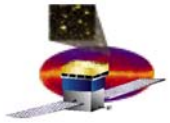


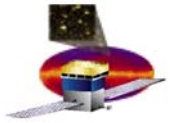
First meeting of the "Blazars and Other AGNs" Science Group

June 14, 2005

Proposition: Today's meeting devoted to a general overview + discussion of the Group activity
Future meetings will also include presentations, concerning general or specific aspects of this activity.

Today's topics:

- List of tasks assigned to the Group
- Current list of anticipated papers
- Blazar studies with the LAT (post-launch)
- Pre-launch activities
- Data Challenge 2
- Multiwavelength observations
- Future meetings: "face-to-face" right before the Collaboration Meeting (August 29-31)



Task list (P. Michelson)

The Science Group coordinators and the Groups are charged to:

(1) Organize and schedule regular meetings of the group and post the date and time for each meeting on the master calendar for the science groups. (Pat Nolan is a resource for doing this.). The scheduling of meetings should be driven by the active group members. The purpose of posting the time and date is to allow other collaboration Members to attend if they want to.

(2) Review the list of anticipated papers (Table 3 of attached document) and, with special attention to papers likely to be generated from data obtained during the first year of operation, update the list. Each group should do this. Also, identify any papers that the group can generate before launch.

(3) Develop a plan for group activities during the next year. This should include a schedule with detail that is sufficient to drive near term accomplishments (i.e. between now and the September Collaboration meeting.). At the September Collaboration meeting the coordinators should report to the whole collaboration on what has been accomplished by their group. These reports will be a regular agenda at future Collaboration meetings.

(4) Develop a science group web site for posting notes, minutes of meetings, reports, etc. The primary purpose of the group web sites are to facilitate exchange of information concerning ongoing work, to serve as an archive, and to be a reference for the Collaboration members who are not members of a particular science group to learn about the group's ongoing work and accomplishments. The web sites will serve to reinforce the principle that science activities are open to all collaboration Members

http://www.cenbg.in2p3.fr/ftp/astropart/glast/agn_group/agn.html
http://confluence.slac.stanford.edu/display/SCIGRPS/Blazars+and+Other+AGNs

Current list of anticipated papers regarding Blazars and other AGNs

Collaboration Working Group	Category I Papers	Category II Papers	Data Collection
Blazars & Other AGNs	Comprehensive paper on Blazar Obs.		year 1 and 5
	Measurement of EBL 1		year 1-2
	Detection/upper limits on radio galaxies		
	Detection/upper limits on radio-quiet galaxies		
		Obs. of 3C273	year 1
		Obs. of 3C279	year 1
		Obs. of Mkn 421	year 1
		Measurement of EBL 2	year 5
		Many papers on individual sources	
		VLBA Survey of GLAST Blazars	

Blazar studies with the LAT

Post-launch activities, 1 year and beyond

1. Blazar catalog, sample definition

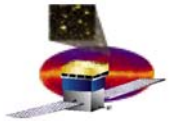
Once the list of GLAST sources is available, three steps are foreseen:
a) A source subset will readily be associated with known sources (e.g. blazars from existig catalogs);
b) Some new GLAST sources will be identified via cross-correlation with radio, X-ray... catalogs. The candidate optical counterparts will be observed. The spectroscopy will confirm their identity as a blazar, and lead to the redshift and luminosity determination.
c) Some information about the blazar contents of the remaining subset can be obtained by statistical studies.

2. Gamma-ray statistical properties of the samples

Once the sample is properly defined, and the sky coverage is calculated, the following statistical properties can be determined for the different populations :

- LogN-LogS
- Redshift distributions
- Luminosity function
- Cosmological evolution

In addition to BL Lacs and FSRQs, two other types of AGNs will be specifically studied:
- Bright radio-galaxies (e.g. CenA, M87, PictorA...);
- Radio-quiet AGNs (upper limits will be set in case of no detection).



3. General properties of GLAST-detected blazars

General properties and spectral parameters will be studied as a function of redshift and of other parameters, for instance:
- spectral index;
- spectral cutoffs;
- luminosity and spectral variability
- duty cycle…

Standard and more complex models (e.g. Synchrotron Self-Compton (SSC) external Compton etc..) will be used to constrain physical parameters using the Spectral Energy Distributions (SED).

