

Proposing for the GBT



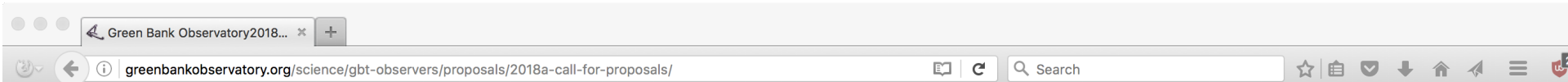
David Frayer (Green Bank Observatory)



GBT 18A Proposal Call

- Next GBT proposal deadline is **Aug. 1, 2017 at 5pm EDT (2100 UT)** which is for semester “18A” (Feb—July 2018) observations {same time frame as VLA and VLBA proposal call}
- Users must propose using the Proposal Submission Tool (PST) and register with myrao.edu
- Scientific Justification (pdf file) limited to 4 pages (11pt font), including all figures, tables, and references
- Technical Justification details are filled into text boxes within the PST
- Large proposals (>200hr) [10 page limit] and must include a data management plan
- Proposals requesting GBT with HSA, VLBA, GMVA should consult VLBA/HSA and GMVA proposal call
- Opportunities for Joint Observations of GBT with HST, Chandra, Swift, Fermi (as well as joint with VLA and VLBA)
- Open-skies reduction – limited VLBI observations, limited time for “fixed” and “windowed” observations, sessions <6hrs, and some instruments will have limited availability

greenbankobservatory.org/science/gbt-observers



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2018A CALL FOR PROPOSALS

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GREEN BANK OBSERVATORY CALL FOR PROPOSALS: 2018A SEMESTER

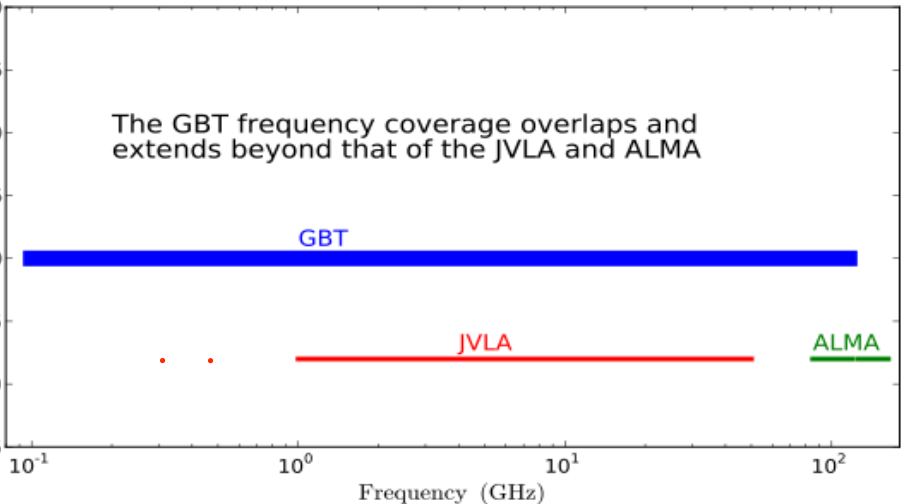
The Green Bank Observatory (GBO) invites scientists to participate in the GBO's 2018A Semester Call for Proposals for the [Green Bank Telescope \(GBT\)](#). This page contains the complete proposal call. Proposals requesting the GBT as part of High Sensitivity Array (HSA), and Global 3mm VLBI Array (GMVA) should be submitted through the Long Baseline Observatory's call ([available here](#)).

The submission deadline for Semester 2018A proposals is Tuesday, 1 August 2017, at 17:00 EDT (21:00 UTC).

The GBO wishes to remind proposers of continuing opportunities for joint observations with the Chandra X-ray Observatory, the Hubble Space Telescope, the Swift Gamma-Ray Burst Mission and the Fermi Gamma-ray Space Telescope.

Key Capabilities of the GBT

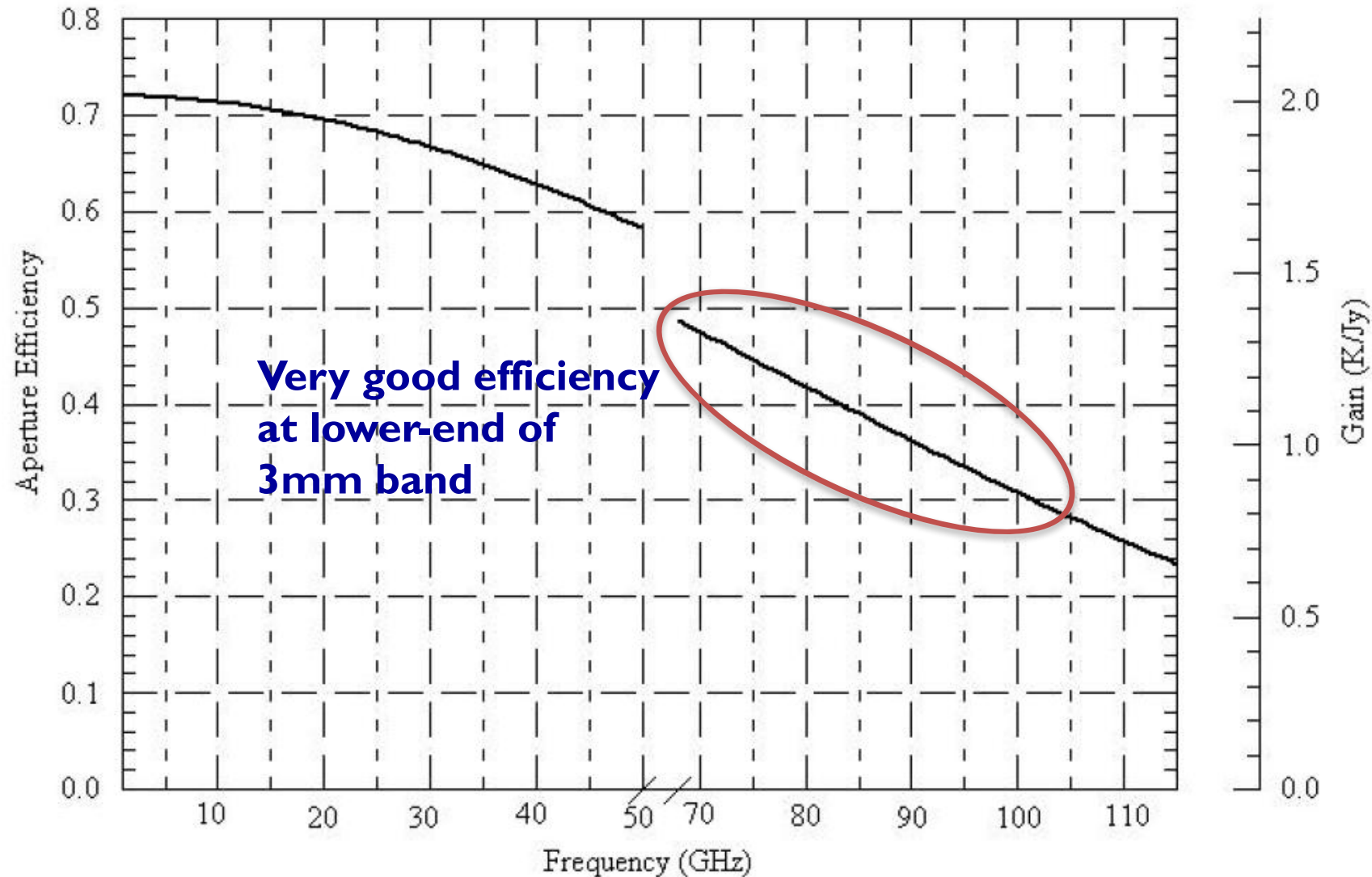
- 100 meter diameter unblocked
- Receivers cover 0.1 to 116 GHz
- Excellent point-source sensitivity
- Unsurpassed sensitivity for extended objects
- >85% of total sky covered ($\delta \geq -46^\circ$)
- Location in the National Radio Quiet Zone



GBT Specs:

