



Fermi Data Analysis Workshop



Fermi Cycle-3 Guest Investigator Program

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Synopsis

- Description of GI program
- Cycle 1 & 2 Summary
- What's new for Cycle-3
 - Implementation timeline
- Fermi SSC User Support Services
- Tips for proposers
- How to submit a proposal

Program Description

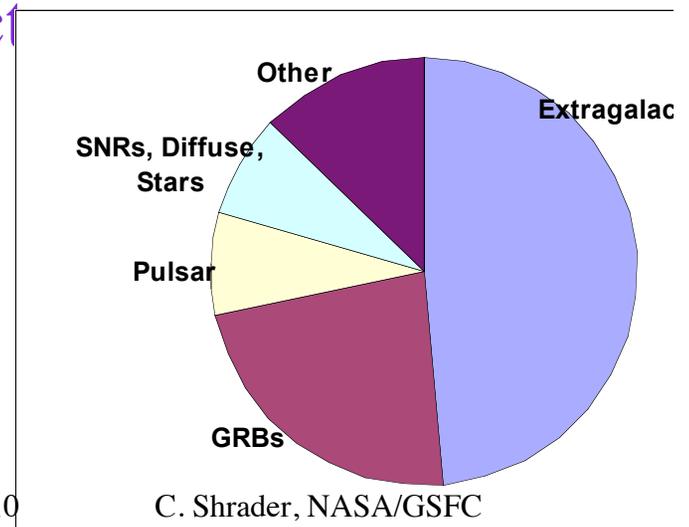


- Unique nature of the Fermi GST defines the Guest Investigator Program
 - Proposals are typically requests for grant support rather than data rights, spacecraft orbits or *ksec*
- Program open to international community
- Data analysis &/or analysis methodologies, coordinated observations, & theory
- NOAO and NRAO joint programs
- Pointed observations (ToO &/or Scheduled)
- Single year, or (~few percent) multi-year

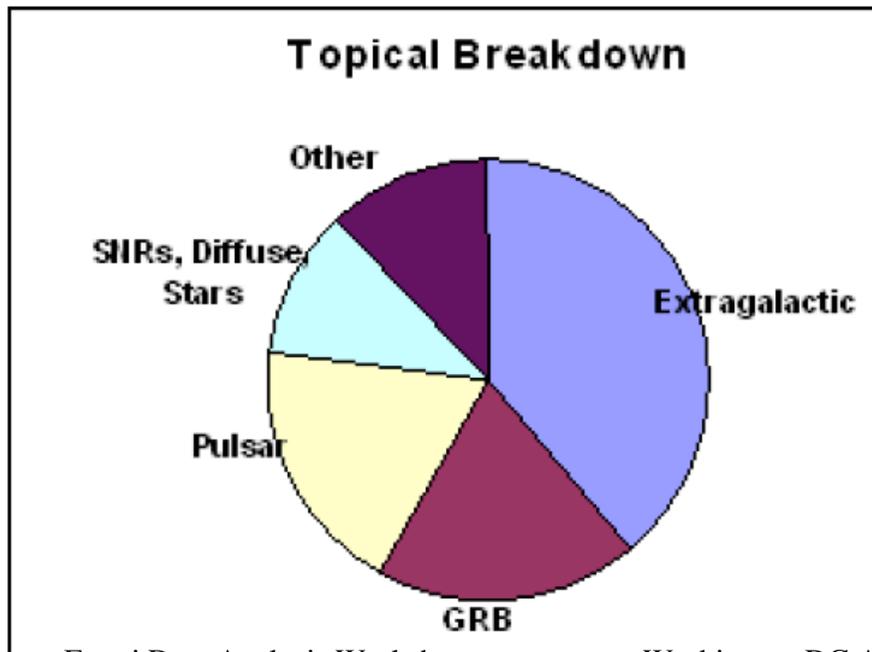
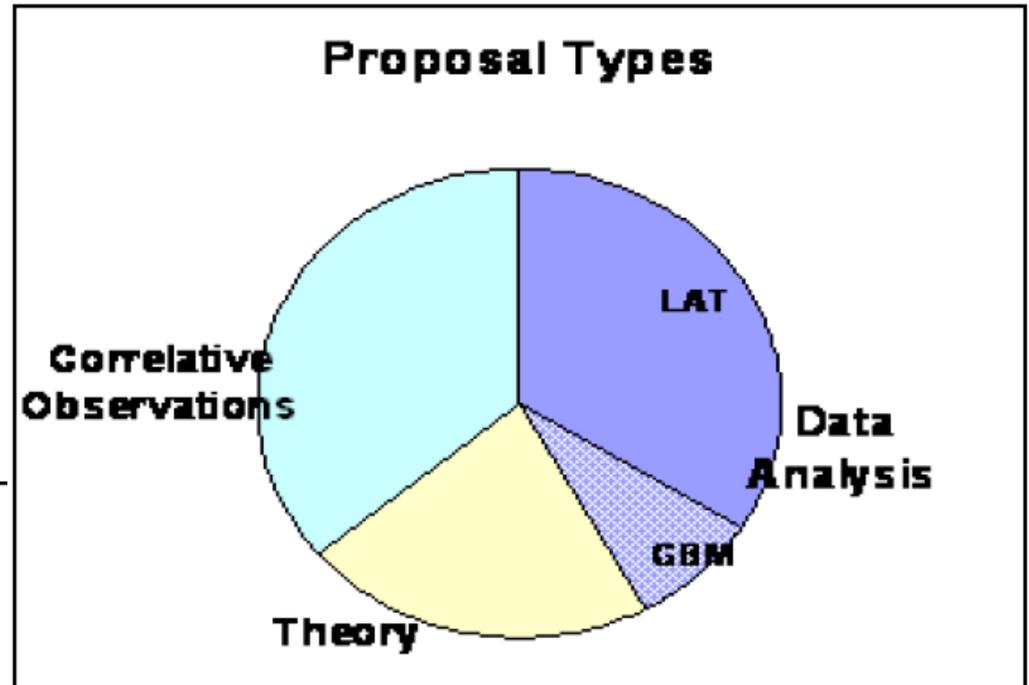
Cycle-1 Summary



