Fermi Gamma-ray Space Telescope

Analysis Coordinators' Report

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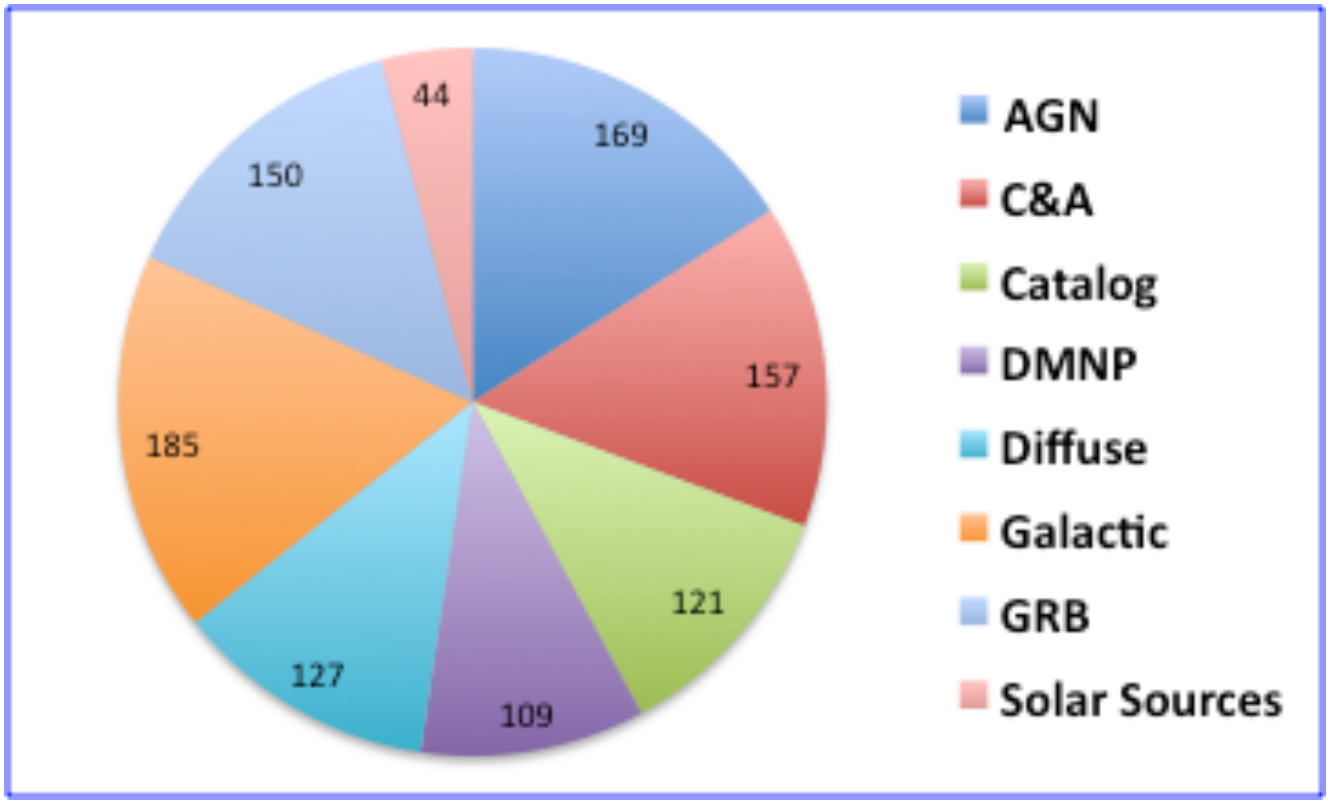
Outline

- Scientific organization and collaboration service
- Internal and external data release plans
  - Standard photon classes
  - LAT Low Energy (LLE)
- Recent highlights
  - “Pass 7” event analysis
  - 2 Year catalogs
- Conclusions

Our Collaboration



Total: 472 members

Collaboration Science Groups Activities

- Definition of photon classes
- Catalogs, Diffuse Models, Software tools
- Science (Peter's talks)
- L1, Data Monitoring, Flares, GRBs Shifts
- Data Analysis
- Internal documentations, web pages

Internal and external data release plans

IRF Set	Details	Blessed for LAT Use	Public Release Date
P6_V3	Post-launch, includes overlays	2008	August 2009
P6_V11	Includes in flight corrections	March 2011 Used for several symposium contributions	May 2011
P7	Pass 7 Event Analysis Includes in flight corrections	April 2011 Used For 2FGL and some related contributions	Expected July 2011

Transition period from Pass 6 to Pass 7 reflects complicated analysis dependencies
(Event Selection -> Diffuse Models + Catalog -> Point Source Analysis)

Many analysis were done with best pass 6 IRFs so as to be ready in time for symposium

Time between internal release and public release dominated by time to perform and publish first analyses and time in transferring software and documentation to Fermi Science Support Center (FSSC)

