GBO Call for Proposals: Semester 2017A

30 June 2016

The Green Bank Observatory (GBO) invites scientists to participate in the GBO's Semester 2017A Call for Proposals for the Green Bank Telescope (GBT). Proposals requesting the GBT as part of High Sensitivity Array (HSA), and Global 3mm VLBI Array (GMVA) should be submitted through the Long Baseline Observatory's call (available here (https://science.nrao.edu/observing/call-for-proposals/lbo_2017a)).

The submission deadline for Semester 2017A proposals is Monday, 1 August 2016, at 17:00 EDT (21:00 UTC).

The GBO especially wishes to highlight continuing opportunities for joint observations with the **Chandra X-ray Observatory**, the **Hubble Space Telescope** and the **Swift Gamma-Ray Burst Mission**.

The GBO strongly encourages proposers to read through the "News and Opportunities (https://science.nrao.edu/observing/call-for-proposals/gbo_2017a/news-opportunities) " page carefully as there have been a number of changes made to instrument availability and student support opportunities for 17A.

Proposal preparation and submission remain via the **NRAO** Proposal Submission Tool (PST) available at NRAO Interactive Services (http://my.nrao.edu/) . Note that PST use requires registration. Proposers who need assistance with proposal preparation or have questions regarding the Call or GBT capabilities should contact Observatory staff via the Helpdesk (https://help.nrao.edu/) .

News & Opportunities

GBT Time Allocation Under a New Organization

On 20 November 2015, the National Science Foundation (NSF) selected Associated Universities, Inc. (AUI) to manage the National Radio Astronomy Observatory (NRAO) through a new 10-year cooperative agreement. The new agreement includes the operation of the Karl G. Jansky Very Large Array (VLA), the North American share of the international Atacama Large Millimeter/submillimeter Array (ALMA), and NRAO's development laboratories and administrative and management functions, effective 1 October 2016.

The Green Bank Telescope (GBT) and Very Long Baseline Array (VLBA), which were recommended for divestment several years ago, will exit NRAO and become independent facilities within as the Green Bank Observatory (GBO), and the Long Baseline Observatory (LBO). Associated Universities, Inc. (AUI) will operate GBO under a 2-year cooperative agreement between the National Science Foundation (NSF).

Because of this reorganization, the 2017A Call for Proposals is now divided into three separate calls for the VLA, LBO, and GBO. This call is for the GBT only; the call for LBO can be found here

(https://science.nrao.edu/observing/call-for-proposals/lbo_2017a/) and the call for VLA can be found here (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/introduction).

The 1 August 2016 deadline is for the Semester 2017A GBT observing period: 1 February 2017 – 31 July 2017.

Details of all GBT observing modes are in the The Proposer's Guide for the Green Bank Telescope (https://science.nrao.edu/facilities/gbt/proposing/GBTpg.pdf). Proposers should also consult the more general document The Performance of the GBT: A Guide for Planning Observations (http://www.gb.nrao.edu/~rmaddale/GBT/ReceiverPerformance/PlaningObservations.htm). Proposers should make sure that they are familiar with the latest versions of these documents before writing their proposal.

The GBT receivers, backends, and observing modes that are available in Semester 2017A are listed in Tables 1 and 2 below.

Table 1: GBT Receivers

Receiver	Frequency Range
Prime Focus 1	290-395 MHz and 680 -920 MHz
L-band	1.15-1.73 GHz
S-band	1.73-2.60 GHz
C-band (linear only - see below)	3.8-8.0 GHz
X-band	8.0-11.6 GHz
Ku-band	12.0-15.4 GHz
K-band Focal Plane Array (7 pixels)	18.0-26.0 GHz
Ka-band	26.0-39.5 GHz
Q-band	38.2-49.8 GHz
W-band	67-93.3 GHz
ARGUS (shared risk - see below)	80-115.3 GHz, Private PI instrument, Shared Risk
Mustang 2	90 GHz, Private PI instrument, Shared Risk