- LAT data was proprietary during year 1
 - Limited high-level product release
 - GBM data analysis, related theory, coordinated observations and analysis methodologies
- No proprietary data after 9/2009
- 167 proposals received, 44 accepted
 - Included 8 large (multi-year) projects
- Average grant \$80k (~\$4M total)
 - (\$170k large)



- LAT data became public
- Early mission science → shift in topical breakdown



Cycle-2 Program



- 199 proposals received, 80 selected
 - 79 grants
 - 8 “Progress Reports”, all passed
- 3 multi-year “Large Projects” selected
 - Down from 8 selections in Cycle-1
- Average grants: \$174k (multi-year) \$78k (regular)
- NRAO: ~650 hours awarded
 - ~50% of proposed amount
- NOAO: under-utilized resource
 - 3 requests, 1 award (24 hrs)

Cycle-3 NRA



- Streamlines proposal types
 - Fewer categories, but no loss as far as what can be proposed
 - e.g. don't need separate LAT data analysis, GBM data analysis and data analysis methods categories
- Separate caps for US Co-I budgets
 - Consistent policy with other missions
- Guideline for large project awards reduced 8→3
- More detail in page limit, formatting guidelines
- Schedule still driven by agency budgeting cycle

Cycle-3 Timeline



Announcement (as part of ROSES 2008)	September, 2009
Release online proposal aids & documentation	November 5, 2009
Notices of Intent (optional)	November 16, 2009
Proposals Due	February 5, 2010
Proposal Peer Review	Late April, 2010
Stage-II (budget proposal) solicitation	May, 2010
Budget deadline, processing & grants administration	June-July, 2010
Fermi Cycle 3 Begins	Mid August, 2010

User Support: FSSC



- The FSSC is responsible for all areas of User Support:
 - Developing & maintaining a public data archive
 - Coordinated w/HEASARC
 - Maintain public distribution site for the analysis software
 - developed in collaboration with the Instrument Teams.
 - Administer Guest Investigator Program for NASA HQ
 - Providing technical and scientific support to GIs.
 - Providing the science timelines to the MOC
- The FSSC is an organization within the NASA GSFC Astrophysics Science Division
- FSSC staff includes scientists, scientific programmers, and administrative support staff

- Web services:
 - Mission news & information,
 - NRAs & support materials
 - Online resources & support tools
 - Planning resources (mission timelines, multi-wavelength campaign logging)
- Distribution of & support science analysis SW
- Phone & e-mail technical/scientific support
- Proposal reviews, grant administration
- Reporting to Fermi Users Group