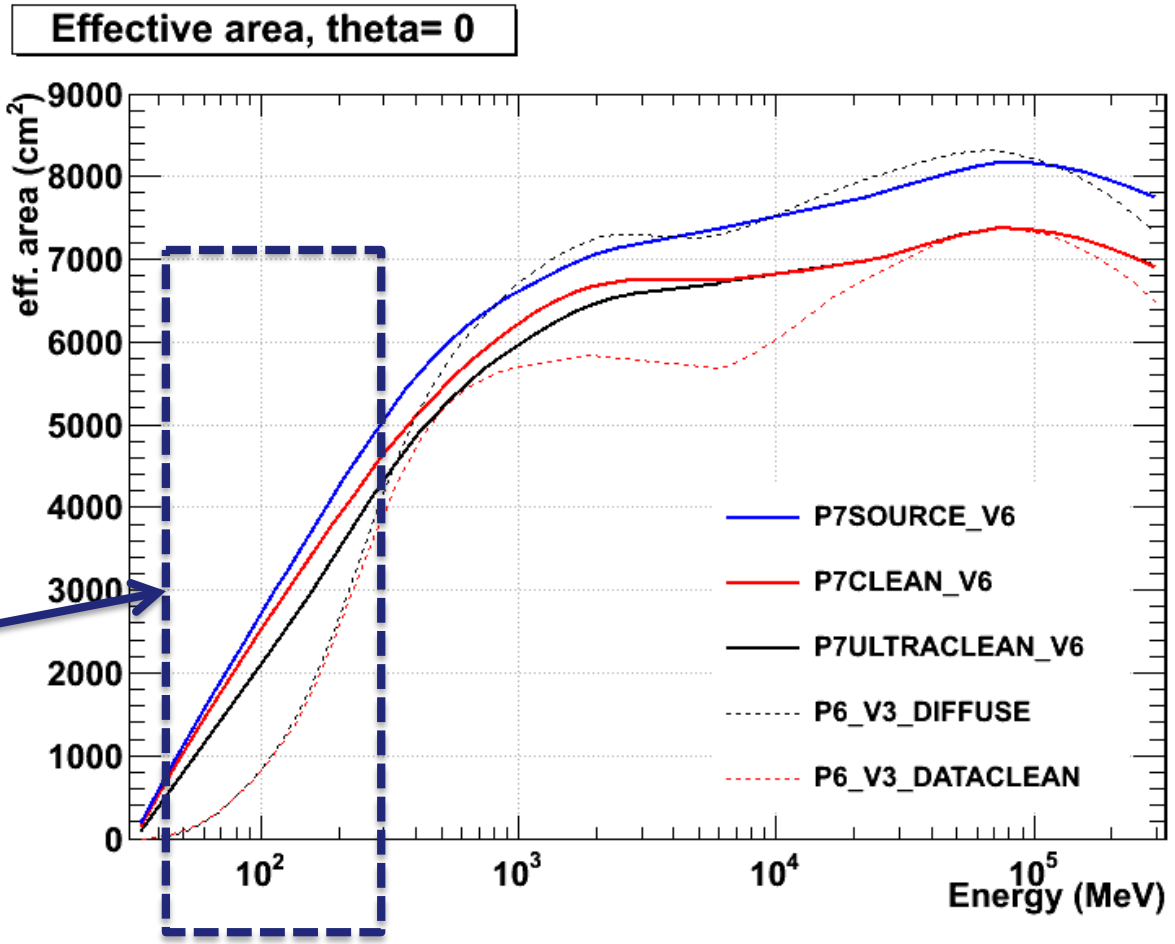
"Pass 7" event analysis

Pass 7 is first version of event analysis to use knowledge from flight data

Compensates for pile-up in electronics from cosmic-ray backgrounds

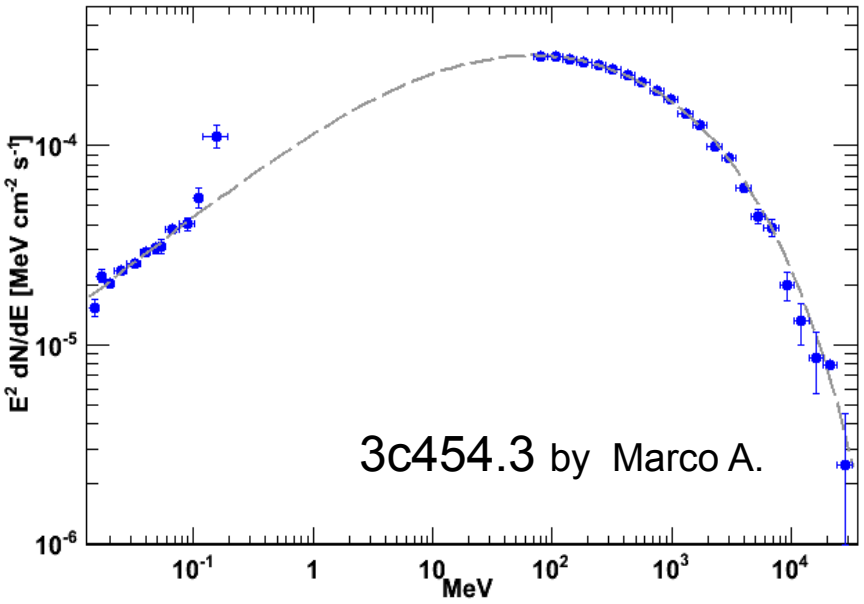
Many times more A_{eff} below 300 MeV

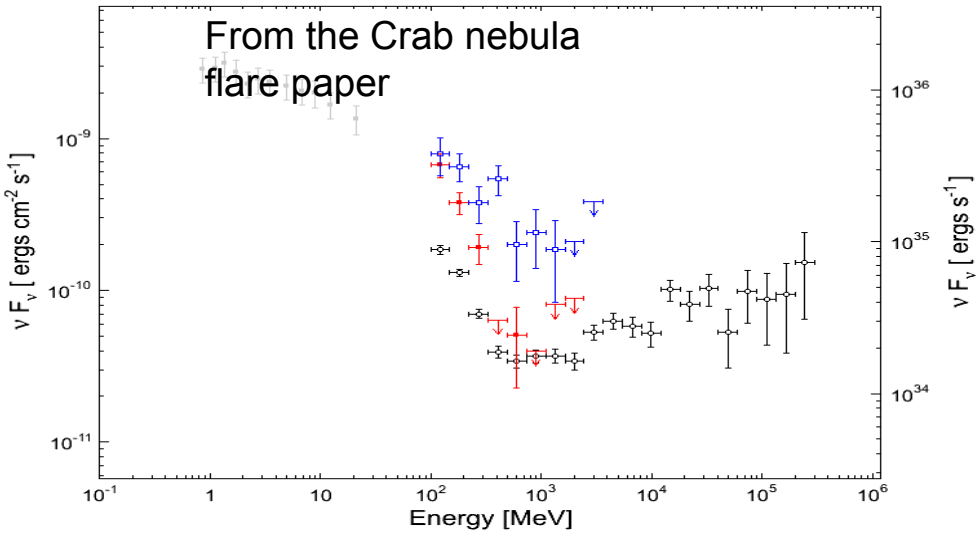
A_{eff} curve is less steep, better for spectral analysis