Table 2: GBT Backends and Observing Modes

Backend	Observing Modes
Versatile Green Bank Astronomical Spectrometer (VEGAS)	Continuum (see below), spectral line, pulsar (shared risk)
Digital Continuum Receiver (DCR)	Continuum
Green Bank Ultimate Pulsar Processing Instrument (GUPPI)	Pulsar (retiring on February 1, 2018; No new GUPPI proposals accepted for observations beyond that date.)
Mark V Very Long Baseline Array Disk Recorder	Very Long Baseline Interferometry
JPL Radar backend	Private PI instrument - Open for Public Use

C-band: Proposals wishing to use the GBT C-band receiver should only use linear polarization outputs. The circular polarization of the receiver is currently not preforming correctly and we will not accept any proposals to use the circular polarization output of this receiver.

C-band VLBI on the GBT: NRAO will only accept proposals for VLBI Stokes I continuum observations using the GBT C-band receiver. All other VLBI observations requesting the C-band receiver on the GBT will be disregarded. Please see the HSA section (https://science.nrao.edu/observing/call-for-proposals/2016B/vlba-hsa-vlbi-proposals) of the 16B call for proposals for more details.

VEGAS:

Continuum: All modes of VEGAS may now be used for continuum observations. We were not able to update the Proposal Submission Tool to reflect this situation before the proposal call was released. Proposers should use the spectral line modes of VEGAS to choose the desired bandwidth and then note in the technical justification that the observations will be for continuum measurements.

Pulsar: VEGAS pulsar modes will be released for shared risk observing. Proposals requested both VEGAS pulsar modes and GUPPI modes must use the same mode for both instruments. Justification for using both GUPPI and VEGAS pulsar modes simultaneously (such as for transitioning current timing campaigns from GUPPI to VEGAS pulsar modes) must be included in the proposal. Proposals for new pulsar timing campaigns and searches are strongly encouraged to use only the VEGAS pulsar modes.

GUPPI: The GUPPI pulsar backend will be retired on February 1, 2018.

ARGUS: Observers interested in shared-risk observations using the ARGUS instrument should see http://www.gb.nrao.edu/argus/ (http://www.gb.nrao.edu/argus/) for further information. All ARGUS proposals must have permission from the instrument development team.

VLBI: Time available for VLBI on the GBT will be dramatically reduced compared to past observing semesters due to its new partnership arrangement. Proposers should only include the GBT in the proposal if it is essential for the science and if it is clearly justified in the text of the proposall. All Very Long Baseline Interferometry (VLBI) proposals requesting the GBT should include any needed setup and overhead time in the time request of their proposals. C-band VLBI observers should see C-band note above.

MUSTANG 2: The GBO will accept proposals for shared risk observations using the MUSTANG 2 instrument at the August 1, 2016 proposal deadline. We anticipate releasing accepted MUSTANG 2 proposals to begin observations in late October 2016 after the Time Allocation Committee has met. All MUSTANG 2 proposals must have permission from the instrument development team.

Mapping If you are considering mapping with the GBT such that there are major turns or moves (end of rows in raster map, change in position for pointed maps, etc.) that occur with a cadence faster than every 30 seconds, you will need to consult with a GBT support scientist to ensure that the GBT can safely withstand the stresses induced by the mapping motions.

Scheduling

The GBT is scheduled by the Dynamic Scheduling System (DSS) (http://www.gb.nrao.edu/DSS) . The DSS system is fully described in the GBT Proposer's Guide (https://science.nrao.edu/facilities/gbt/proposing/GBTpg.pdf) and

the GBT Observer's Guide (https://science.nrao.edu/facilities/gbt/observing/GBTog.pdf) .