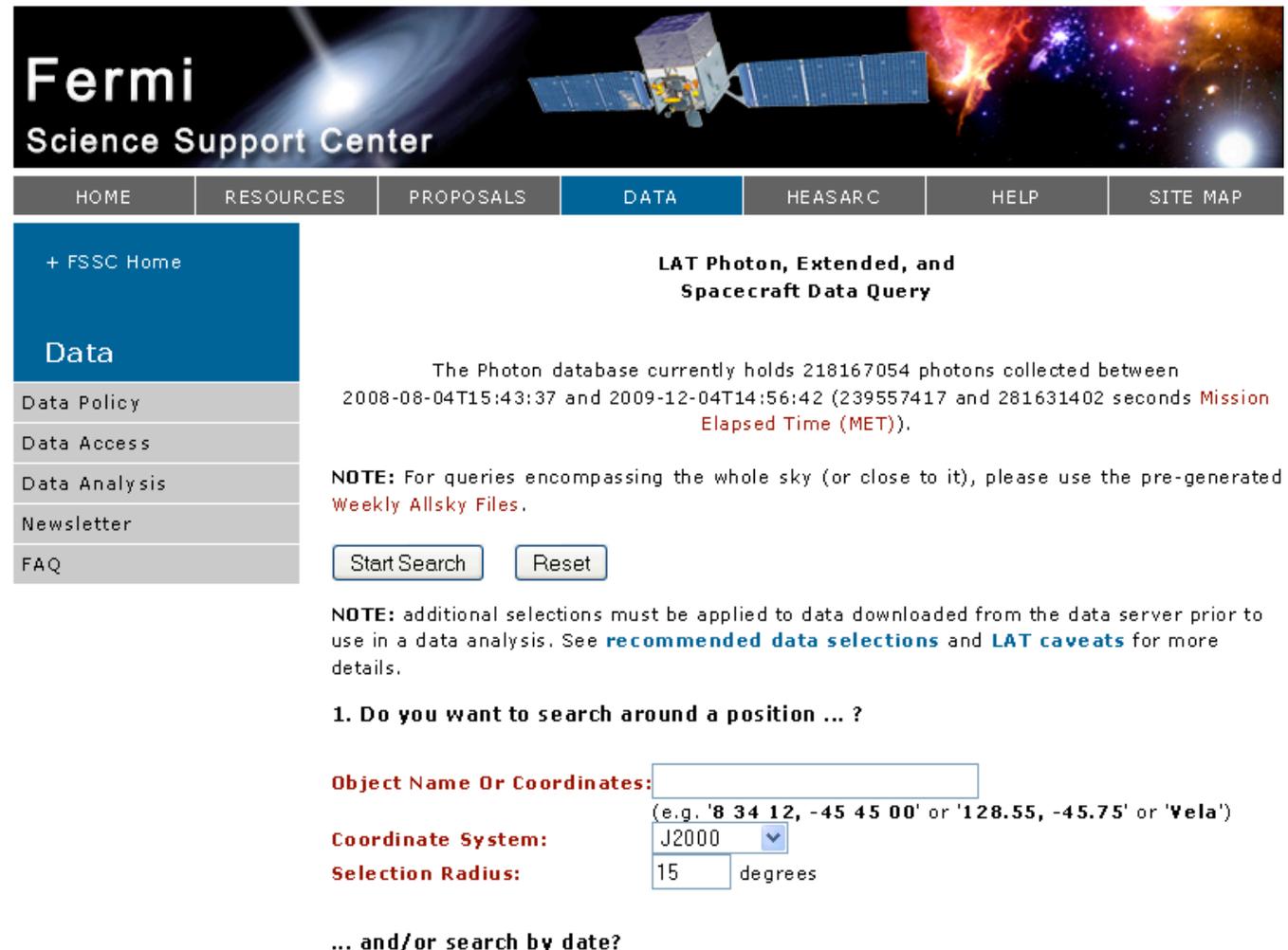
<http://fermi.gsfc.nasa.gov/ssc/>

- Mission cycle 2 & beyond:
 - All Science Data Are Public As Soon As Processed
- Automated pipeline, SLAC → FSSC
 - <2-day latency requirement, but typically <1 day

LAT data server
fully operational
since 8/2009.

Basic products:
screened event
lists, spacecraft
history file.

Please read
caveats, basic
data selection
and exploration
threads



Fermi Science Support Center

HOME RESOURCES PROPOSALS **DATA** HEASARC HELP SITE MAP

+ FSSC Home

Data

- Data Policy
- Data Access
- Data Analysis
- Newsletter
- FAQ

LAT Photon, Extended, and Spacecraft Data Query

The Photon database currently holds 218167054 photons collected between 2008-08-04T15:43:37 and 2009-12-04T14:56:42 (239557417 and 281631402 seconds **Mission Elapsed Time (MET)**).

NOTE: For queries encompassing the whole sky (or close to it), please use the pre-generated **Weekly Allsky Files**.

NOTE: additional selections must be applied to data downloaded from the data server prior to use in a data analysis. See [recommended data selections](#) and [LAT caveats](#) for more details.

1. Do you want to search around a position ... ?

Object Name Or Coordinates:
(e.g. '8 34 12, -45 45 00' or '128.55, -45.75' or 'Vela')

Coordinate System: J2000

Selection Radius: degrees

... and/or search by date?