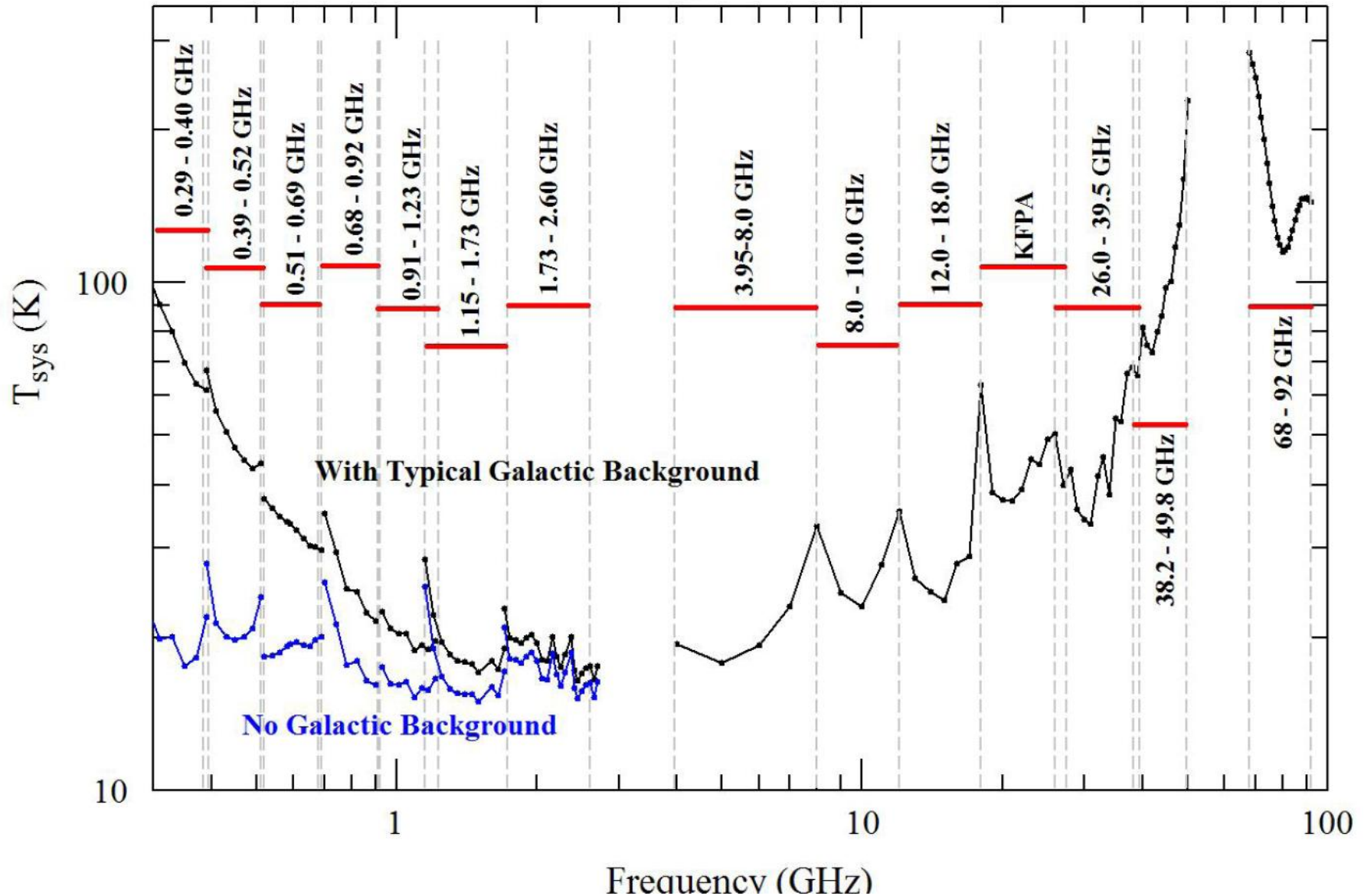
Location	Green Bank, West Virginia, USA
Coordinates	Longitude: 79°50'23.406" West (NAD83) Latitude: 38°25'59.236" North (NAD83) Track Elevation: 807.43 m (NAVD88)
Optics	110 m x 100 m unblocked section of a 208 m parent paraboloid Offaxis feed arm
Telescope Diameter	100 m (effective)
Available Foci	Prime and Gregorian f/D (prime) = 0.29 (referred to 208 m parent parabola) f/D (prime) = 0.6 (referred to 100 m effective parabola) f/D (Gregorian) = 1.9 (referred to 100 m effective aperture)
Receiver mounts	Prime: Retractable boom with Focus-Rotation Mount Gregorian: Rotating turret with 8 receiver bays
Subreflector	8-m reflector with Stewart Platform (6 degrees of freedom)
Main reflector	2004 actuated panels (2209 actuators) Average intra-panel RMS 68 μm
FWHM Beamwidth	Gregorian Feed: $\sim 12.60/f_{GHz}$ arcmin Prime Focus: $\sim 13.01/f_{GHz}$ arcmin (see Section 3.1.1)
Elevation Limits	Lower limit: 5 degrees Upper limit: ~ 90 degrees
Declination Range	Lower limit: ~ -46 degrees Upper limit: 90 degrees
Slew Rates	Azimuth: 35.2 degrees/min Elevation: 17.6 degrees/min
Surface RMS	Passive surface: 450 μm at 45° elevation, worse elsewhere Active surface: ~ 250 μm , under benign night-time conditions
Pointing accuracy	1 σ values from 2-D data 5" blind 2.7" offset

GBT Aperture Efficiency and Gain (K/Jy)



Noise Levels (T_{sys}) for Typical Weather

Log-Log Plot of Expected T_{sys} for Typical Weather Conditions

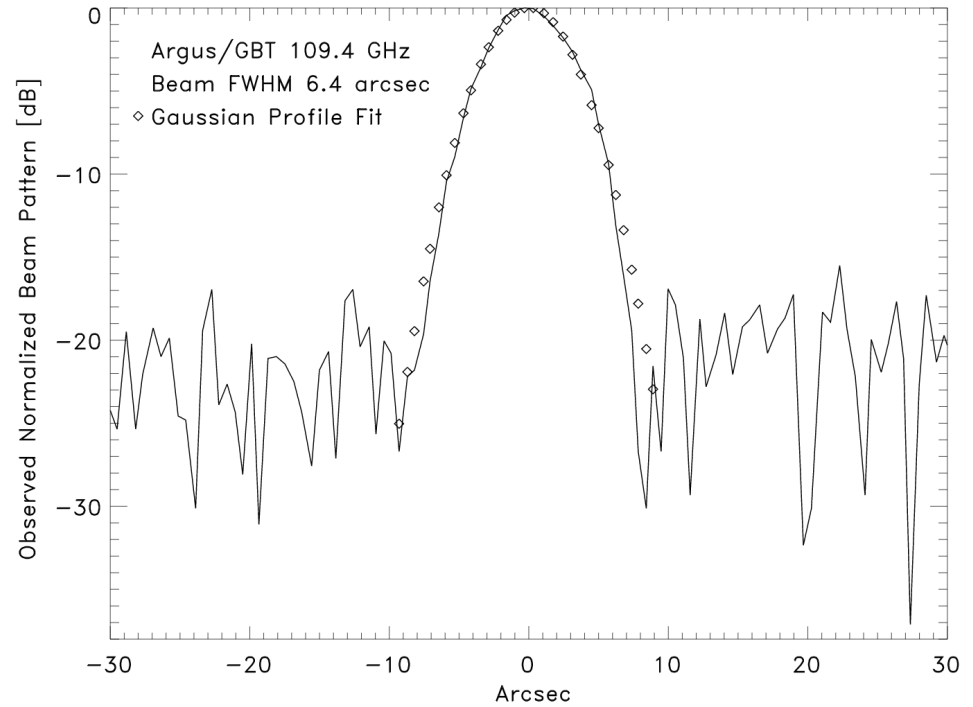
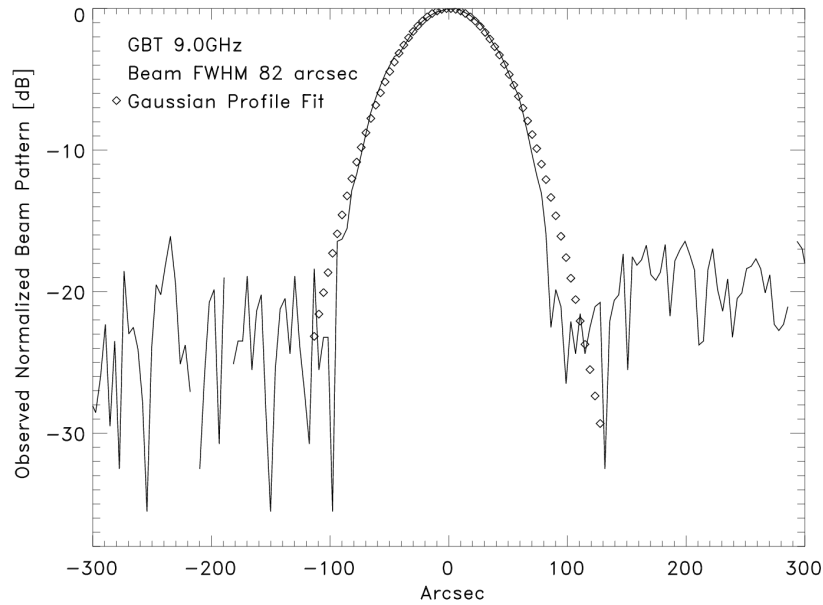


