

National Aeronautics and Space Administration



# Fermi

Gamma-ray Space Telescope

[www.nasa.gov/fermi](http://www.nasa.gov/fermi)

## **Fermi**

**Gamma-ray Space Telescope**

**International Finance  
Committee Meeting**

**Mission Status Update**

**J. McEnery**

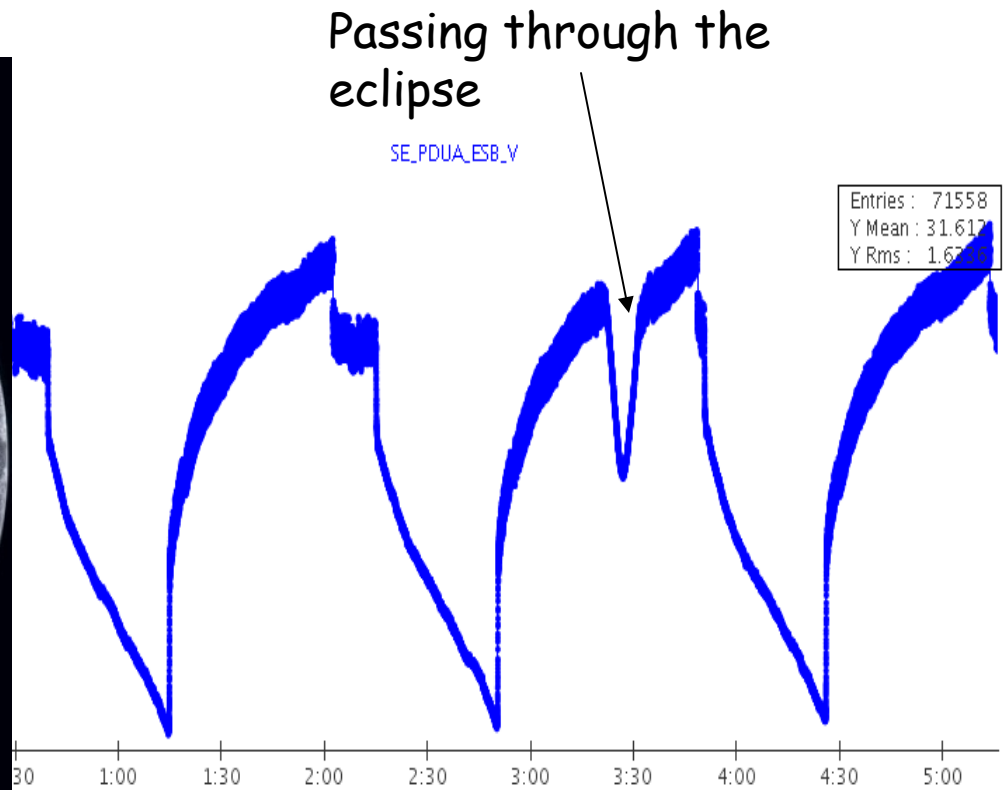
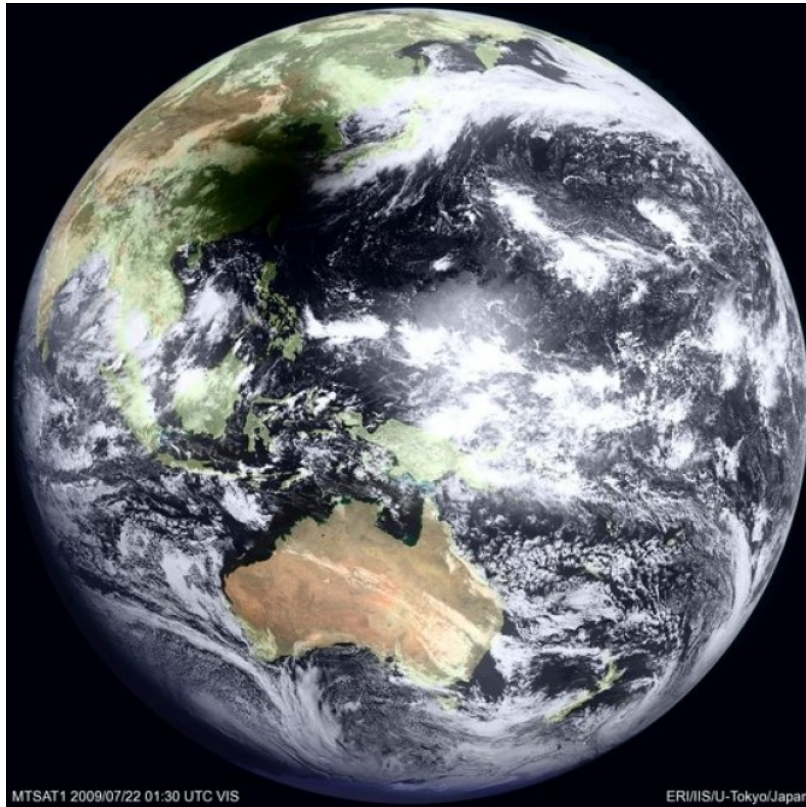


# Status Highlights

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- Operations continue to be very smooth, thanks to an outstanding Flight Ops Team and great cooperation across the mission.
  - Weekly planning, status and issues meetings
- Proactively working issues to maintain smooth operations, including:
  - battery management (see later slides)
  - FSW updates (LAT, GBM, spacecraft) for minor bug fixes, operations and science processing improvements
  - collision avoidance
    - Several planning exercises to test procedures and policies
  - continuously looking at robustness of fault management and opportunities for improvements
  - careful monitoring of all subsystems (including the reaction wheels)
- LAT Data release on Aug 25.
- Liz Hays appointed as Deputy Project Scientist.
- Jaya Bajpayee is Fermi Program Exec
- Press and outreach coordination and planning, tied to major science results releases. 12 press/web releases (2 in 2008, 10 in 2009).
  - Biweekly telecons

