a point source, and 'P' type
- ❖ ■ P : <3% amplitude closure errors expected. Great for calibration!
- ❖ ■ S : 3-10% closure errors expected. Good for phase and gain (amplitude) calibration.
- ❖ ■ W : 0-?% closure errors expected. Suitable for calibration of phases only.
- ❖ ■ C : Confused source, probably not good to use for calibration.
- ❖ ■ X : Do not use.

Searching for a Phase Calibrator

VLA Calibrator Search Tool

This tool searches for the VLA calibrator sources within the circle centered at target position.

[VLA Calibrators](#) | [Manual](#) | [User Help Document](#) | [*Useful tip*](#)

Target RA:	<input type="text" value="00h00m00.00s"/>	Target Dec:	<input type="text" value="00d00'00.00"/>
Search Radius(deg):	<input type="text" value="10d00'00.00"/>		
Band :	<input type="text" value="Any"/> ▼		
Flux Density Lower Limit(Jy):	<input type="text" value="0"/>		
Array Configuration:	<input type="text" value="Any"/> ▼	Cal Code:	<input type="text" value="Any"/> ▼
Maximum UVMin(kL):	<input type="text" value="NULL"/>		
Minimum UVMax(kL):	<input type="text" value="NULL"/>		

<http://gmrt.ncra.tifr.res.in/~astrosupp/calib/vlacal.html>

Rise, Transit and Set time of Source(s)

Rise, Transit and Set times for the source(s) at GMRT

Observing date: 29 August 2019

Elevation Limit (degree) : 17.0

Source	RA	Dec	Epoch
3C147	05h38m43.50s	+49d49'42.7"	1950.
3C48	01h37m41.30s	+33d09'35.13"	2000.
3C286	13h31m08.29s	+30d30'33.0"	2000.

Enter the source coordinates in to the box :

Calculate clear back

[VLA Calibrators list](#)

Important Notes:

- GMRT Latitude: **+19d06'(N)**, Longitude : **74d03'(E)**
- Elevation limit (Min) : **17.0deg**
- Sky covered by GMRT: **Declination +90d00' to -53d54'**.
- If source sets after midnight, please re-submit the query using the next observing day to determine the set time.

Rise, Transit and Set Timings for the Source(s) @ GMRT

Date : 23 Nov 2018, Elevation : 17.0 deg, IST=UTC+0530

Source	RA	Dec	Epoch	Rise(IST)	Transit(IST)	Set(IST)	Rise(LST)	Transit(LST)	Set(LST)	UpTime(Hrs)
3C286	13h31m08.2879s	+30d30'32.958"	2000.	04:34:04	09:57:24	15:20:44	08:07:47	13:32:00	18:56:13	10:48:25
OQ208	14h07m00.3944s	+28d27'14.690"	2000.	05:11:56	10:33:09	15:54:21	08:45:45	14:07:51	19:29:56	10:44:10
PG1501+106	15h04m01.201s	+10d26'16.15"	2000.	06:29:05	11:30:04	16:31:03	10:03:07	15:04:55	20:06:44	10:03:36
1445+099	14h45m16.465213s	+09d58'36.072440"	2000.	06:10:59	11:11:23	16:11:47	09:44:58	14:46:11	19:47:25	10:02:26
PG1426+015	14h29m06.588s	+01d17'06.48"	2000.	06:06:27	10:55:18	15:44:09	09:40:26	14:30:04	19:19:42	09:39:16
PG1448+273	14h51m08.763s	+27d09'26.92"	2000.	05:57:16	11:17:08	16:37:00	09:31:13	14:51:58	20:12:42	10:41:29
1513+236	15h13m40.185630s	+23d38'35.200460"	2000.	06:23:28	11:39:37	16:55:45	09:57:29	15:14:30	20:31:30	10:34:01
PG1404+226	14h06m21.883s	+22d23'46.22"	2000.	05:17:46	10:32:32	15:47:19	08:51:36	14:07:14	19:22:52	10:31:16
1330+251	13h30m37.6892s	+25d09'10.978"	2000.	04:39:11	09:56:55	15:14:38	08:12:55	13:31:31	18:50:07	10:37:12
PG1351+236	13h54m06.432s	+23d25'49.09"	2000.	05:04:25	10:20:19	15:36:12	08:38:13	13:54:59	19:11:44	10:33:30
PG1341+258	13h43m56.748s	+25d38'47.69"	2000.	04:51:55	10:10:11	15:28:26	08:25:41	13:44:49	19:03:57	10:38:15
PG1310-108	13h13m05.789s	-11d07'42.40"	2000.	05:10:38	09:39:32	14:08:25	08:44:27	13:14:05	17:43:43	08:59:15
1248-199	12h48m23.898197s	-19d59'18.587620"	2000.	05:04:08	09:14:54	13:25:40	08:37:56	12:49:23	17:00:51	08:22:54
PG1244+026	12h46m35.248s	+02d22'08.79"	2000.	04:22:43	09:13:04	14:03:25	07:56:24	12:47:33	17:38:41	09:42:17
1254+116	12h54m38.255601s	+11d41'05.895070"	2000.	04:18:36	09:21:04	14:23:33	07:52:16	12:55:35	17:58:53	10:06:36
PG1229+204	12h32m03.605s	+20d09'29.21"	2000.	03:46:15	08:58:33	14:10:52	07:19:50	12:33:00	17:46:09	10:26:18
PG1211+143	12h14m17.670s	+14d03'13.10"	2000.	03:35:32	08:40:51	13:46:10	07:09:06	12:15:15	17:21:24	10:12:18

http://www.ncra.tifr.res.in:8081/~secr-ops/obs_setup/rst.html

Email the completed command files
to “gmrtooperations@ncra.tifr.res.in”

DDT Proposals

- ❖ Proposals that need data urgently (e.g., a gamma-ray burst followup) OR Proposals that want to carry out a Feasibility study before applying for a Large GMRT proposal using a special setup -
- ❖ Can request for Director's Discretionary Time (DDT)
- ❖ Submit a DDT proposal through NAPS, like a Regular proposal

ToO Proposals

- ❖ Target of Opportunity proposals: typically for transient sources that can burst anytime.
- ❖ Submitted at regular proposal calls – if observing time allotted then observations can take place whenever the source bursts during that observing cycle.
- ❖ Typically used for supernovae, GRBs, FRBs, GW sources etc.

Summary

- ❖ Science goal that needs radio observations is the starting point.
- ❖ Scientific justification and technical justification are the main components of the proposal.
- ❖ GMRT call for proposals is twice a year: 15th January and 15th July.
- ❖ Read the telescope documentation and use the available tools to prepare the proposal.
- ❖ Prepare well in time: For anything related to the GMRT take help from NCRA astronomers well in advance if you need.