GBT Proposal Preparation

Proposers should consult the The Performance of the GBT: A Guide for Planning Observations (http://www.gb.nrao.edu/~rmaddale/GBT/ReceiverPerformance/PlaningObservations.htm) and the GBT Observer's Guide (http://www.gb.nrao.edu/gbtprops/obsman/GBTog.pdf) . All proposers, including pulsar proposers, should use the GBT Sensitivity Calculator (https://dss.gb.nrao.edu/calculator-ui/war/Calculator_ui.html) . Please see the Calculator's User's Guide (https://dss.gb.nrao.edu/docs/Calculator_ug.pdf) for instructions. The Sensitivity Calculator results can be cut and pasted into the Technical Justification section of the proposal. This will streamline the creation of your Technical Justification and will increase your chances of getting a positive technical review. If you are planning on making maps with the GBT, you should use the GBT Mapping Calculator (http://www.gb.nrao.edu/~rmaddale/GBT/GBTMappingCalculator.html) tool.

The GBT observing policies (https://science.nrao.edu/facilities/gbt/observing/policies) describe the telescope's remote observing restrictions.

Proposers requesting GBT participation in High Sensitivity Array (HSA), Very Long Baseline Array (VLBA), or Global Millimeter Very Long Baseline Interferometry (GMVA) observations should consult the VLBA, HSA, and GMVA Proposal Call.

GBT Shared Risk Observing

Observers requesting instruments that are shared-risk will be expected to travel to Green Bank for observations. The observers may be expected to help commission the instruments, to help debug observing and data reduction software, as well as helping to develop data reduction and calibration schemes.

Proposals to use ARGUS (80-115.3 GHz) will be accepted with the instrument development team's permission. Proposals to use MUSTANG 2 will be accepted with the instrument development team's permission. NRAO will consider shared-risk proposals for Semester 2017A observations with these instruments.

Limited Time for "Fixed" and "Windowed" Observations

Due to varied pressures on the GBT's schedule, the amount of time that can be accepted for fixed time observations (e.g. VLBI, pulsar transit observations, etc.) and windowed observations (e.g. monitoring observations) will be limited for the proposal call. Proposals needing fixed and windowed observations will likely have to be ranked at least in or near the top decile in order to be accepted.

Limited Instrument Availability

Due to existing obligations, the Prime Focus 800 MHz feed will only be available for approximately two weeks each month. The Prime Focus 342 MHz feed will only be available for approximately one week per month. The other Prime Focus feeds (450, 600 and Prime Focus 2) are unlikely to be considered for installation. Similarly, the Caltech Continuum Backend (CCB), Zpectrometer, Ku-wide and RRI receiver are also unlikely to be considered for installation in 17A. The PFS radar backend (PI: Margot) is available only with prior agreement by the PI.

Table 3: Instruments Available Only Upon Special Request

Backend	Notes
Prime Focus 1	450 and 600 MHz feeds: 385-690 MHz
Prime Focus 2	910-1230 MHz
Caltech Continuum Backend (CCB)	Continuum
Zpectrometer	26.0-39.5 GHz, Private PI Instrument, Shared Risk
Ku-wide	12-18 GHz, not for spectral line use
RRI	Private PI Instrument, Shared Risk
PFS Radar	Private PI instrument

Other GBT Gregorian receivers (primarily, but not limited to, Ku, Ka, Q and W) may only be available during a few short, two or three week periods during the semester.

470-700 MHz RFI Digital TV transmissions above 470 MHz will make observing very difficult with the 450 and 600 MHz feeds of the PF1 receiver. Available RFI plots do not show the strength of these signals as they overpower the system: they are too low by a factor of 10 to 50. Observers should consult the GBT support scientists before submitting a proposal for these feeds.

Page Charge Support:

The GBO will not be providing page charge support for observers.

Student/Visitor Support:

Limited financial support is available for student travel to Green Bank as part of the observing or data reduction of an accepted proposal. Please contact the helpdesk (https://help.nrao.edu/) for more information.

Observer Training:

Two workshops will be offered annually to provide training in the basics of GBT observing and science. These workshops will be offered in the fall and spring, with the next workshop dates being October 24-28, 2016 and May 15-19, 2017. Please contact the helpdesk (https://help.nrao.edu/) for more information.