Rate of data queries:

Archive statistics:

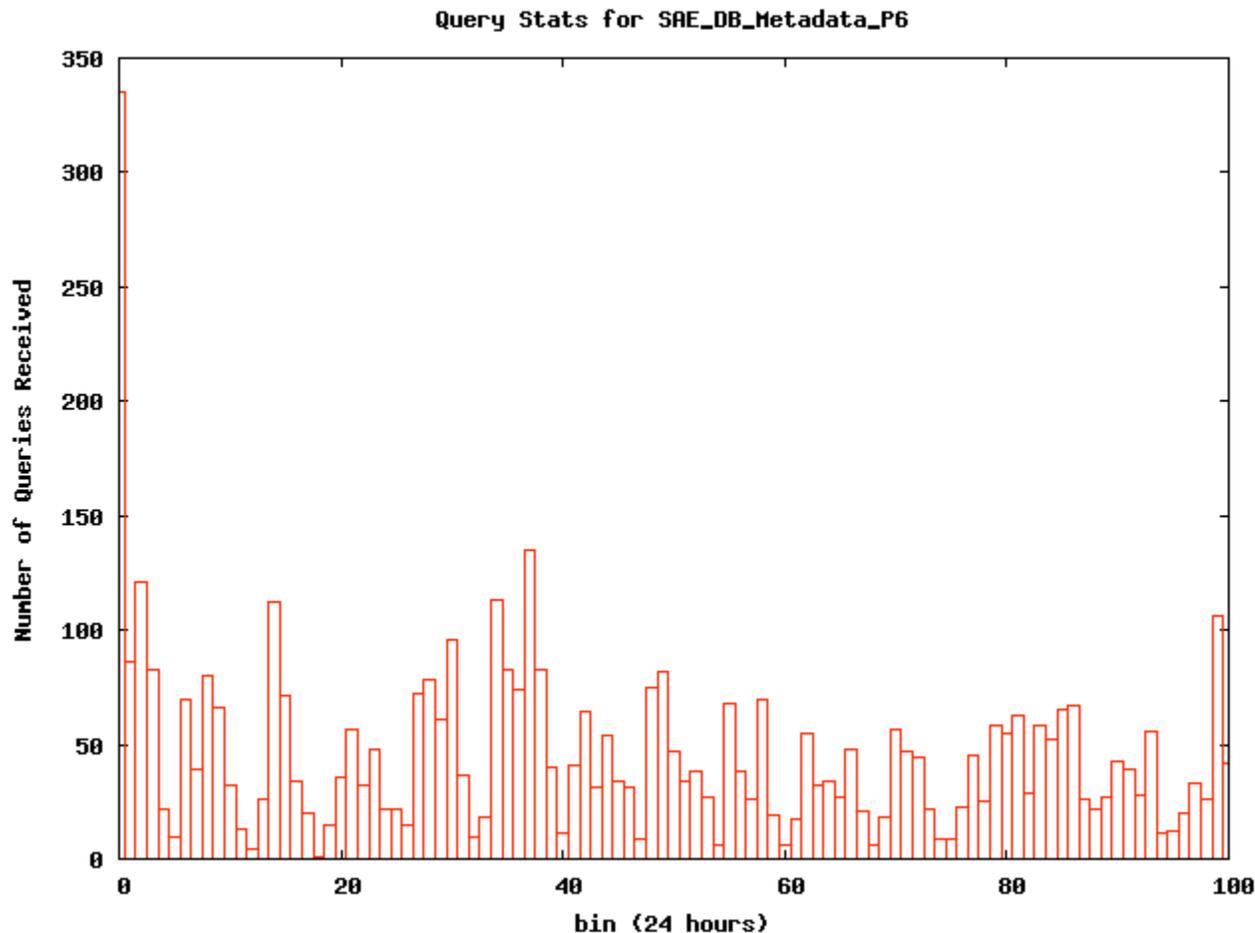
Total photons in database:
217478410 (18.8 Gb)

Total spacecraft positions in
database: 1164576 (0.3Gb)

Total photons served:
13230597921 (1141.4 Gb)

Total extended photons
served: 540008960 (87.0 Gb)

Total queries: 4831



Current databases include LAT lightcurves (~45 objects), GBM trigger, GRB and continuous data + pulsar ephemerides and (soon) 1-yr source catalog.