# Fermi sees the Solar Eclipse!





# Observations summary

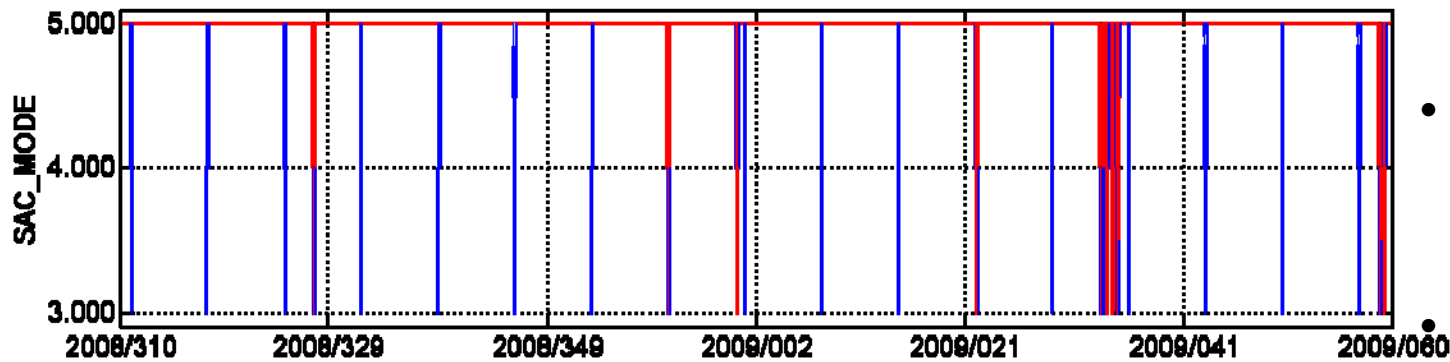
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- **Almost exclusively in nominal data taking in survey mode**
  - 35 deg rocking angle for first few months (some short periods at 40 and 39 deg)
  - 39 deg rocking angle from July 9, 2009
  - 50 deg rocking angle from Sept 2, 2009
- **30 ARR**s
  - 5 hour pointed mode observations in response to bright GBM detected bursts.
- **LAT Calibrations**
  - 13 hours (6 hr in Dec, 3.5 in March and 3.5 in Aug)
- **Reboot anomalies (now fixed)**
  - 5 days (in March and April)
- **Data recovery efficiency (do all the bytes reach the ground)**
  - <10 s of data lost since Aug 11, 2008

# Mode Transitions & Rocking Profile

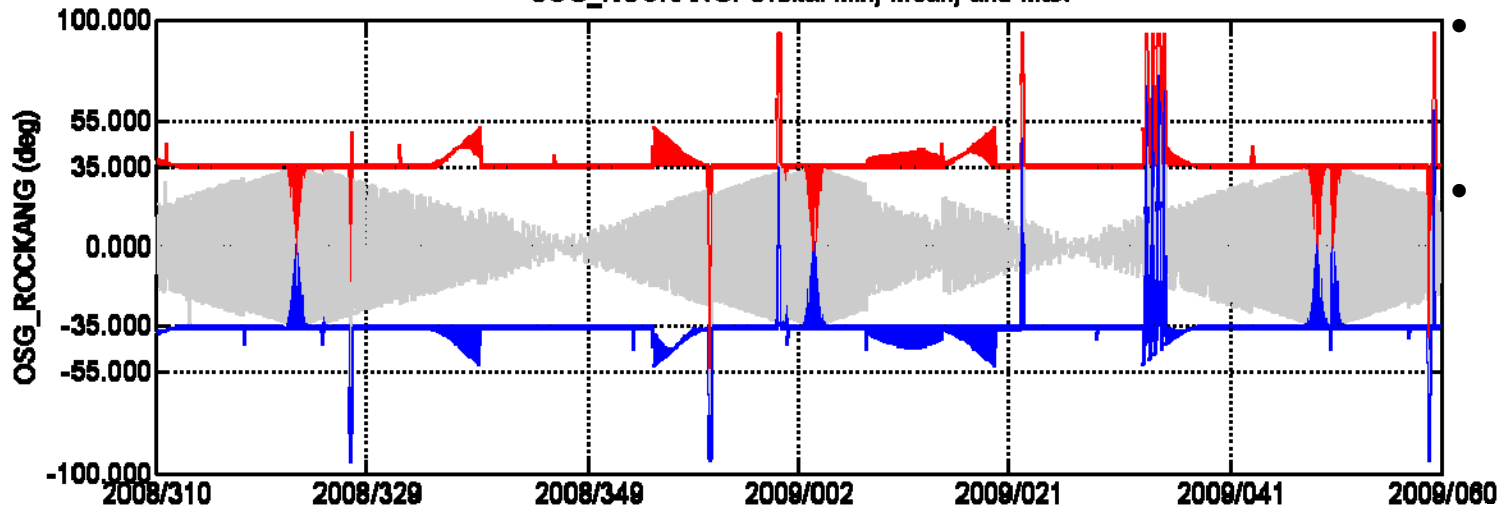
Tim Wasserman (FOT)