Continuing Opportunities:

Joint Observations with Chandra X-ray Observatory

In previous semesters, the community has had the opportunity to propose for observing time on NRAO facilities through a joint program with the Chandra X-ray Observatory. The Green Bank Observatory will continue with this program. Proposers to the GBO will have the opportunity to request time on Chandra, to be awarded on the recommendation of the GBO Telescope Allocation Committee (TAC) and approved by the GBO Director. Up to 120 ksec will be made available to GBO/LBO/NRAO proposers annually. See the Joint Observations with Chandra (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/chandra) page for details.

Joint Observations with the Hubble Space Telescope (HST)

By agreement between the NRAO (and continued honoring by GBO) and the Space Telescope Science Institute,

STScI will be able to award up to 3% of the available time on GBO/LBO/NRAO's North American facilities to highly ranked proposals that request time on both HST and GBO/LBO/NRAO telescopes. In return, STScI has offered 30 orbits of HST time for allocation by the GBO/LBO/NRAO TAC to proposals submitted for the GBO deadlines for Semester 2017B and Semester 2018A. See the Joint Observations with HST (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/hubble-space-telescope) page for details.

Joint Observations with Swift Gamma-Ray Burst Mission

To foster correlative observations, a joint Swift/NRAO observing program was established, detailed in a Memorandum of Understanding (http://swift.gsfc.nasa.gov/proposals/nrao.html) . The GBO will continue to honor this agreement. By this agreement, the Swift Program permits GBO/LBO/NRAO to award up to 300 kiloseconds of Swift observing time per year. Similarly, GBO/LBO/NRAO permits the Swift Guest Investigator (GI) Program to award GBO observing time. See the Joint Observations with Swift (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/swift) page for details.

Joint Observations with Fermi Gamma-ray Space Telescope

We remind the community that it is possible to propose for observing time on the GBT through the Fermi Gamma-ray Space Telescope Joint Proposal Opportunity or the Cooperative Proposal Opportunity. See the Joint Observations with Fermi (https://science.nrao.edu/observing/call-for-proposals/nrao_2017a/fermi) page for details.

Joint Proposals Between the GBT, LBO, and NRAO

Observing programs that require combinations of the GBT, VLBA, and/or the VLA should submit a proposal for each of the requested telescopes, with a clear justification for each, as has been the case to date. The proposals will be reviewed as before and considered jointly by the Time Allocation Committee. VLBI proposals which request the GBT or VLA (or the HSA, for example) as elements of the VLBI array do not need separate proposals---those telescopes can be selected as separate VLBI stations from a VLBA/HSA proposal.

Director's Discretionary Time for Education and Public Outreach

Proposals for Director's Discretionary Time (DDT) may be submitted at any time. They must be submitted through the PST (https://my.nrao.edu/) . DDT proposals are intended to address targets of opportunity (https://science.nrao.edu/observing/proposal-types/too) , high-risk/high-return exploratory time (https://science.nrao.edu/observing/proposal-types/exploratoryproposals) , or other science opportunities deemed sufficiently urgent to justify prompt action.

DDT proposals may also be submitted for the purpose of education and public outreach - for example, to image an iconic source or to support a educational opportunity for students. Such proposals should clearly justify the requirements for the requested time allocation and observing mode on any given instrument, and should describe the anticipated impact of the observation.

While there is not an *a priori* limit to time that can be requested via DDT, it is expected that no more than 5% of the observing time on each telescope will be allocated for this purpose.

Other Proposal Opportunities

The GBO would like to make users aware that there are additional proposal opportunities as follows:

- **High Risk Proposals:** As a means of maximizing its scientific impact through cutting-edge observations, the Observatory encourages the submission of high-risk/high-reward proposals.
- **Filler Programs:** Some programs are not time critical or require highly subscribed LST ranges. Such programs may be able to take advantage of "filler" time. There are opportunities for so-called "filler" programs on the GBT.

Further information about each of these programs can be found here (https://science.nrao.edu/observing/proposal-types/proposal-opportunities) .