[Archive](#) Search of [FERMI](#) and object Catalog(s)

[Main Search Form](#) > **Search Form** > Search Results > Choose Data Products

1. Please select one or more of the tables below.

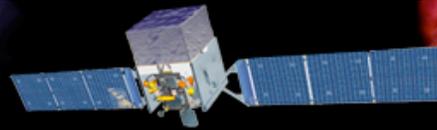
↓ Sort by a column in order: 1,2,3 ↑ Sort by column in reverse order: 3,2,1

Select:	Description	Catalog	Data	Default Radius (arcmin)	Mission	Table Type
All <input checked="" type="checkbox"/>						
<input checked="" type="checkbox"/>	Fermi GBM Burst Catalog	fermigbrst	Y	30	FERMI	Object
<input checked="" type="checkbox"/>	Fermi GBM Trigger Catalog	fermigtrig	Y	30	FERMI	Object
<input checked="" type="checkbox"/>	Fermi GBM Daily Data	fermigdays	Y	***	FERMI	Observation
<input checked="" type="checkbox"/>	Fermi LAT Monitored Source List	fermilasp	N	10	FERMI	Object
<input checked="" type="checkbox"/>	Fermi LAT Bright Source List	fermilbsl	N	30	FERMI	Object

2. Do you want to change any of your current query selections?

Databases are implemented under HEASARC Browse. &/or simple www interface.

Fermi
Science Support Center



WWW interface to
LAT lightcurves

HOME

RESOURCES

PROPOSALS

DATA

HEASARC

HELP

SI

+ FSSC Home

Data

Data Policy

Data Access

+ LAT Data

+ GBM Data

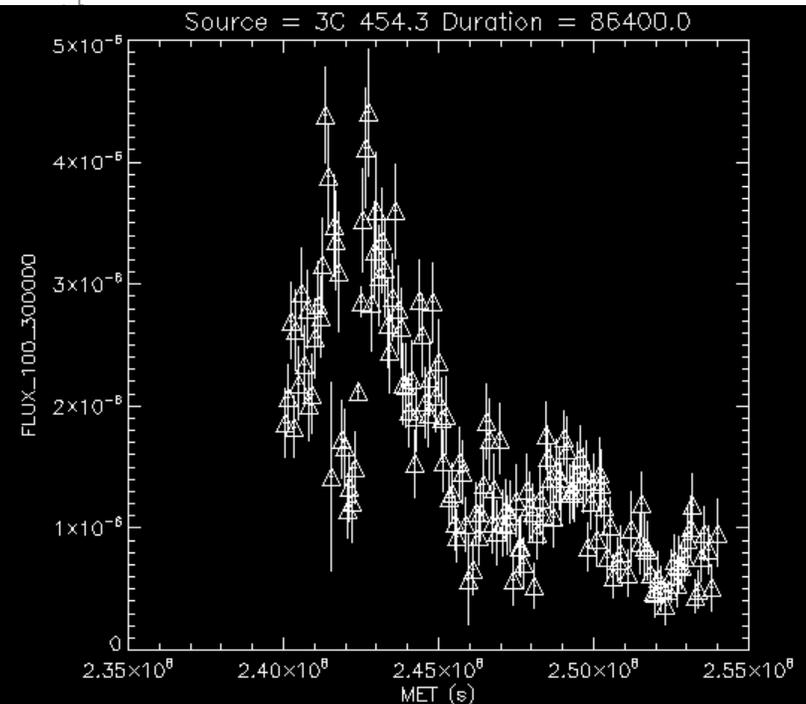
Data Analysis

Newsletter

FAQ

Monitored Source List Light Curves

Source	Daily LC	Weekly LC
<p>4C 31.03 (RA = 18.2100, Dec = 32.1380)</p> <ul style="list-style-type: none"> » Daily Light Curve » Daily Light Curve Fits File » Weekly Light Curve » Weekly Light Curve Fits File 		
<p>0208-512 (RA = 32.6930, Dec = -51.0170)</p> <ul style="list-style-type: none"> » Daily Light Curve » Daily Light Curve Fits File » Weekly Light Curve » Weekly Light Curve Fits File 		
<p>3C 66A (RA = 35.6650, Dec = 43.0350)</p> <ul style="list-style-type: none"> » Daily Light Curve » Daily Light Curve Fits File » Weekly Light Curve » Weekly Light Curve Fits File 		
0235+164		



GBM Burst catalog: contains ~300 bursts. Also trigger catalog w/solar flares (more to come..), SGR and TGFs

[Fermi GBM Burst Catalog \(fermigbrst\)](#) [Bulletin](#) [README](#)