SAC\_MODE: Orbital Min, Mean, and Max



- Vast majority of time spent in Zenith Point (GNC Mode=5)
- Weekly rocking profile updates transition briefly to Inertial Point (GNC Mode=3)
- Total of 10 ARR occurred during 117 day period

OSG\_ROCKANG: Orbital Min, Mean, and Max

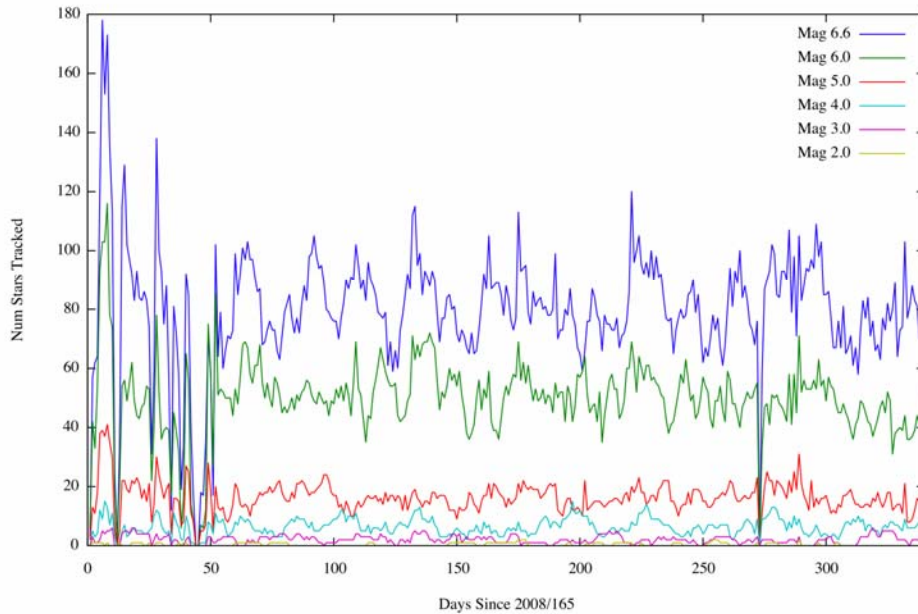


- Six “bursts” of ARRs visible in rocking angle plot
- Sun avoidance causes rocking deviations < 20 degrees

# Star Tracker Performance

Perry Baltimore (FOT) and Eric Stoneking (GNC engineer)

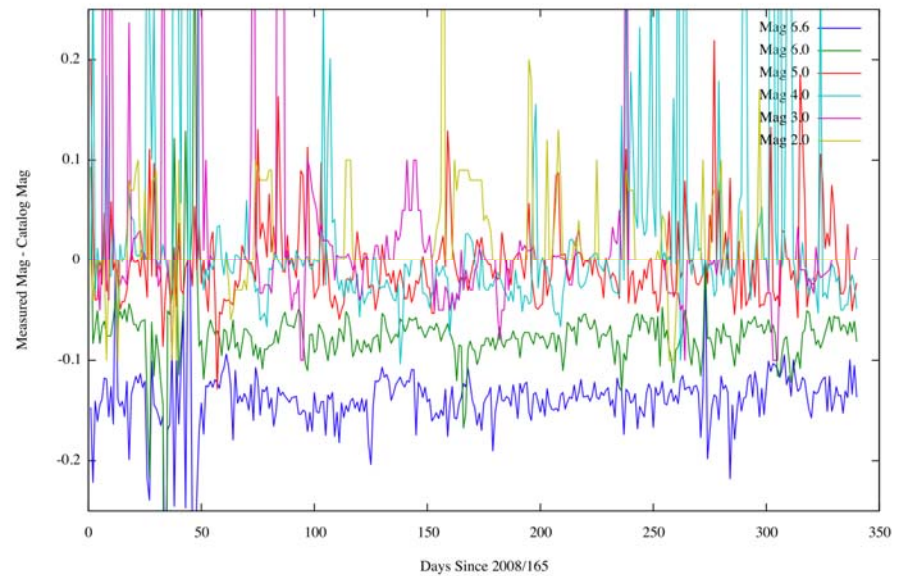
Number of Stars Tracked by ST3, by Day and Magnitude