GBT Pointing and Surface Performance

- ~5-10 arcsec blind pointing
- ~1.5 arcsec offset pointing
- ~<1 arcsec tracking accuracy
- Rms (surface) ~ 0.35mm – no corrections during day
- Rms (surface) ~ 0.3mm – no corrections during night
- Rms(surface) ~0.23mm with corrections at night
- Long-term Goal: Rms(surface)~0.20mm

GBT Achieves Theoretical Beam

(even at 110 GHz! – GBT memo #296)



Available GBT receivers

Table 1: GBT Receivers

Receiver	Frequency Range
Prime Focus 1	290-920 MHz
Prime Focus 2	910-1230 MHz
L-band	1.15-1.73 GHz
S-band	1.73-2.60 GHz
C-band (shared risk)	3.8-8.0 GHz
X-band	8.0-11.6 GHz
Ku-band	12.0-15.4 GHz
Kband 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
MUSTANG 2 bolometer array (shared risk)	80-100 GHz
ARGUS (shared risk)	75-115.3 GHz, Private PI instrument

Available GBT Backends

Table 2: GBT Backends and Observing Modes

Backend	Observing Modes
Versatile Green Bank Astronomical Spectrometer (VEGAS)	Continuum, pulsar, spectral line
Digital Continuum Receiver (DCR)	Continuum
Green Bank Ultimate Pulsar Processing Instrument (GUPPI) Starting to move away from GUPPI in 18A	Pulsar
Mark V Very Long Baseline Array Disk Recorder	Very Long Baseline Interferometry
Caltech Continuum Backend (CCB) (Ka-band)	Continuum
Zspectrometer (Ka-band)	Private PI instrument
Radar	Private PI instrument Open for public use

Breakthrough Listen Backend available in 18A , shared risk

Observing Mode vs Backend Capabilities


What are you doing?:	Continuum	Continuum full-stokes	Line	Pulsar	VLB	Radar
	DCR	Mode-1 VEGAS	VEGAS	GUPPI	Mark5 VLBA recorder	Radar backend
	CCB (Ka)	Mueller matrix calibration (function of parallactic angle)	{29 modes}	VEGAS- Pulsar		
	Mustang (3mm)			{Search mode, timing mode}		
	Reduction uses specialized scripts					

Table 4: VEGAS modes.

VEGAS Modes:

16 separate spectrometer channels (8 dual polarization channels) that can be divided between beams and different frequencies as needed and can support up to 8 spectral sub-windows per spectrometer.

Maximum data rate ~160GB/s, but most projects at <1MB/s

Mode	Spectral Windows per Spectrometer	Bandwidth per Spectrometer (MHz)	Number of Channels per Spectrometer	Approximate Spectral Resolution (kHz)
1	1	1500 ^a	1024	1465
2	1	1500 ^a	16384	92
3	1	1080 ^b	16384	66
4	1	187.5	32768	5.7
5	1	187.5	65536	2.9
6	1	187.5	131072	1.4
7	1	100	32768	3.1
8	1	100	65536	1.5
9	1	100	131072	0.8
10	1	23.44	32768	0.7
11	1	23.44	65536	0.4
12	1	23.44	131072	0.2
13	1	23.44	262144	0.1
14	1	23.44	524288	0.05
15	1	11.72	32768	0.4
16	1	11.72	65536	0.2
17	1	11.72	131072	0.1
18	1	11.72	262144	0.05
19	1	11.72	524288	0.02
20	8 ^c	23.44	4096	5.7
21	8 ^c	23.44	8192	2.9
22	8 ^c	23.44	16384	1.4
23	8 ^c	23.44	32768	0.7
24	8 ^c	23.44	65536	0.4
25	8 ^c	16.875	4096	4.1
26	8 ^c	16.875	8192	2.0
27	8 ^c	16.875	16384	1.0
28	8 ^c	16.875	32768	0.5
29	8 ^c	16.875	65536	0.26

^a The useable bandwidth for this mode is 1250 MHz.

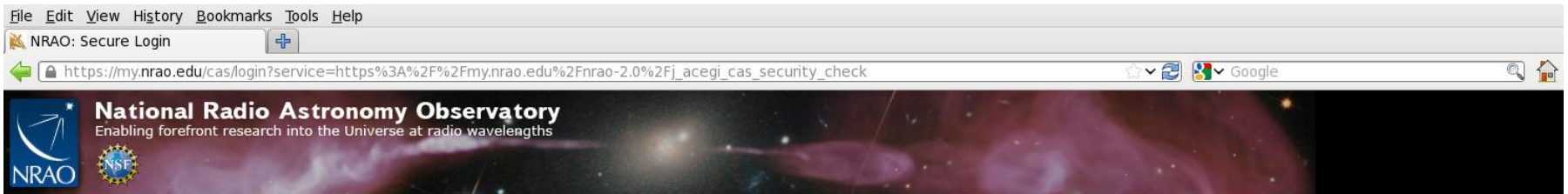
^b The useable bandwidth for this mode is 850 MHz.

^c For modes 20-24, the spectral windows must be placed within 1500 MHz with a useable frequency range of 150 to 1400 MHz. For modes 25-29, the spectral windows must be placed within 1000 MHz with a useable frequency range of 150 to 950 MHz.

GBT Bandwidth Limitations

- IF system limit is 4 GHz of instantaneous bandwidth for most current high-frequency receivers
- CCB and Zpectrometer covers full Ka-band but with low spectral resolution
- Low end of W-band and Ka-band enables 6 GHz of bandwidth
- Argus limited to 1.5 GHz of bandwidth
- Current optical fiber system limited to 8 GHz of bandwidth
- Studies on-going for a wide-bandwidth pulsar instrument (e.g., 0.5-4 GHz).
- Bandwidth limitations are not fundamental, just \$\$.

“MyNRAO” Account needed for using the Proposal Submission Tool (PST)



Login

Username:
dfrayer

Password:
•••••

Register for an Account

Accounts are used by astronomers to create and submit proposals, prepare for observations, and gain access to proprietary data from the archive.

[Lost your Username or Password?](#) You can reset it [online](#).

If you need help, please [email us](#).

<https://my.nrao.edu>

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Use NRAO Helpdesk for any Questions (https://help.nrao.edu: VLA/GBT/VLBA Proposal Submission “Department”)

The screenshot shows the NRAO Helpdesk website in a browser window. The address bar displays <https://help.nrao.edu>. The page header includes the NRAO logo and the text "National Radio Astronomy Observatory" and "A facility of the National Science Foundation". A navigation bar contains "Home" and "Knowledgebase" links, along with a language dropdown set to "English (U.S.)". On the left, there is a "Login" section with a text input field and a "Login" button. Below this is a "Knowledgebase" section with a list of categories: Downloads, VLA (13), ALMA (3), CASA (11), and GBT (5). On the right, there is a search bar with the placeholder text "Please type your question here" and a green "SEARCH" button. Below the search bar is a "Knowledgebase" link with a folder icon.

Browser address bar: <https://help.nrao.edu>

Page Header: **National Radio Astronomy Observatory**
A facility of the National Science Foundation

Navigation: [Home](#) [Knowledgebase](#) English (U.S.)

Login Section:

Knowledgebase Categories:

- >> Knowledgebase
 - Downloads
 - VLA (13)
 - ALMA (3)
 - CASA (11)
 - GBT (5)

Search Bar:

Knowledgebase Link: [Knowledgebase](#)

Create New Proposal

File Edit View History Bookmarks Tools Help

NRAO: Proposals

https://webtest.aoc.nrao.edu/nrao-2.0/secure/ProposalList.htm

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Dashboard Proposals Reviews Data Processing Obs Prep Helpdesk Profile