Select	Services	version	trigger name	name	ra	dec	time	end time	trigger time	reliability
<input type="checkbox"/> All	Q R N S D H	↕↕	↕↕	↕↕	↕↕	↕↕	↕↕	↕↕	↕↕	↕↕
<input type="checkbox"/>	Q R N S D H	0	bn080912360	GRB080912360	02 04 04.0	-06 39 00	2008-09-12 08:36:41.01	2008-09-12 08:46:56.01	2008-09-12 08:38:55.02	0.3647
<input type="checkbox"/>	Q R N S D H	0	bn080916009	GRB080916009	07 18 16.0	-57 47 00	2008-09-16 00:10:30.98	2008-09-16 00:20:45.97	2008-09-16 00:12:44.99	0.9373
<input type="checkbox"/>	Q R N S D H	0	bn080916406	GRB080916406	23 05 32.0	-61 51 00	2008-09-16 09:43:03.96	2008-09-16 09:53:18.01	2008-09-16 09:45:17.97	0.4824
<input type="checkbox"/>	Q R N S D H	0	bn080919790	GRB080919790	13 50 28.0	+78 09 00	2008-09-19 18:55:21.99	2008-09-19 19:05:36.99	2008-09-19 18:57:34.96	0.5686
<input type="checkbox"/>	Q R N S D H	0	bn080920268	GRB080920268	08 19 16.0	+00 06 00	2008-09-20 06:23:34.97	2008-09-20 06:33:49.97	2008-09-20 06:25:48.03	0.8353
<input type="checkbox"/>	Q R N S D H	0	bn080924766	GRB080924766	05 17 36.0	+33 58 00	2008-09-24 18:20:24.98	2008-09-24 18:30:30.99	2008-09-24 18:22:35.96	0.3569
<input type="checkbox"/>	Q R N S D H	1	bn080925775	GRB080925775	06 27 04.0	+21 11 00	2008-09-25 18:33:40.98	2008-09-25 18:43:55.03	2008-09-25 18:35:54.99	0.5529
<input type="checkbox"/>	Q R N S D H	0	bn080927480	GRB080927480	03 20 32.0	+38 10 00	2008-09-27 11:28:17.04	2008-09-27 11:38:31.00	2008-09-27 11:30:32.00	0.7098
<input type="checkbox"/>	Q R N S D H	2	bn080928628	GRB080928628	06 54 20.0	-65 01 00	2008-09-28 15:02:43.04	2008-09-28 15:12:58.03	2008-09-28 15:04:56.01	0.4000
<input type="checkbox"/>	Q R N S D H	0	bn081003644	GRB081003644	17 55 44.0	+26 01 00	2008-10-03 15:25:06.04	2008-10-03 15:35:13.00	2008-10-03 15:27:17.02	0.4941
<input type="checkbox"/>	Q R N S D H	1	bn081003779	GRB081003779	14 24 12.0	-72 08 00	2008-10-03 18:39:27.96	2008-10-03 18:49:33.97	2008-10-03 18:41:39.03	0.5216
<input type="checkbox"/>	Q R N S D H	0	bn081006604	GRB081006604	09 32 32.0	-64 50 00	2008-10-06 14:27:18.98	2008-10-06 14:31:57.01	2008-10-06 14:29:34.02	0.9137
<input type="checkbox"/>	Q R N S D H	0	bn081008832	GRB081008832	19 47 36.0	-46 12 00	2008-10-08 19:55:50.02	2008-10-08 20:05:56.03	2008-10-08 19:58:01.00	0.8118
<input type="checkbox"/>	Q R N S D H	1	bn081009140	GRB081009140	16 44 19.2	+17 12 36	2008-10-09 03:18:45.01	2008-10-09 03:29:00.01	2008-10-09 03:20:57.98	0.6902
<input type="checkbox"/>	Q R N S D H	0	bn081009690	GRB081009690	04 45 56.0	+16 22 00	2008-10-09 16:31:18.97	2008-10-09 16:41:33.01	2008-10-09 16:33:37.04	0.5137
<input type="checkbox"/>	Q R N S D H	2	bn081012045	GRB081012045	05 14 45.6	-00 39 36	2008-10-12 01:03:08.04	2008-10-12 01:13:21.99	2008-10-12 01:05:22.04	1.0000

Submitting a proposal

- Stage-1 (scientific) proposal submission is straight forward
 - HEASARC ARK/RPS facility
- No paper submission or institutional signatures required at this stage
- Web-based form, self documented, verification feature
- 4- and 6-page limits for regular/large proposals
 - Science justification as PDF attachment
- 1-page technical appendix for joint NOAO or NRAO programs
- Stage-2 proposal managed by NASA HQ/NRESS
 - Must use NSPIRES facility

Submitting a proposal



NASA's HEASARC: Archive

ARK HOME FAQ HELP EDIT PROFILE CHANGE PASSWORD My ARK LOGOUT

Verify Save Reload LaTeX PostScript PDF Add Targets Feedback

Proposal for Fermi Guest Investigator AO-3

There are only **51** days remaining until the submission deadline at **4:30pm EST** on **2010-02-05**.

Need help? All labels link to a description with additional information about each field in the form.

Click on the green triangles to the left of the section headers to toggle the display of individual sections of the form.