- **Difference between measured and catalog magnitudes**

- **Number of stars tracked by ST3.**

Measured Magnitude Error of Stars Tracked by ST3, by Day and Magnitude

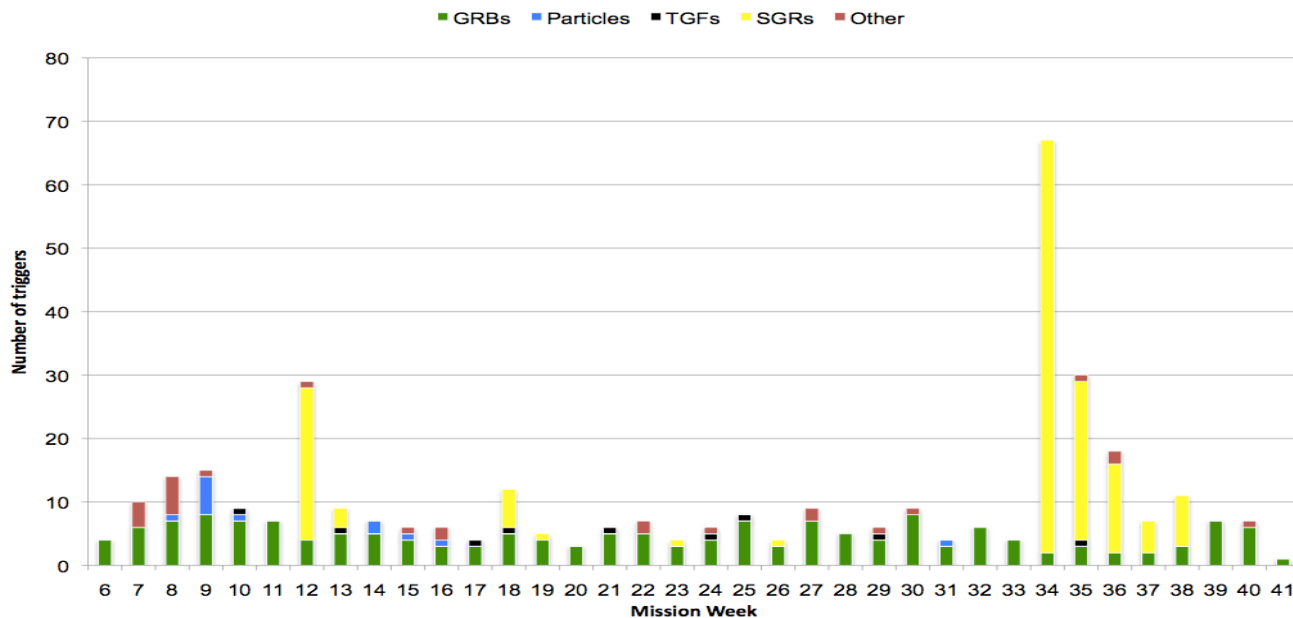


## Survey profile change

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- **Moved to 50 deg rocking profile in early Sept largely to improve the operating efficiency of the flight battery**
  - **Modest increase in non-uniformity (factor of two in exposure from max to min exposure on sky), provides deeper exposure on part of the sky which can be beneficial for population studies.**
  - **3% decrease in observation efficiency due to Earth limb encroaching on the FoV.**

# Gamma-ray Burst Monitor



USA (MSFC, UAH,  
LANL) and Germany  
(MPE)

PI- Bill Paciesas (UAH)

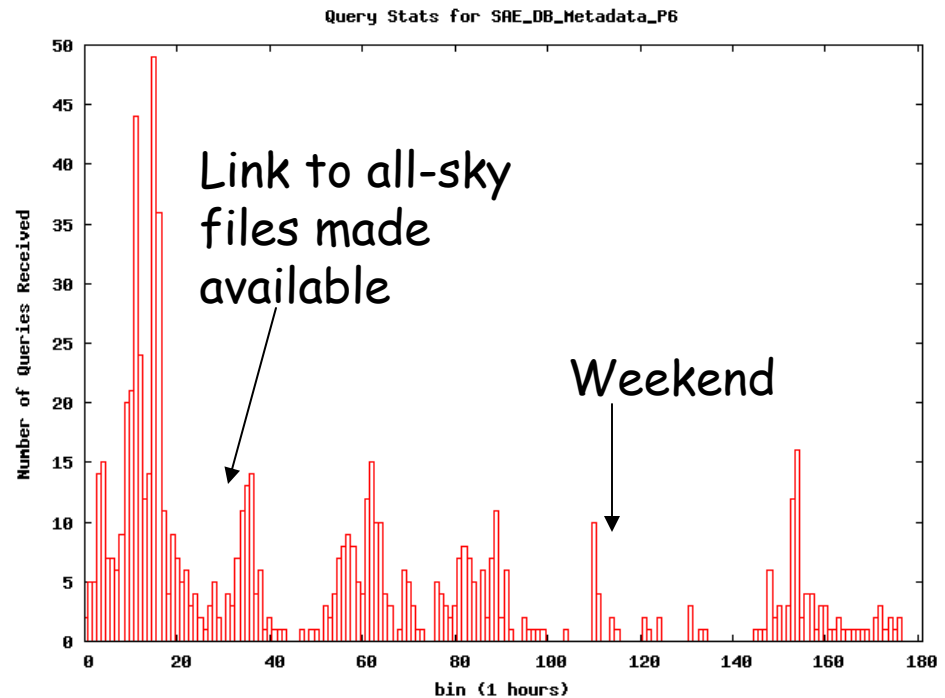
Co-PI- Jochen Greiner  
(MPE)

- Since July 2008, GBM has detected approximately 350 GRB (250/year c.f. 200/year predicted)
  - Benefited from flexible onboard triggering algorithms
- Also has seen four SGRs, >12 TGFs and some solar flares.
- Recent flight software updates to improve reliability of autonomous repoint requests (to more reliably slew only to bright GRB)