Hi, David | Sign Out

Monday 29 September 2013

My Proposals Available Authors Available Organizations

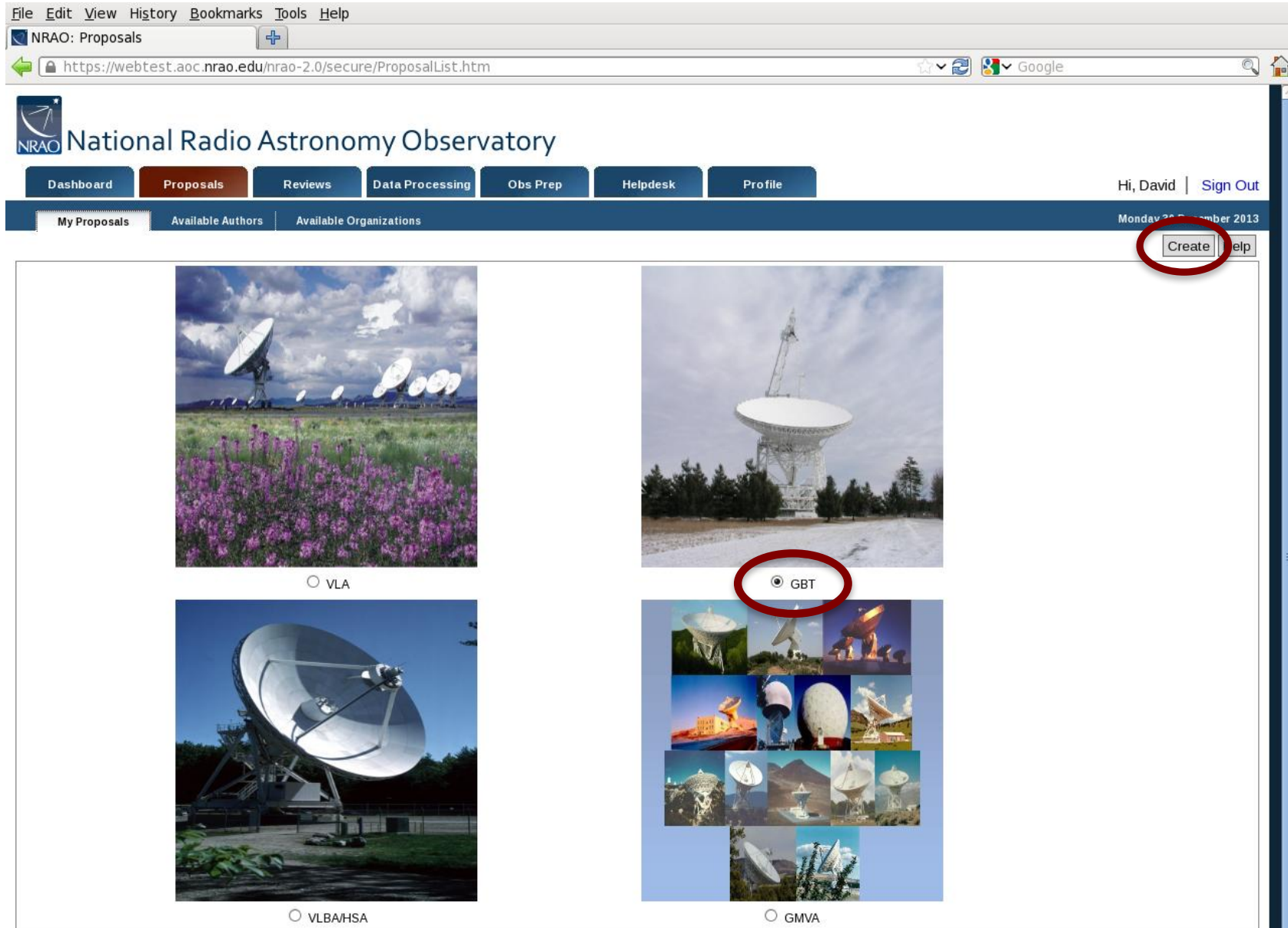
Create Help

VLA

GBT

VLBA/HSA

GMVA



GENERAL

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 - GBT/13A-474
 - GBT/13A-253
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 - GBT/13A-124
 - GBT/13A-108
 - GBT/13A-104
 - GBT/13A-042
 - GBT/13A-021

Observing Proposal

Status: DRAFT
Create Date: 05/24/2013
Modify Date: 05/24/2013
Submit Date:
Total Time: 0.0

Title	This is a blank proposal created on Friday May 24, 2013
Type	Regular
Scientific Category	
Abstract	
Joint	Not a Joint Proposal
Observing Type(s)	
Dissertation Research Plan	Dissertation Research Plan(s) not required
Observer Present for Observations	



General Information

- Dashboard
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- My Proposals
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Friday 24 May 2013

- Validate
- Print
- Submit

Cancel Save Help

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 - GBT/13A-104
 - GBT/13A-042
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GENERAL *(changes will auto-save in 9 minutes)*

General

Observing Proposal

Status: DRAFT

Create Date: 05/24/2013

Modify Date: 05/24/2013

Submit Date:

Total Time: 0.0

Title *(80 characters max)*

The GBT is best radio telescope on planet Earth

Proposal Type

Regular
 Large
 Triggered
 Director's Discretionary Time

Scientific Category (Click [here](#) for additional information about Proposal Science Categories)

- Active Galactic Nuclei (Active galactic nuclei: Seyferts; low-luminosity AGN; H2O megamasers; radio galaxies; blazars; quasars/QSOs; environmental interactions)
- Energetic Transients and Pulsars (X-ray binaries, cataclysmic variables, supernovae, gamma-ray bursts, pulsars)
- Extragalactic Structure (Galaxies (line): galaxy structure; galaxy kinematics and dynamics; galaxy chemistry; gas in galaxies)
- High Redshift and Source Surveys (High-Z objects; extragalactic source surveys; galaxy formation; gravitational lenses; CMB; early universe)
- Interstellar Medium (galactic HI & OH; ISM magnetic field; SNRs; HII regions; astrochemistry)
- Normal Galaxies, Groups, and Clusters (Galaxies (continuum), groups, clusters: disk emission; star formation; magnetic fields; galactic winds; starbursts; intracluster emission)
- Solar System, Stars, Planetary Systems (Sun, planets, comets, IPM; exoplanets; main sequence stars; active stars; stellar winds; AGB & post-AGB stars; PNe; novae)
- Star Formation (young stellar objects; protostars; jets, outflows; T Tauri stars; circumstellar disks; protoplanetary systems; astrochemistry)

Abstract *(200 words max, 10 min)* **[Word Count : 30]**

We proposed GBT W-band observations of HCN and HCO+ to combine GBT short-space data with our ALMA images to study the dense gas properties in our favorite galaxy.

Joint

Not a Joint Proposal
 Joint with VLA
 Joint with VLBA
 Joint with VLA and VLBA

Observing Type(s)

Continuum
 Spectroscopy
 Polarimetry

Adding in Authors



[Help](#)

AUTHORS

« < **Authors** > »

Principal Investigator:

Contact:

Order	Name	Email	Affiliation	Dissertation Plan	Add
up / down	David Frayer	dfrayer@nrao.edu	National Radio Astronomy Observatory	N/A	<input type="button" value="Add"/>
up / down	John Doe	jdoe@nrao.edu	Please contact me to add my Institution	N/A	

Options

- My Proposals
 - VLA/13B-385
 - VLA/13A-382
 - VLA/12B-217
 - VLA/12B-124
 - VLA/12A-201
 - VLA/11B-044
 - VLA/11A-182
 - VLA/10C-231
 - VLA/10C-218
 - VLA/10C-205
 - VLA/10B-203
 - VLA/10A-211
 - VLA/10A-146
 - VLA/09A-122
 - VLA/07B-236
 - VLA/07A-224
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Add in Science Justification (4pages)

Dashboard

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Profile

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My Proposals

Available Authors

Available Organizations

Monday 03 June 2013



[Add](#) [Help](#)

SCIENCE JUSTIFICATION

« < Science Justification > »

Justification File

.pdf, .txt only; font size no less than 11pt; no more than 4 pages (including figures, tables, and references).

File Preview

Note: Only a preview. Please click on 'Download' to view the uploaded File.

Options

- My Proposals
 - VLA/13B-385
 - VLA/13A-382
 - VLA/12B-217
 - VLA/12B-124
 - VLA/12A-201
 - VLA/11B-044
 - VLA/11A-182
 - VLA/10C-231
 - VLA/10C-218
 - VLA/10C-205
 - VLA/10B-203
 - VLA/10A-211
 - VLA/10A-146
 - VLA/09A-122
 - VLA/07B-236
 - VLA/07A-224
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Enter Source Information

NRAO: Proposals - Mozilla Firefox
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 NRAO: Proposals
 https://my.nrao.edu/nrao-2.0/secure/ProposalSources.htm

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Dashboard Proposals Reviews Data Process Obs Prep Helpdesk Profile

Hi. David | Sign Out

My Proposals Available Authors Available Organizations Friday 24 May 2013

Validate Print Submit

Convert Export Import Copy Sources New Source Group Help

SOURCES Sources

Proposers must specify their source lists (or potential targets) in full with the exception of Triggered proposals where the targets are unknown a priori.