Proposal Guide

The GBT Proposer's Guide is available as a pdf here:
https://science.nrao.edu/facilities/gbt/proposing/GBTpg.pdf
(https://science.nrao.edu/facilities/gbt/proposing/GBTpg.pdf)

Alerts & Tips for Proposers

Tips for Proposers

The GBO proposal evaluation and time allocation process is panel based. That is, members of the scientific community are responsible for reviewing proposals based on their scientific merit through eight Science Review Panels (https://science.nrao.edu/observing/proposal-types/sciencereviewpanels) . As a means of broadening the scientific perspective of its reviewers, and of increasing the participation of the wider astronomy and astrophysics community in the science program of the GBT, SRP membership is deliberately selected to include some colleagues that are not necessarily experts in radio observational techniques. This being the case, we encourage proposers to consider the following when preparing their proposals:

1. Avoid the use of radio astronomy jargon
2. Do not assume the reader is familiar with a particular observing technique - explain it briefly
3. Do not assume the reader is familiar with an earlier rationale for a developing line of research - provide adequate historical context and connect the dots as necessary
4. Describe previous observations and publications relevant to the proposed observations
5. If a particular point source or brightness temperature sensitivity is required, justify it.

Source Lists

The Observatory requires proposers to specify their source lists in full. This enables the Observatory to identify potential conflicts between observing programs and to better understand scheduling pressure on the instruments it operates. It may be the case that the final target list has not been selected at the time a proposal is submitted. In such cases, all potential targets and fields should be listed. The only exceptions to this requirement are for Triggered proposals to observe targets that are unknown a priori. Proposal source lists are not made public by the Observatory.

Dissertation Plans

Students planning to use the GBT for their PhD dissertation must submit a "Plan of Dissertation Research" of no more than 1000 words with their first proposal. This plan must be referred to in later proposals for time allocations relevant to the thesis work described in the plan. It is the responsibility of the student to ensure that the information contained in the plan is up-to-date at the time a given proposal is submitted. By the same token, a proposal for work that is relevant to a student thesis should refer to the plan and clearly state the

relevance of the proposal to the plan. At a minimum the plan should contain:

1. An overview of the research program
2. The thesis timeline, including the expected date of completion
3. An estimate of the GBT resources needed to complete the program of research
4. Clear statements about the importance of each proposal to the thesis as a whole.

The plan provides some assurance against a dissertation being impaired by an adverse review of a proposal when the full scope of the thesis is not seen. The plan can be submitted via NRAO Interactive Services (http://my.nrao.edu/) . Students are reminded to submit their plan comfortably in advance of the proposal deadline. Thesis plans must be in pdf format so science reviewers can easily access the plans. Students who have not yet graduated but have active plans on file should update those plans to a pdf format if they are not already in that form.

Useful Resources & Tools

Note: you must be a registered NRAO user to access many of these resources. Please go to NRAO Interactive Services (http://my.nrao.edu/) . If you are already a registered user, you are encouraged to update your profile.

Proposal Submission Tool

The Proposal Submission Tool and associated documentation is accessed through NRAO Interactive Services (http://my.nrao.edu/) .

Proposal Finder Tool

The Proposal Finder Tool (http://library.nrao.edu/proposals) (PFT) may be used to search cover sheets of proposals approved for time on NRAO telescopes. The PFT returns the proposal's authors, title, abstract, and, if available, approved hours.

Green Bank Telescope (GBT)

- The Proposer's Guide for the Green Bank Telescope (https://science.nrao.edu/facilities/gbt/proposing/GBTpg.pdf)
- The Performance of the GBT: A Guide for Planning Observations (http://www.gb.nrao.edu/~rmaddale/GBT/ReceiverPerformance/PlaningObservations.htm)
- GBT Sensitivity Calculator (https://dss.gb.nrao.edu/calculator-ui/war/Calculator_ui.html)
- GBT Mapping Calculator (http://www.gb.nrao.edu/~rmaddale/GBT/GBTMappingCalculator.html)