After the forms below have been submitted, the technical/scientific/management justifications must be uploaded as a single PDF in order for your proposal submission to be complete.

▼ [Cover Page](#)

[Proposal Title](#)

[Abstract](#)

[Subject Category](#)

[Proposal Type](#)

[Observation Type](#)

[Joint Proposal?](#)

ARK/RPS page for Fermi GI program. Straight forward, internally documented web form. Sub-menus for NOAO, NRAO requests. File input accommodated for large target lists. Verification feature & upload function.

A Few Tips



- NOAO, and to a lesser extent, NRAO have been undersubscribed resources
- If you do ask for time on those facilities, be thorough in detailing your observation plans
- Don't propose for a multi-year program unless you can REALLY justify it
- Don't ask for pointed observations unless you REALLY understand the technical issues

A Few Tips (con.)



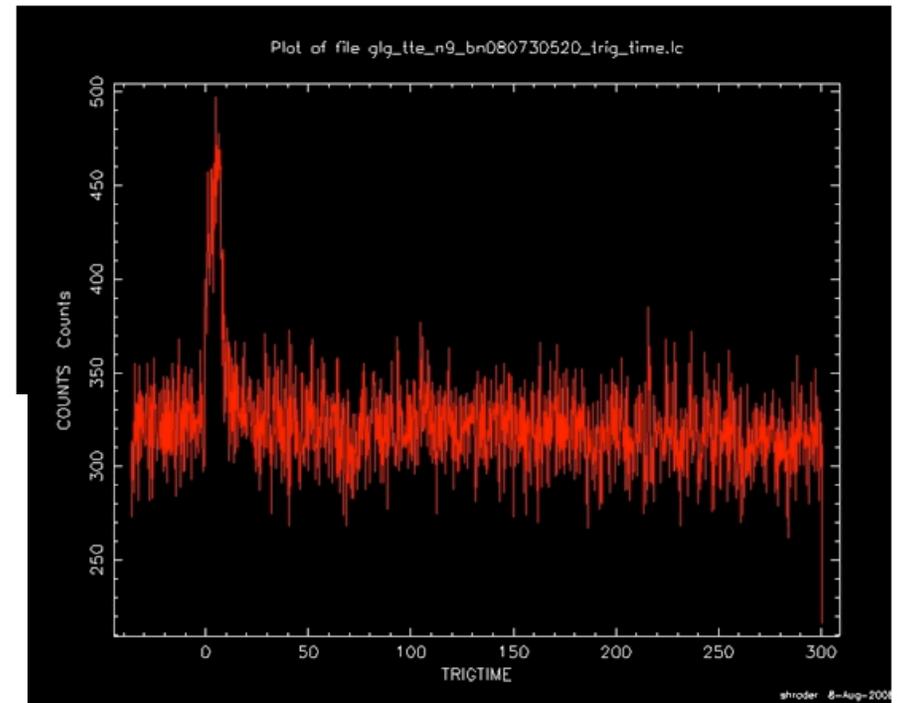
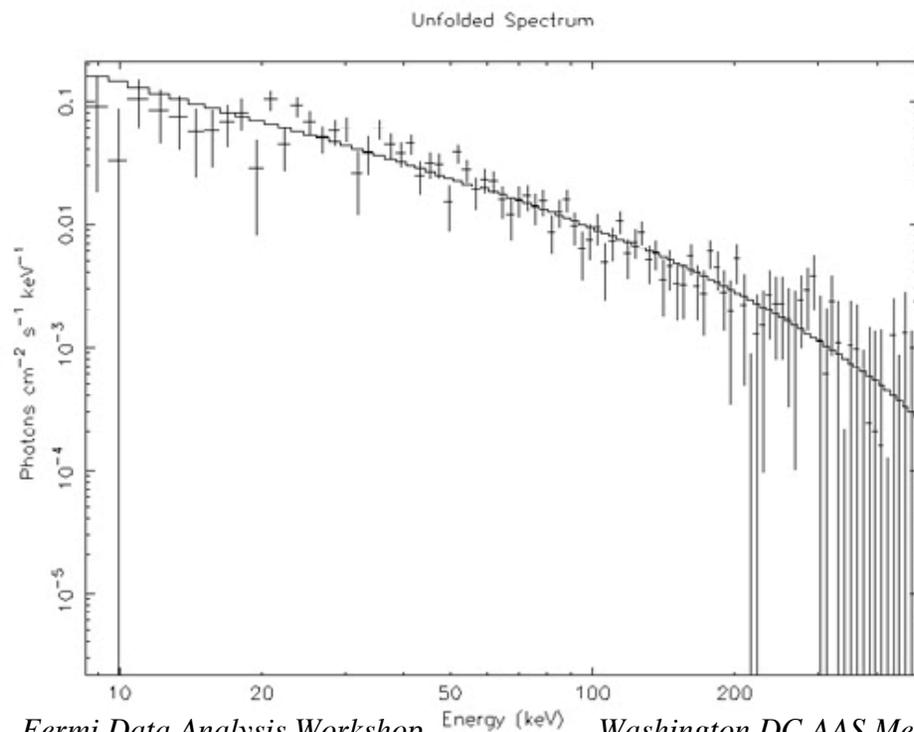
- Don't cheat on the format guidelines
 - Tiny margins and small print annoy reviewers
- Typically cited peer-review “weakness”
 - Relevance to Fermi not well demonstrated
- Don't promise resources – e.g. supporting observations facilities – that you don't really have
- There is cycle-to-cycle ‘institutional’ memory
 - If you re-propose unsuccessful proposal, show that you addressed criticisms
 - If you propose to continue previously approved program, show that progress was made