Galaxy-X No Sessions up / down Search NED/SIMBAD

Order	Name	Position		Velocity			
	My_Galaxy	Co-ordinate System		Equatorial	Convention	Radio	
		Equinox		J2000			
		Right Ascension	Value:	00:00:00	Ref. Frame	LSRK	Save Delete Cancel
			Range(±):	00:00:00			
		Declination	Value:	00:00:00	Velocity	0.00	
			Range(±):	00:00:00			
	Calibrator				<input type="checkbox"/>		

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Proposal Help Desk



Enter "Resources" (Receiver and Backend configuration)

Options

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GBT RESOURCES

Mygalaxy-wband

No Sessions up / down

Order	Name	Receiver	Back End
	Wband	W-band MM4 (85-93)	VEGAS

Observing Type: Spectral Line

Number of Beams: 2


Number of Vegas Spectrometers: 4

	Spectrometer 1	Spectrometer 2	Spectrometer 3	Spectrometer 4
Mode:	2	2	2	2
Bandwidth (MHz):	1250.000	1250.000	1250.000	1250.000
Rest Frequencies (GHz):	88.63	88.63	89.19	89.19
Spectral Resolution (KHz):	92	92	92	92
Integration Time (s):	2.0000	2.0000	2.0000	2.0000
Data Rate per Spectrometer (MB/s):	0.125	0.125	0.125	0.125
	Spectrometer 5	Spectrometer 6	Spectrometer 7	Spectrometer 8
Mode:				
Bandwidth (MHz):				
Rest Frequencies (GHz):				
Spectral Resolution (KHz):				
Integration Time (s):				
Data Rate per Spectrometer (MB/s):				

Save
Delete
Cancel

Enter Observing "Sessions" (defined by source LST ranges and resources/receiver)

https://my.nrao.edu/nrao-2.0/secure/SessionsPage.htm



National Radio Astronomy Observatory

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Validate Print Submit

New Session Help

SESSIONS

« < Sessions > »

Session	Number of Sessions	Separation	Min. Start LST	Max. End LST	Min. Elevation
<input type="text" value="mysession"/>	<input type="text" value="1"/>	<input type="text" value="0"/> day(s)	<input type="text" value="16:00:00"/> (HH:MM:SS)	<input type="text" value="04:00:00"/> (HH:MM:SS)	<input type="text" value="30"/>

[GBT Sensitivity Calculator](#)
[Mapping Planner](#)
[Spectral Advisor](#)

Constraints:
 Comments:

Save Cancel

Source Groups	Resources Groups	Time/Session (hrs)
<input type="text" value="Galaxy-X"/>	<input type="text" value="Mysetup"/>	<input type="text" value="1.0"/>

Note: Adding Source/Resource Groups to a session will automatically associate all sources/resources, within the group, to the session.

[Proposal Help Desk](#) 



Fill in Technical Justification Boxes

No page limits for technical boxes.

The screenshot shows the NRAO Proposals system interface. The main content area is titled 'TECHNICAL JUSTIFICATION' and contains a section for 'GBT Technical Justification'. The instructions state: 'Use this page to specify how the technical set-up requested for your proposal enables the scientific goals to be met. Input is required for all fields. If a field is not relevant for your proposal then enter "NA" into the textbox. The links within each box provide information concerning these technical questions.'

The page is divided into several rows, each with a text box on the left and a yellow box with an orange arrow icon on the right. The labels for these boxes are:

- Observing modes and sensitivity level
- Mapping details
- RFI issues
- Overheads
- Non-standard techniques
- Pulsar information

The text boxes contain the following instructions:

- Observing modes and sensitivity level:** For each resource briefly justify the observing mode and all values used in determining the required observing time (e.g. frequency switching or position switching, bandwidth, spectral resolution, polarization, etc.). Include all inputs and results for the GBT sensitivity calculator. IF the sensitivity calculator is not used then provide all equations, with each term defined, along with the values used. If a specific documented instrument sensitivity is used then provide the reference for the value used. https://dss.gb.nrao.edu/calculator-ui/war/Calculator_ui.html
- Mapping details:** For any session that uses mapping present all inputs and results from GBT mapping planner. If the mapping planner is not used then provide all equations, with each term defined, along with the values used. The sensitivity calculator observing time results are for a sensitivity per beam. To calculate time per pixel simply divide the time per beam by the number of pixels per beam. <http://www.gb.nrao.edu/GBT/setups/mapplan.html>
- RFI issues:** For each resource, briefly discuss the potential impact of RFI and how it would be handled during the observations and during data reduction:
- Overheads:** For each session, discuss the amount of overhead time needed and how that value was derived (e.g. receiver change time, slew time, time for pointing and focusing, time for AutoOOF, calibration observations, etc.): <https://science.nrao.edu/facilities/gbt/proposing/GBTpg.pdf> (Section 6)
- Non-standard techniques:** If your proposal contains novel observing or data reduction techniques please provide details on the techniques to be used:
- Pulsar information:** Pulsar proposals should list the information such as the spin period, dispersions measure, binary period, average flux, etc. for any known pulsar:

Review Proposal, “Validate”, and Submit

If you need to update the proposal after hitting submit, withdraw proposal and copy information into a new proposal and resubmit (unlike ALMA, Spitzer,...)

NRAO: Print Preview - Mozilla Firefox
Edit View History Bookmarks Tools Help
NRAO: Print Preview Sensitivity Calculator
https://my.nrao.edu/nrao-2.0/secure/PrintPreviewPage.htm

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Friday 24 May 2013

Download Justification Print All Help

PRINT PREVIEW (without Science Justification) « < Print Preview > »

Validate Print Submit

Options

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 - GBT/13A-500
 - GBT/13A-474
 - GBT/13A-253
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 - GBT/13A-108
 - GBT/13A-104
 - GBT/13A-042
 - GBT/13A-021

Observing Application

Date :
Proposal GBT/2013-04-007
ID :
Legacy
ID :
PI : David Frayer
Type : Regular
Category Normal Galaxies,
: Groups, and
Clusters
Total 1.0
Time :

The GBT is best radio telescope on planet Earth

Abstract:
We proposed GBT W-band observations of HCN and HCO+ to combine GBT short-space data with our ALMA images to study the dense gas properties in our favorite galaxy.

Authors:

Name	Institution	Email	Status
David Frayer	National Radio Astronomy Observatory	dfrayer@nrao.edu	

Principal Investigator: David Frayer
Contact: David Frayer
Telephone: 304-456-2223
Email: dfrayer@nrao.edu

Related proposals:

Joint:
Not a Joint Proposal

Ksnapshot Thunderbird Firefox Konsole XTerm 3:16 pm

GBT Astronomer's Web-page ("Practical Information for Astronomers")

- Call for Proposals
- GBT proposal Guide
- Proposal Submission Tool (PST)
- Sensitivity calculator
- Mapping Planner
- Known RFI

National Radio Astronomy Observatory
Enabling forefront research into the Universe at radio wavelengths

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Home About NRAO Science **Facilities** Observing Opportunities

ALMA/NAASC VLA **GBT** VLBA CDI

Facilities > GBT > Practical Information For Astronomers

Practical Information For Astronomers

Proposing on the GBT	Observing	Helpdesk	Schedules	Single Dish Radio Astronomy Basics
Data Reduction and Archive	Financial Support	Scientific Visitor Info	Observer Alerts!	

Proposing on the GBT

- [Call For Proposals](#) for all NRAO telescopes
 - [General Proposal Information](#) describes the proposal evaluation and time allocation process. Starting February 2011, the NRAO's uses an Observatory-wide panel system that is no longer telescope based, that depends on community members for scientific evaluation, and the NRAO staff for technical reviews only.
- [Practical GBT Information and Proposer's Guide](#) updated prior to each proposal deadline, provides essential information for the preparation of proposals, including a detailed description of the submission process, instrument status, observing modes, and staff contacts.
- [Proposal Submission Tool](#) for the GBT, EVLA, and VLBA telescopes.
- [Sensitivity Calculator](#), an on-line tool for calculating the the time required for science on the GBT.
- [Mapping Planner](#), an online tool to plan on-the-fly mapping
- [Known Sources of Radio Frequency Interference](#) shows recent observations of the local, very helpful when planning observations.

The Green Bank Site
In the News
GBT Science
GBT Development Program
Broader Impact/General Public
Help Desk
Practical Information for Astronomers
People
Publications
Other Green Bank Telescopes
Weather Forecast
Interference

Where to find information needed for “Technical Justification Boxes”:

- 1) **Observing modes and sensitivity level: inputs and results of sensitivity calculator**
- 2) **Mapping details: Mapping Calculator web page**
- 3) **RFI issues: RFI web pages, if needed**
- 4) **Overheads: GBT proposers guide and instrument web pages**
- 5) **Non-standard techniques: staff/experts, if needed**
- 6) **Pulsar information: pulsar experts, if needed**

GBT Sensitivity Calculator/Time Estimator

GBT Sensitivity Calculator also useful for verifying available modes (number of beams, polarization, spectral windows)

Input sensitivity needed, results of observing time required, setup and observing mode(s) in the Technical Justification boxes of the PST

The screenshot shows the GBT Sensitivity Calculator/Time Estimator web application. The browser address bar indicates the URL: https://dss.gb.nrao.edu/calculator-ui/war/Calculator_ui.html. The application is titled "Sensitivity Calculator" and includes a "Help Desk" and "Users Guide" link.