4. Specific Properties of Individual Source (Which ones?)

Several correlations will be studied as a function of time for the flaring blazars:
- Epeak vs Flux;
- Epeak vs Index;
- Index vs Flux.

Multiwavelength campaigns will allow time lags, correlations of fluxes and other parameters for different bands to be measured.

5. Extragalactic Infrared-UV Background Light

The EBL density will be estimated from the evolution of the SED high-energy cutoffs with redshift.

6. Contribution to calibration

Pre-launch activities

1. "Outreach"

Production of a set of figures illustrating the expected LAT performance in the context of AGN Science (see below)

2. Pre-launch studies ("Demonstration of readiness")

The post-launch studies should be prepared by means of simulations. Data Challenges will serve this purpose but complementary work will be needed as well.
Production of technical notes and publications. A least one paper per topic:

- Blazar catalog+sample definition
- Gamma-ray statistical properties of the samples,
- General properties of GLAST-detected blazars,
- Specific Properties of Individual Source,
- Extragalactic Infrared-UV Background Light

3. Modeling - Simulations

The simulation tools must be developed/reviewed/improved as required. Different ingredients are needed:

- luminosity functions;
- EBL estimates;
- "realistic" light curves of flaring blazars…

In addition, the capability of comparing the observed SEDs with standard model predictions should be developed.

4. Specific Analysis Tools for Blazars: variable source detection, spectral variability analysis…

5. Production of catalogs (see Multiwavelength observations)

Data Challenge 2

When: January-March (?) 2006

What: One-month worth of LAT data, whose contents will not be disclosed until the close-out meeting.

Blazars will be flaring, their positions in the sky will be realistic,
EBL attenuation will be included…
Inclusion of a well-defined sample in another energy band (?)

DC2 represents a good opportunity to establish where we stand in terms of simulation tools, analysis tools, modeling tools, degree of coordination, manpower…

Preparation meeting: June 27-29, GSFC (Julie McEnery)
"This will be a face-to-face meeting primarily for those preparing for DC2. The workshop will cover topics in simulation and data analysis which relate to DC2 including things like detector simulation, reconstruction, event classification, source modeling, high level science analysis and data servers."

Extended Science Tool checkout: starting at Collaboration meeting, August 29-31

Multiwavelength activities

The recommendations given in the Report of the Ad Hoc Multiwavelength Observation Planning Group concerning Blazars are:

- Complete a southern hemisphere catalog of flat-spectrum radio sources out to 8.4 Ghz or higher frequencies, at least down to 100 mJy, and preferably to 30 mJy.

- Complete a program of optical identifications and redshift measurements for all known flat-spectrum radio sources brighter than 100 mJy at 8 GHz.

- Plan coordinated proposals with optical and radio observatories for follow-on observations of LAT sources.

- The LAT blazar program should collaborate with existing blazar study groups wherever possible, for both Target of Opportunity campaigns and preplanned MW campaigns.

Peter Michelson will work with Dave Thompson to form a MW coordination group. There will probably be at least one knowledgeable (with regard to observational issues) person from each science group.

Multiwavelength activities

1. Production of new Catalogs and Reference Data (prior to launch)

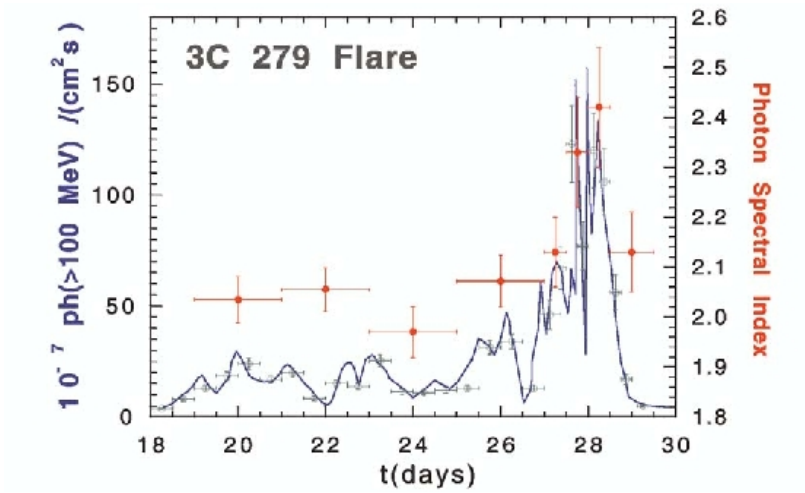
On-going activities:
- at Stanford: Roger Romani at al.
- at ASI: Paolo Giommi et al.