Summary

- Cycle-3 deadline is rapidly approaching!
 - February 5, 2010
- Online resources available
 - NRA, detailed proposal instructions
 - Hierarchical documentation set
- Source list, 1-year catalog (soon)
- Science Analysis Tools & Data available
- Expanded opportunities
 - no proprietary data for Cycle-2 & beyond
- We look forward to your participation!

- Extra slides

GBM data can be analyzed using a subset of the Fermi Science tools suite + HEASARC *FTOOLS* & *XSPEC* packages.



Alternative, GBM-specific software to be released from MSFC in near future

Cycle-2: A few Details

- As for Cycle 1, opportunity for joint NOAO and NRAO facility programs
 - Up to ~10% of time on various NRAO facilities
 - ~1-5% on various NOAO telescopes
 - Refer to FSSC web pages for details of agreement
- Two stage proposal process
 - Stage 1 scientific evaluation; ARK/RPS submission
 - Stage 2 budget proposal: NSPIRES
- Stage 1 proposal form requires proposer supplied budget cap, + absolute ceilings (\$100k & \$200k) imposed by NRA

New for Cycle-2



- Anticipate ~2X increase in participation;
 - ~\$8M grant support
- LAT data analysis is likely to be the predominant mode of participation
- Possible to request pointed observation
 - Scheduled &/or ToO (likely to be limited)
- Instrument performance established
- Bright Source List: resource to proposers
 - $>10\sigma$ significance list, released Feb 9
 - Instrument team generates all-sky catalog after year 1
- Software suite available
 - Simulation capability
 - Assess analysis capabilities

Fermi LAT GRB Table

[Fermi SSC Home](#) » [LAT GRB Search](#)

- 4 bursts met your search criteria.
- Database last updated: Monday, December 22, 2008, 14:55:19 EST
- Download this table as a tab-delimited text file: [grb_table_1233073601.txt](#)

GRB	Time [UT]	Trigger Number	LAT RA (J2000)	LAT Dec (J2000)	LAT Counts	LAT Burst Advocate	GBM RA (J2000)	GBM Dec (J2000)	GBM Fluence [10^{-5} erg/cm ² /s]	GBM Counts
081215A	18:48:36.85	251059717	TBD 00:00:00.0	TBD 00:00:00.0	TBD	Julie McEnery	135.0 09:00:00.0	53.8 53:48:00.0	5.44	68.9
081024B	21:22:41	246576161	322.9 21:31:36.0	21.204 21:12:14.4	n/a	Nicola Omodei	n/a	n/a	0.034	4.2
080916C	00:12:45	243216766	119.88 07:59:31.2	-56.59 56:35:24.0	n/a		121.8 08:07:12.0	-61.3 61:18:00.0	19	n/a
080825C	14:13:48	241366429	233.96 15:35:50.4	-4.72 04:43:12.0	n/a		232.2 15:28:48.0	-4.9 04:54:00.0	2.4	n/a

* All numbers are preliminary and may be revised as we do reprocessing (s/w improvements, thinking/experience improvements). Users are encouraged to view the actual data.

[Fermi SSC Home](#) » [LAT GRB Search](#)

Summary information –trigger time, sky position, net counts, GBM fluence – is available on line to facilitate GRB researchers

Burst Data Products

- Time-Tagged Events (TTE)— counts in 128 energy channels from each detector
- Background Spectra—estimated background spectra for the period of the burst
- Detector Response Matrices (DRMs)—the detector response matrix
- Catalog entry—summary info: duration, fluence, lightcurves , spectral params
- CTIME and CSPEC —series of spectra w/different temporal & spectral resolution
- TRIGDAT—burst alert telemetry, information downlinked after a burst.

Continuous Data Products

- CTIME and CSPEC— series of spectra w/different temporal & spectral resolution
- Calibration and Housekeeping Files