General Information

- Derive: Observing Time from Desired Sensitivity
- Sensitivity from Observing Time
- Sensitivity Units: Flux Density (mJy)
- Antenna Temp., Ta (mK)
- Main Beam Temp., Tmb (mK)
- Radiation Temp., Tr (mK)
- Desired Sensitivity (1-sigma):

Hardware Information

Answer questions from top to bottom. If you change a question that was answered previously, check all answers that follow. Some answers will dictate the answer for other questions.

- Backend:
- Mode:
- Receiver:
- Beams:
- Polarization:
- BandWidth (MHz):
- Number of Spectral Windows:
- Switching Mode:

Source Information

- Frequency Specified in the: Topocentric Frame
- Rest Frame
- Rest Frequency (MHz):
- Doppler Correction:
- Source Velocity (km/s):

Controls

Update Re: Save to

Results

Result Grids

Results	
Derived Total Observing Time:	00:34:24.6 HH:MM:SS.S
Time at Signal Position or Frequency:	00:17:12.3 s
Time at Reference Position or Frequency:	00:17:12.3 s
Effective Integration Time:	00:08:36.1 s
Obs. Mode Time Mult. Factor:	4
FWHM Beamwidth:	0.14 '
Aperture Efficiency:	0.31
Extended Source Efficiency:	0.31
Confusion Limit:	0.00 S (mJy)
# Hrs Above Min Elevation:	6.71 hours
Topocentric Frequency:	88631.000 MHz
Min. Topocentric Channel Width:	88.000 kHz
Desired Freq. or Vel. Resolution:	50.000000 MHz or km/s
Typical Air Mass:	1.6
Typical Atmospheric Attenuation:	1.221
Typical System Temperature:	123.8 K
Backend Sampling Efficiency (K1):	1.0000
Backend Channel Weighting (K2):	1.0000
Other Results	
Maximum Elevation:	51.6 d

GBT Mapping Calculator



GBT Mapping Calculator

Last Modified: December 6, 2013

Ronald J Maddalena

Calculates the time needed to map, an area including overhead, based on the integration time per beam area (e.g., the results from the [Sensitivity Calculator](#)) and the area to be mapped. Provides example ASTRID commands as well as other mapping parameters. Supports the typical mapping commands for on-the-fly (OTF) rectangular maps, OTF Daisy maps, and point rectangular maps.

Input:

- Backend
- Map Type (OTF, point)
- Frequency
- Integration time per beam
- Map Size (or radius)
- Sampling (with respect to Nyquist)

Output:

- Observing time (including overheads)
- Astrid command to carry out observation
- Any warnings (e.g., too many accelerations per minute)

Input Values

Instructions

Backend and Mode

Default Spectral Line

Used by the calculator to provide values for the minimum time resolution and minimum sampling time. If you don't know what to select here, try 'DCR' for continuum observations and 'Default Spectral Line' for spectral line observations.

Map Type

OTF Rectangle

OTF Daisy

Point Rectangle

The type of map. Either:

OTF Rectangle:
On-the-fly mapping of a rectangular area. The OTF motion is either along rows of the map (i.e., *RALongMap*) or along columns

Radio Frequency Interference (RFI)

Check for possible RFI issues from RFI group's web pages and posted RFI scans from the GBT

GBT Radio Frequency Interference

- [Introduction](#)
- [GBT Receiver Plots by Band](#)
- [GBT RFI Monitoring Station Plots by Band](#)
- [Older Surveys and Band Summaries](#)
- [Known Sources Database](#)



Introduction

The Green Bank Radio Frequency Interference (RFI) Protection Group would like to offer two primary tools to observers for the purposes of RFI avoidance and mitigation. One of these tools is an archive of RFI scans which will give the observer an idea of spectral occupancy seen by the GBT receivers themselves, and (eventually) from the [GBT RFI Monitor](#) (pictured right).

The second, still under construction, will be a RFI Database which provides details of persistent, identified RFI sources including coordination information where applicable. Now, we have a [Table of Known RFI Sources](#) and a number of [Older Surveys and Summaries](#) linked below.

To maximize your chances of RFI avoidance, we advise the following:

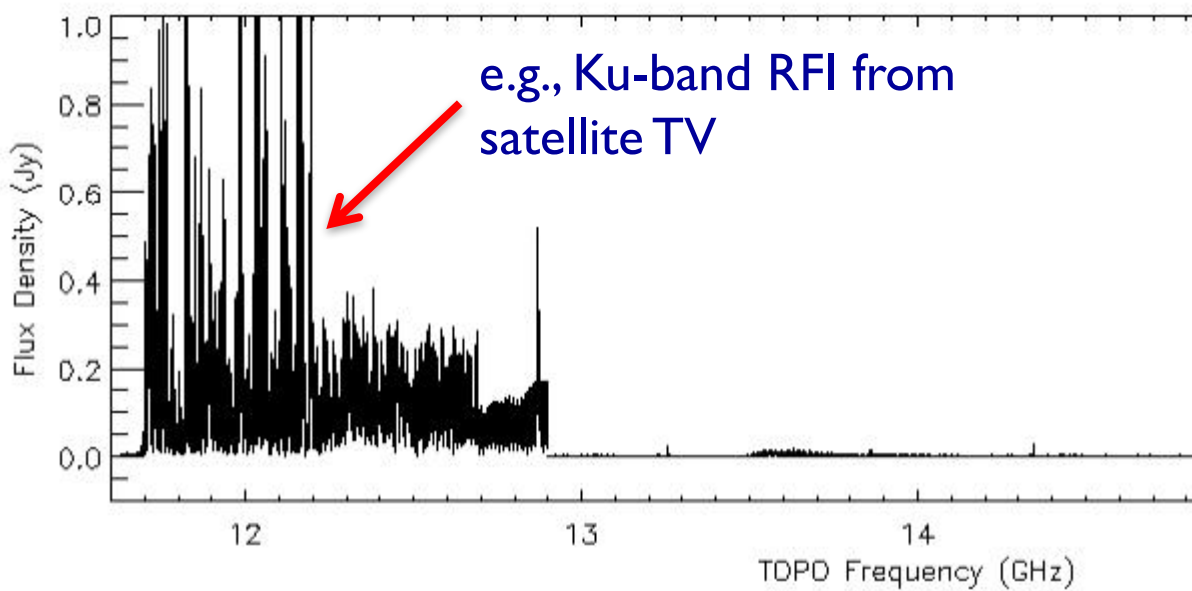
- 1) Consult the latest GBT RFI plots to determine whether the spectrum you wish to observe is typically clear, or occupied by RFI.
- 2) Consult the [Table of Known RFI Sources](#) and/or the [Surveys and Band Summaries](#) to determine whether the source of the RFI is well known and/or likely to be something you can coordinate with (broadcast television, for instance, isn't going to coordinate with us).
- 3) Contact a member of the Green Bank RFI Group to determine whether coordination is possible. If it is, you will need to obtain a fixed window from the dynamic scheduling system for your observation, and the RFI group can then arrange coordination.

Usually, by the time RFI is experienced during observation, it is too late to do anything, but it is still worth reporting, in case it can be mitigated in advance of future observations.