# Data Releases

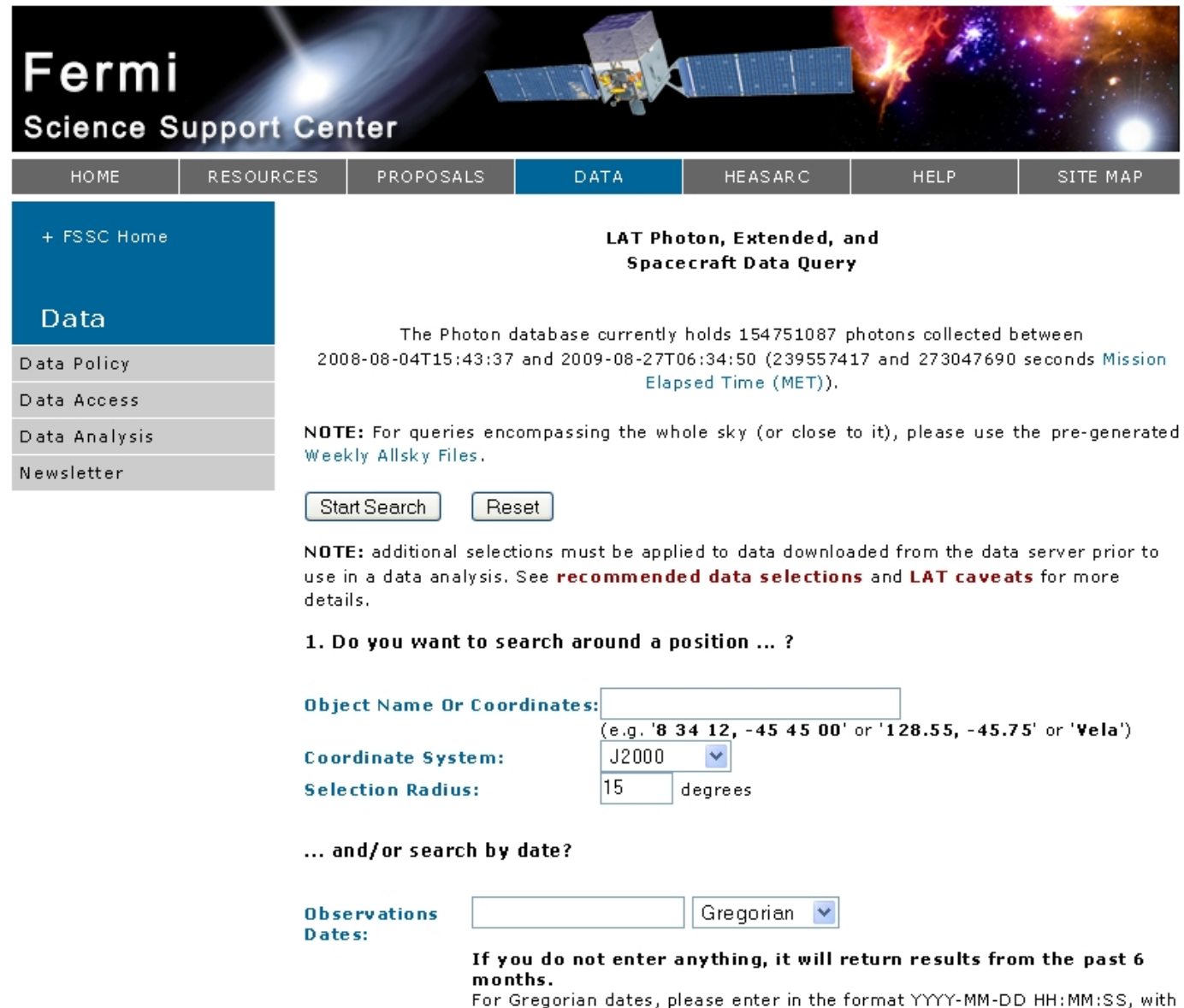
- **Beginning of science operations: GBM data + LAT high level data from start of science operations**
- **Feb 6, 2009: LAT bright source list, first LAT analysis software release**
- **Aug 25, 2009: low level LAT data, second LAT analysis software release**

- **~400 queries in first day, many requesting the entire dataset.**
- **Made link to weekly all-sky files more obvious (so number of queries dropped)**



# FSSC Data Server

- Data server interface
  - Time, space & energy cuts
- Default energy selection 100 MeV - 300 GeV
- Similar to HEASARC Browse interface
- Weekly all-sky files available as FTP downloads



**Fermi Science Support Center**

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

+ FSSC Home

**Data**

- Data Policy
- Data Access
- Data Analysis
- Newsletter

**LAT Photon, Extended, and Spacecraft Data Query**

The Photon database currently holds 154751087 photons collected between 2008-08-04T15:43:37 and 2009-08-27T06:34:50 (239557417 and 273047690 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?**

**Observations Dates:**   Gregorian

**If you do not enter anything, it will return results from the past 6 months.**  
 For Gregorian dates, please enter in the format YYYY-MM-DD HH:MM:SS, with