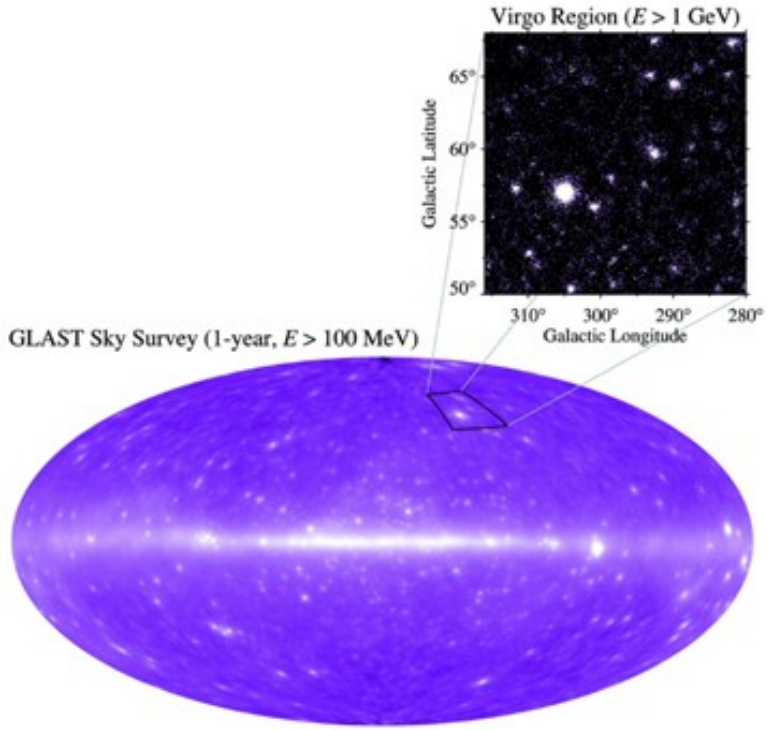
- VLBA Imaging and Polarimetry Survey proposed to obtain a set of reference images for 1000 potential LAT sources in advance of GLAST launch

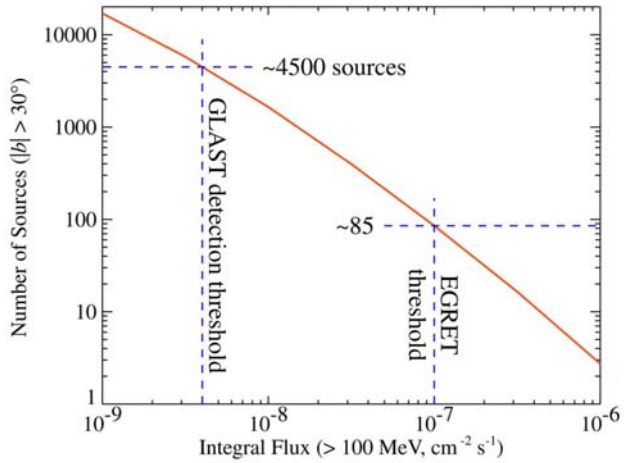
2. Monitoring - Coordinated Multiwavelength Campaigns

- VLA monitoring for a large sample of flat-spectrum, compact sources
- optical monitoring by e.g.:
  - the Whole Earth Blazar Telescope (WEBT)
  - the Global Telescope Network (GTN)…
- X-ray missions: Swift, Chandra, XMM, MAXI, NuStar, EXIST…
- Cherenkov Telescopes: Hess, Magic, Veritas, Cangaroo…

A few existing figures illustrating the LAT capabilities with respect to Blazar Science…







Future meetings

Next Group meeting: July 1st (?)

Collaboration meeting (SLAC): August 29-31, 2005

Blazar Science Group “face-to-face” meeting (SLAC): August 28 (?)

DC2 preparation meeting (GSFC): June 27-29, 2005

“Extended Science Tool ckeck-out”: starting at the Collaboration Meeting