For additional information email interference@nrao.edu.

```
Scan          V :      0.0 RADI-OBS      FO : 11.80000 GHz
2011-09-14   Int : 00 05 54.3      Fsky : 11.99961 GHz
OPERATOR      LST : +17 01 18.6           BW : 800.0000 MHz
18 57 45.41  -07 02 39.1
```

rfiscan2



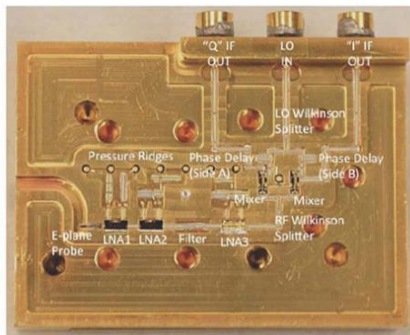
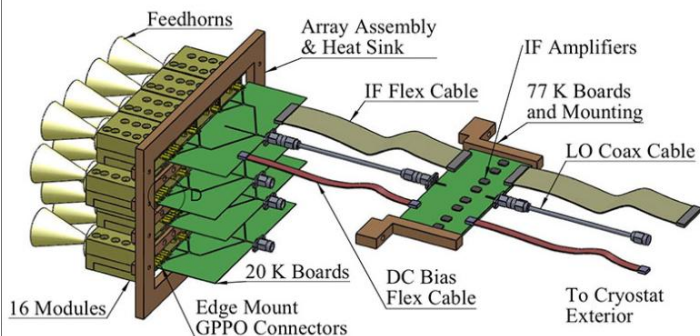
New Instruments

FLAG

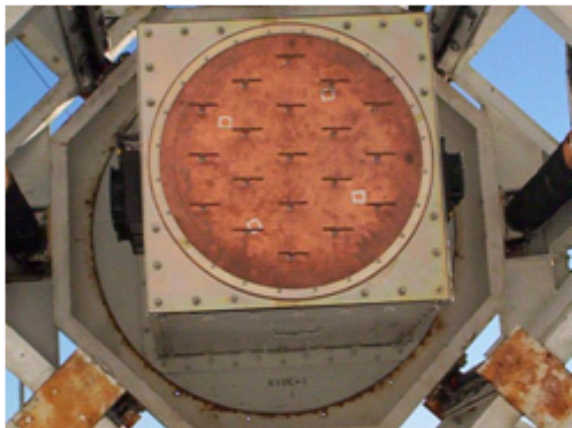
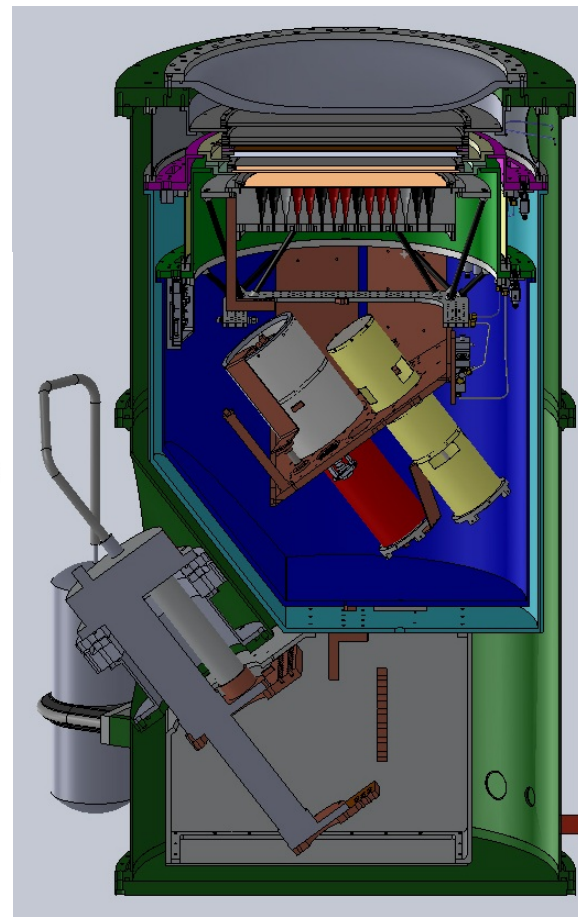
19-element phased-array feed [PAF] (7beams) at 21cm BYU/NRAO.
Planned future 37element PAF (20beams).



16 element scalable 75-115 GHz FPA [Stanford/CIT-JPL/UMd/Miami/NRAO]