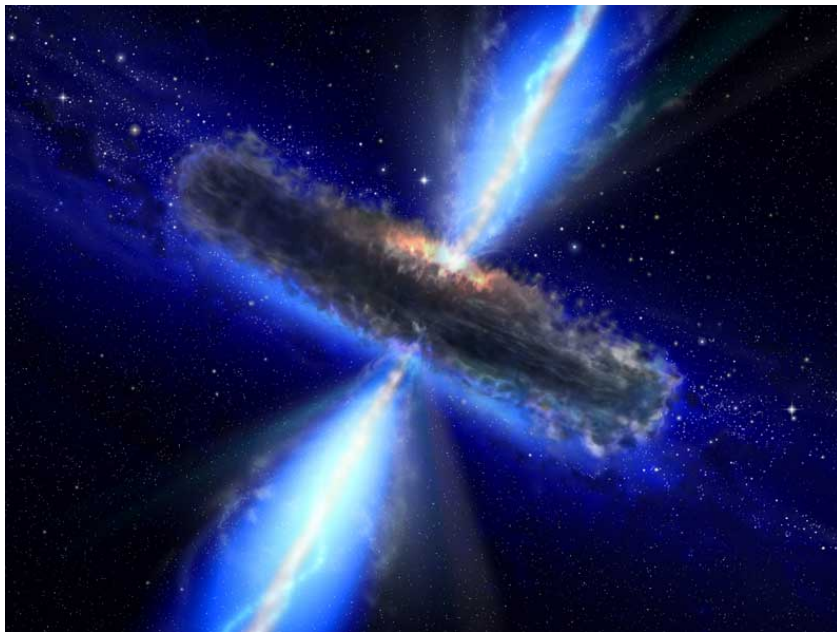
# Data analysis workshops

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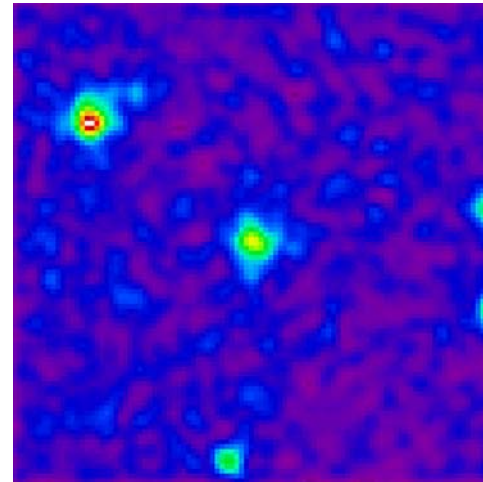
- **The Fermi Science Support Center is holding a sequence of regional data analysis workshops**
- **First workshop on Oct 1 at GSFC (simultaneous with a Fermi analysis workshop in Frascati organised by ASDC)**
- **1-day, focus on hands-on activities**
- **~<25 participants**
  - **Larger group limits 1-on-1 interactions**
- **Future workshops**
  - **US Venues chosen based on community feedback**
  - **May try internet conferencing analysis workshops**

## Press/Web Releases

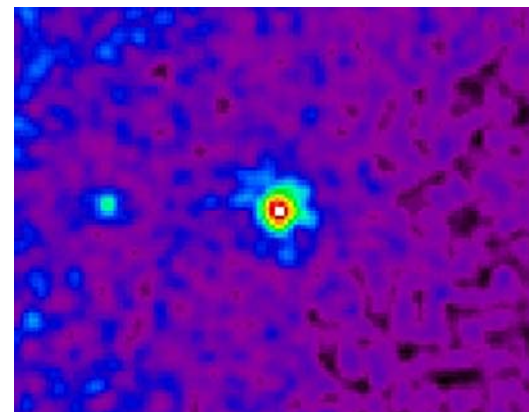
- **NASA's Fermi Finds Gamma-ray Galaxy Surprises, May 29, 2009**



Finding Gamma-ray emission from new types of Active Galaxies

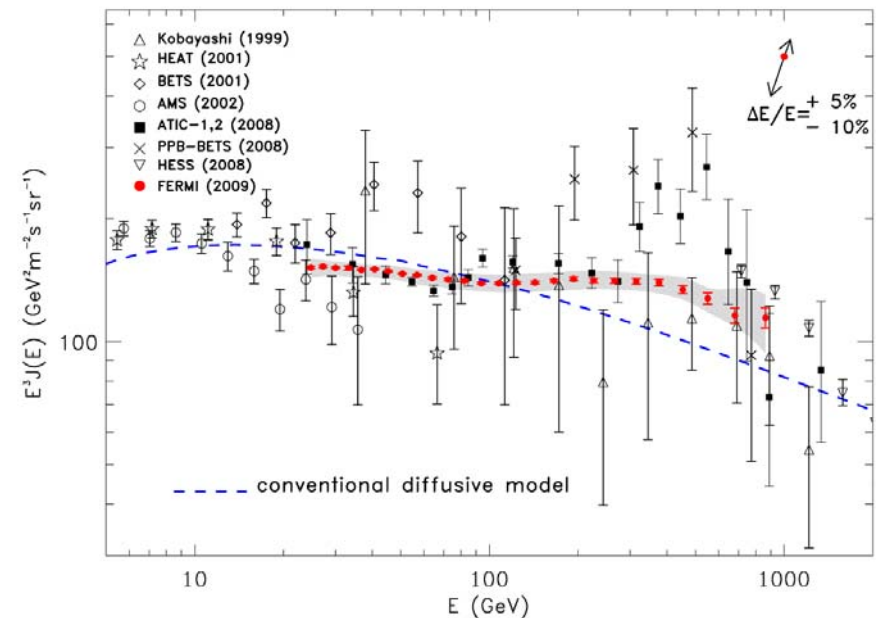
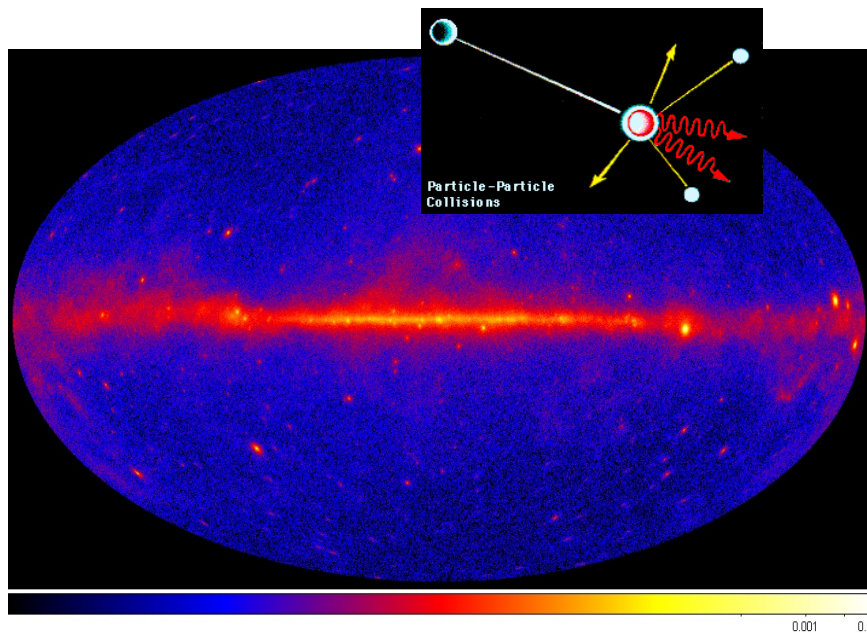


PMN 0948+022, Seyfert 1 galaxy (with narrow lines), not expected to host a jet.



NGC 1275  
Must have been inactive or much weaker 10 years ago

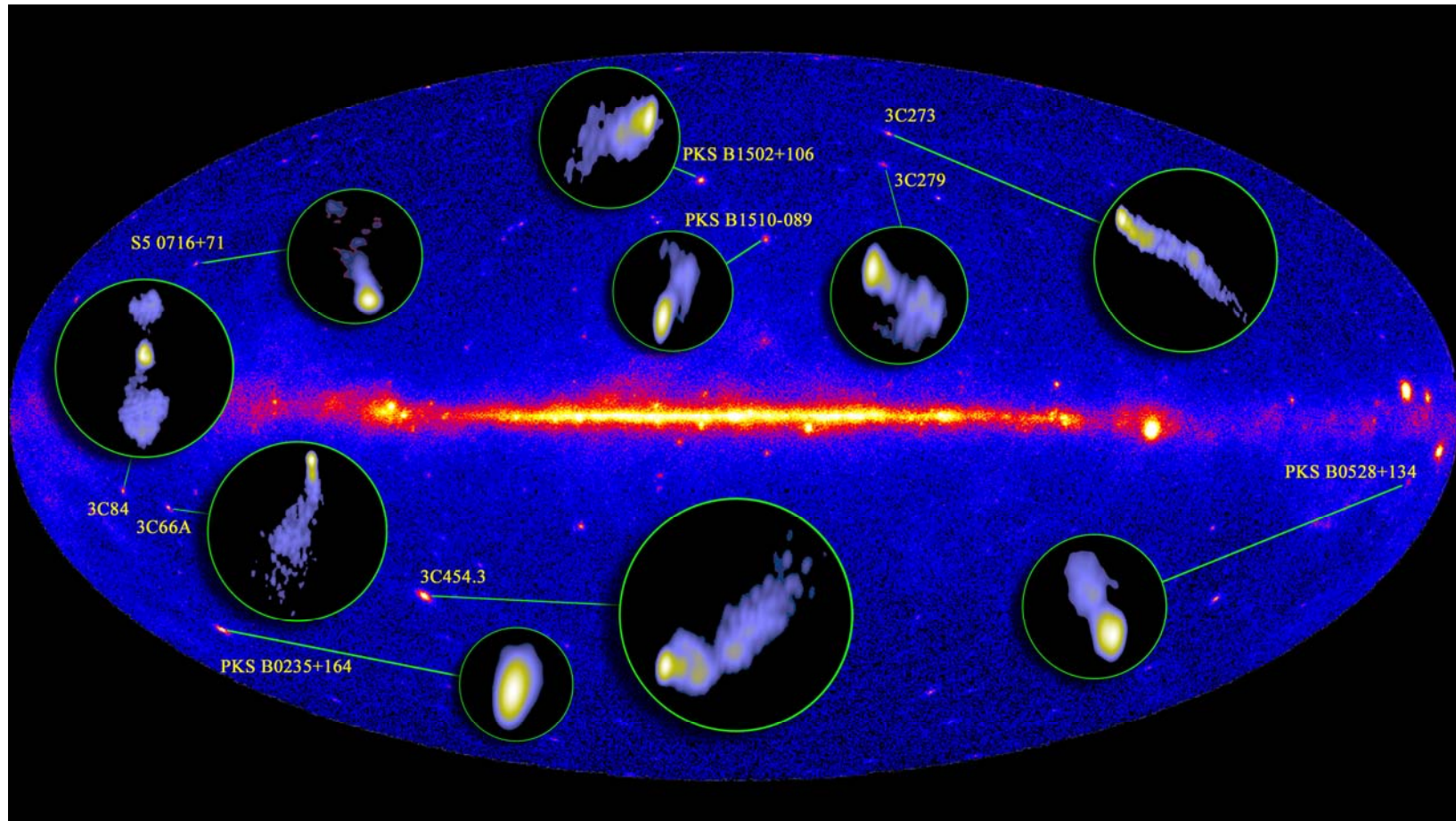
- **NASA's Fermi Explores High-energy "Space Invaders", May 4 2009.**
  - Described the Fermi-LAT observations of the electron spectrum



Means that there must be some nearby source/accelerator of electrons and positrons: leading candidates are pulsars or dark matter