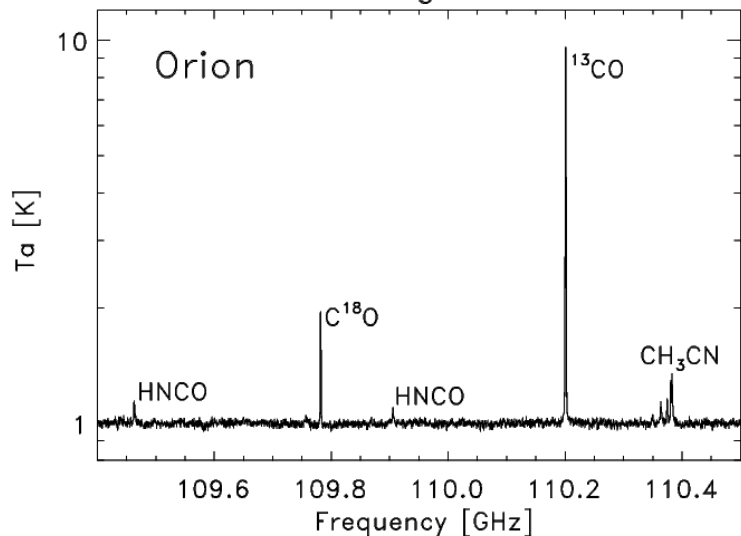


Mustang-2 [Upenn/NRAO]
3mm bolometer camera

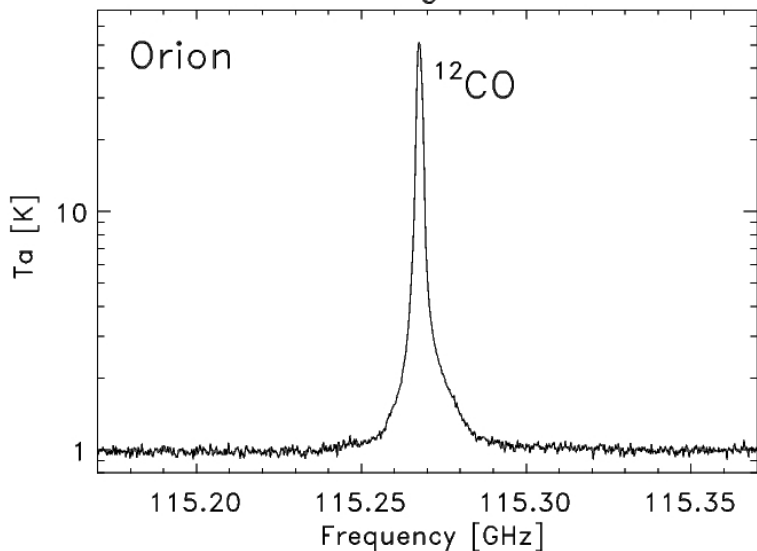


Argus First Light & Map

ARGUS First Light 2016.03.30

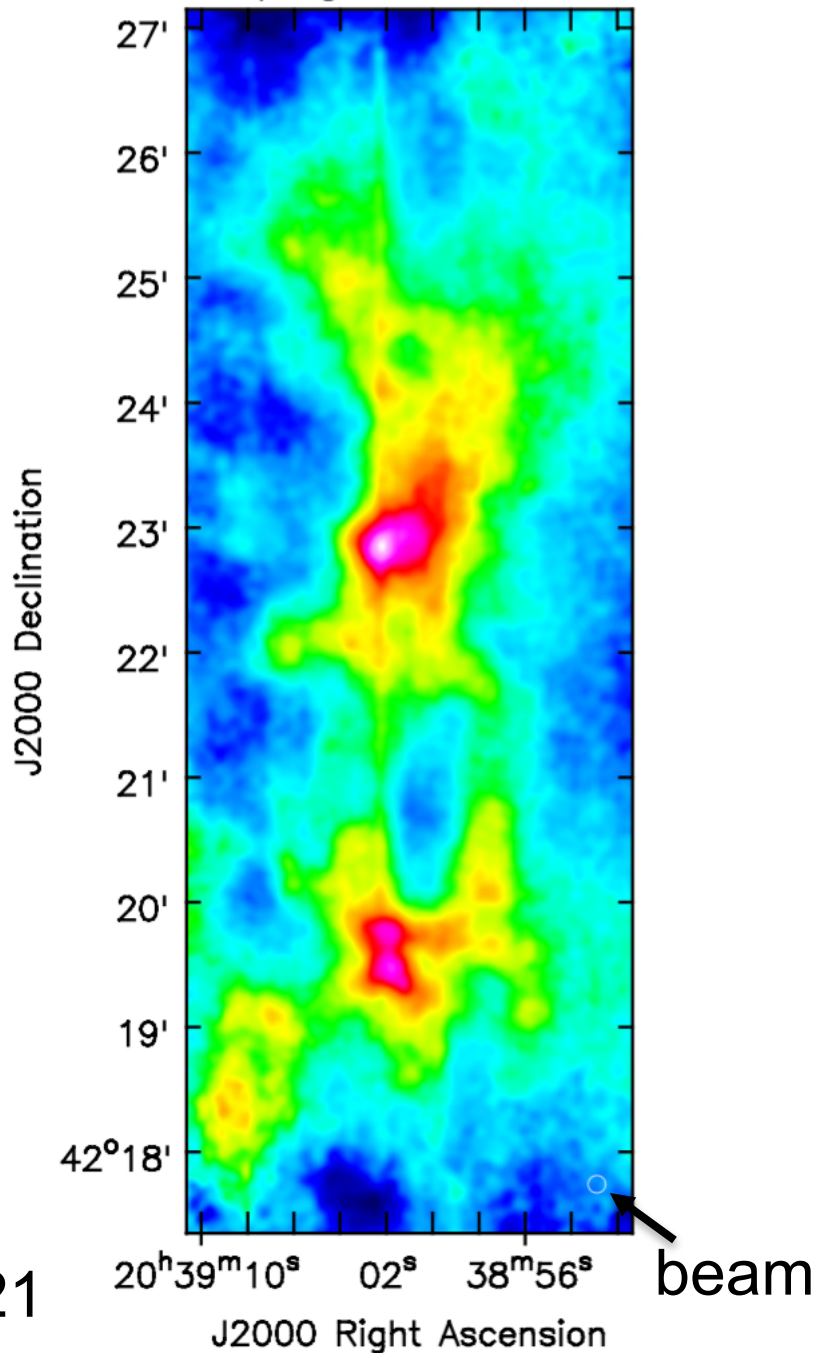


ARGUS 2nd Light 2016.04.06



40min
map
of DR21

GBT/Argus: DR21 13CO



Some Key Points for GBT Observing

- All awarded projects are assigned a GBT scientific staff member as the friend of the project who will help you set up observing scripts and with your data reduction.
- After setting up your observing scripts, enable your project within the DSS and specify observers and have observers fill out their blackout dates.
- The DSS will schedule your project based on weather, observer availability, and receiver/backend availability.
- **GBT users carry out their own observations** (either by visiting the site or remotely {but need training for remote observing} – on-site observers are given priority for observations.

Demo of GBT proposal tools

- Demos of sensitivity and mapping calculator as time permits:

➤ <http://www.gb.nrao.edu/CDE2017>



GBT CDE Material



Cornell 2017 July 10-11

Key Links

- [Remote GBO Login](#)
- [GBO Observers Web Page](#)
- [NRAO-GBT Practical Information for Astronomers Web Page](#)

Presentations

GBT Spectral-line Data Reduction Demos

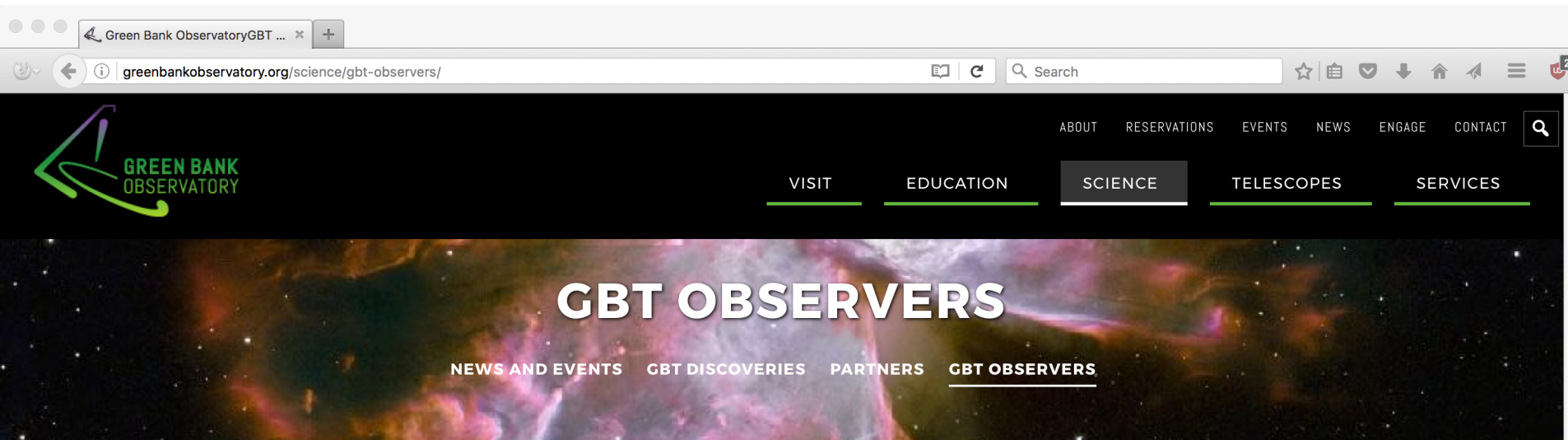
All demo's, data, and scripts are located at: /home/scratch/dfrayer/DATAdemo

- [DEMO basics](#) (Basics of GBTIDL)
- [DEMO frequency switching](#) (Frequency switching example)
- [DEMO sdfits Hlsigref](#) (sdfits example, basic gbtidl scripting, and reducing HI data)
- [DEMO argus mapping](#) (Argus Mapping)
- [DEMO NGC6946 HI pipeline](#) (Example of the GBT pipeline)
- [DEMO argus frequency switching deep coadd](#) (Argus coadd of FSW HCN(1-0) data)

Observing Related Documentation and Links

- Observer Information
 - [GBT Proposer's Guide](#)

GBO GBT Observers Web Page (under construction)



[HOME](#) > [SCIENCE](#) > [GBT OBSERVERS](#)

 [Print Page](#)

GBT Observers

We're so glad you're interested in observing with the Green Bank Telescope. Here you will find many helpful links to help you through the observation cycle from proposal to analyzing your data.

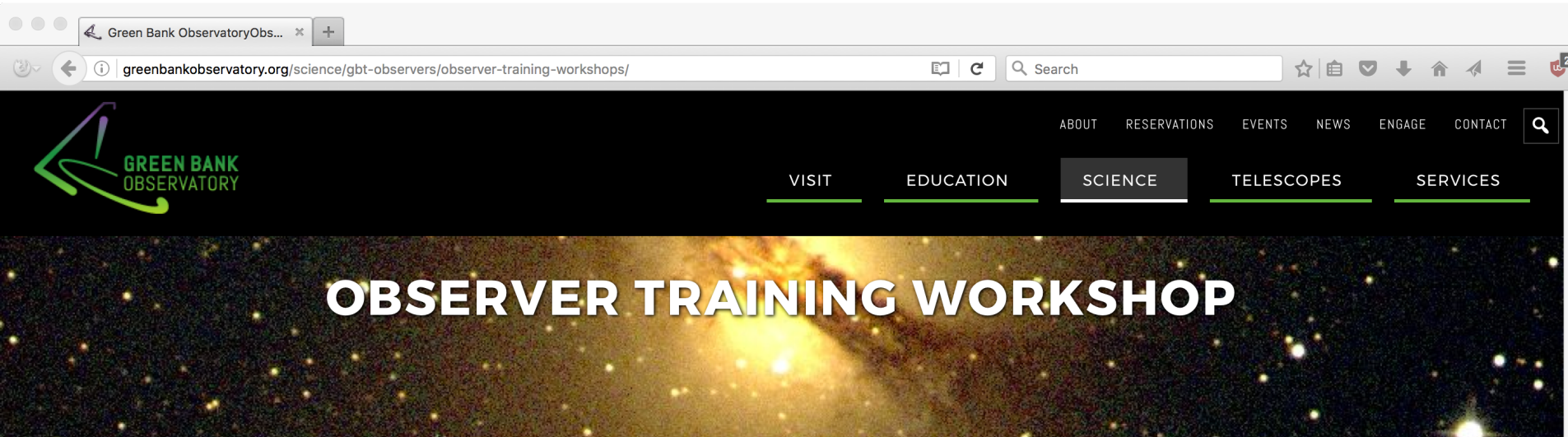
If you are planning on observing using the GBT, please be sure to review our [Visitor Facilities and Policies](#) page to get the most up-to-date information on where you can stay in the Green Bank area and what you can do here. Working with our [Observer Helpdesk](#) will provide you with the proper access to our systems and you can find out what [instruments and observing modes](#) are available as well.

Science

- [News And Events](#)
- [GBT Discoveries](#)
- [Partners](#)
- GBT Observers**
 - [Proposals](#)
 - [Observing](#)
 - [Visitor Facilities And Policies](#)
 - [Observer Training Workshop](#)
 - [Data Analysis](#)
 - [Radio Interference](#)

Next GBT Observer Training Workshop

18-22 Sep 2017



[HOME](#) > [SCIENCE](#) > [GBT OBSERVERS](#) > [OBSERVER TRAINING WORKSHOP](#)

 [Print Page](#)

Observer Training Workshop - Fall

Description:

Fall 2017 GBT Observer Training Workshop

[September 18 - 22, 2017, Green Bank Observatory](#)

Open only to GBT Observers and Scientific Community

The Green Bank Telescope (GBT) Observer Training Workshop will provide the essential skills and knowledge needed to use the GBT and maximize its scientific output. In addition, after completing the workshop, an attendee will be certified to use the GBT as a remote observer. The workshop will consist of classroom lectures that provide background on observing

Science

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