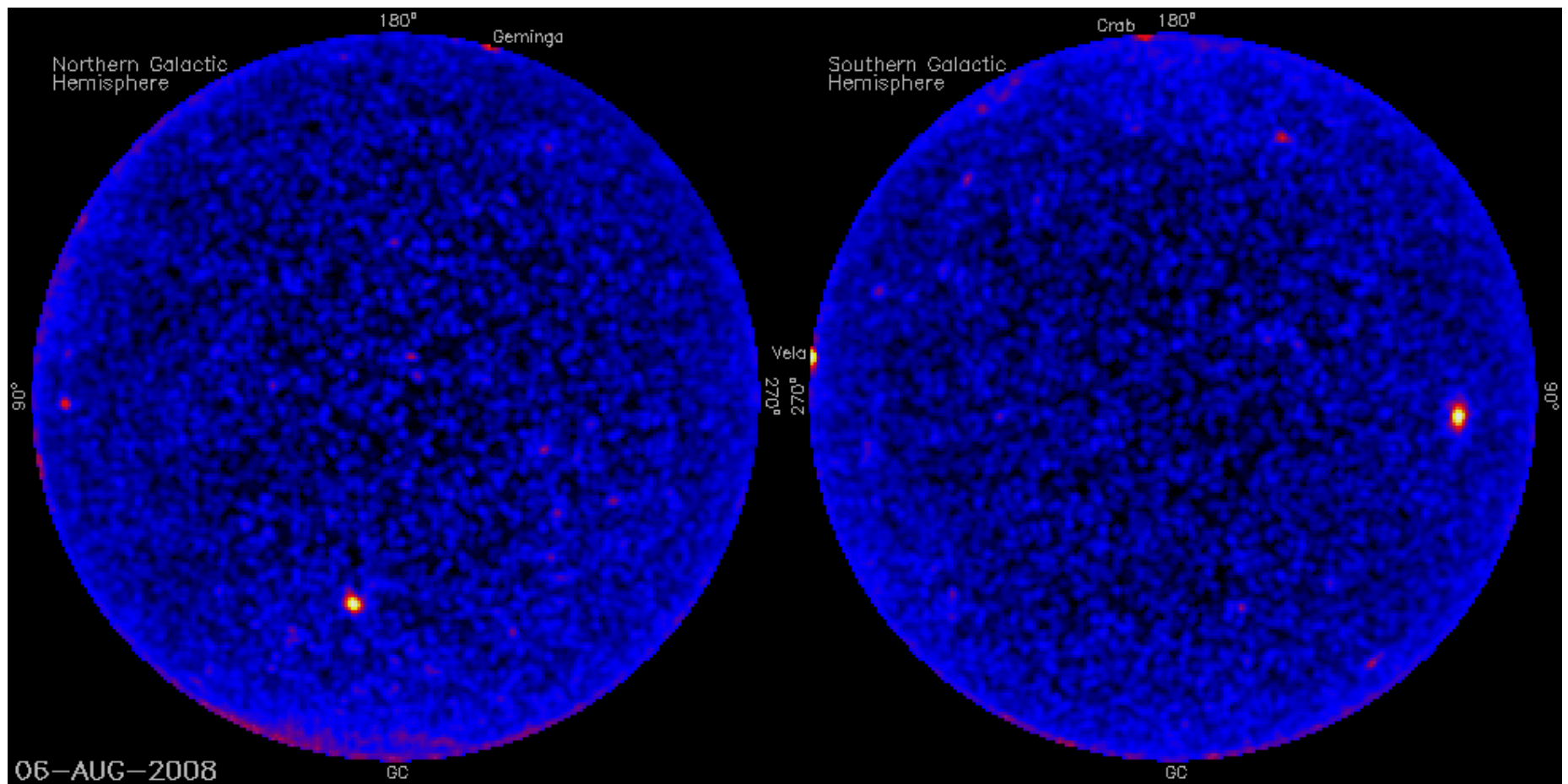
## Press/Web Releases

- **Fermi Active Galaxies Ready for Their Close-Up, April 22, 2009**

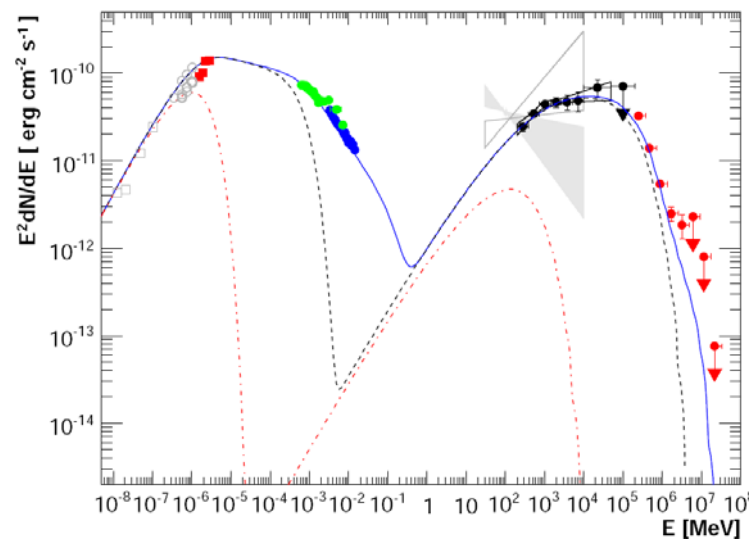


Time resolved radio images of Fermi active galaxies

- **Active Galaxies Flare and Fade in Fermi Telescope All-Sky Movie, April 3, 2009**



- **NASA's Fermi Mission, Namibia's HESS Telescopes Explore a Blazar, March 18, 2009**



Combining space and ground based gamma-ray data provides complete coverage of the gamma-ray band.



# Fermi Telescope Caps First Year With Glimpse of Space-Time