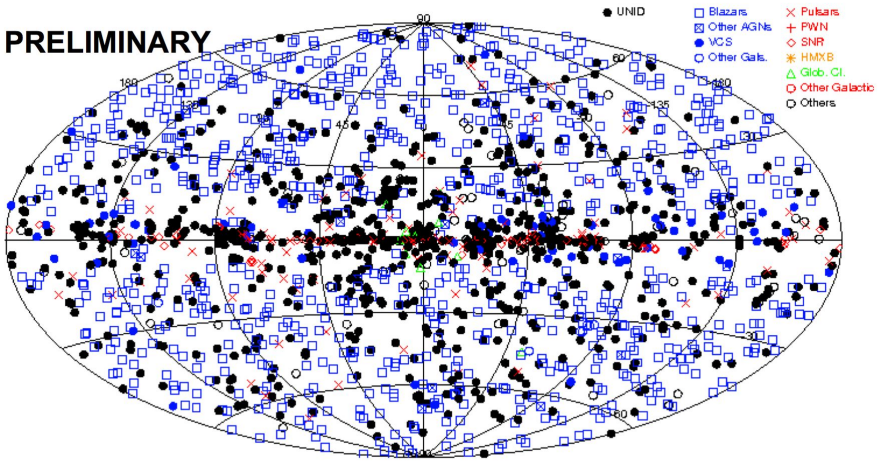
Pass 7 and the E<200 MeV region

- AGNs
  - Define the Peak of the IC component
- Galactic Sources
  - Many. ie, Crab
- GRBs & Solar flares
  - LLE analysis (see Nicola talks) P7 extended classes
- Solar
  - Lunar emission
- DMNP
  - DM Dwarfs, Dm Spher.
- Diffuse emission
- Extragalactic background
  - Starbursts vs AGNs

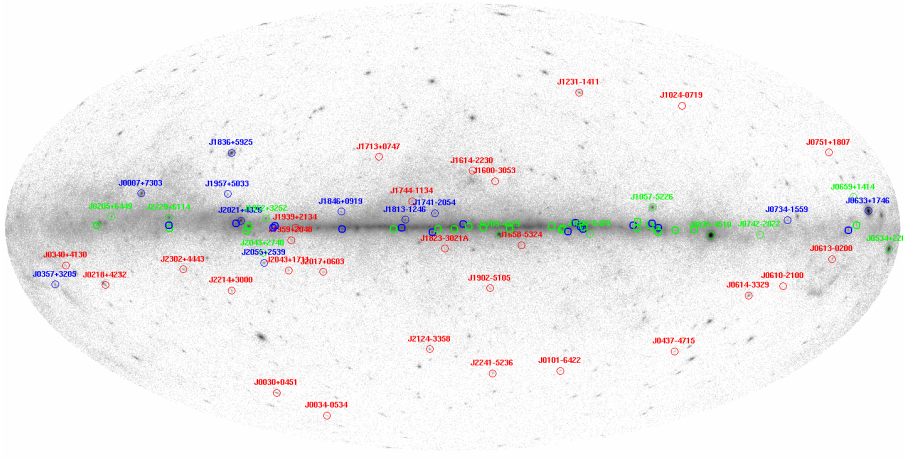




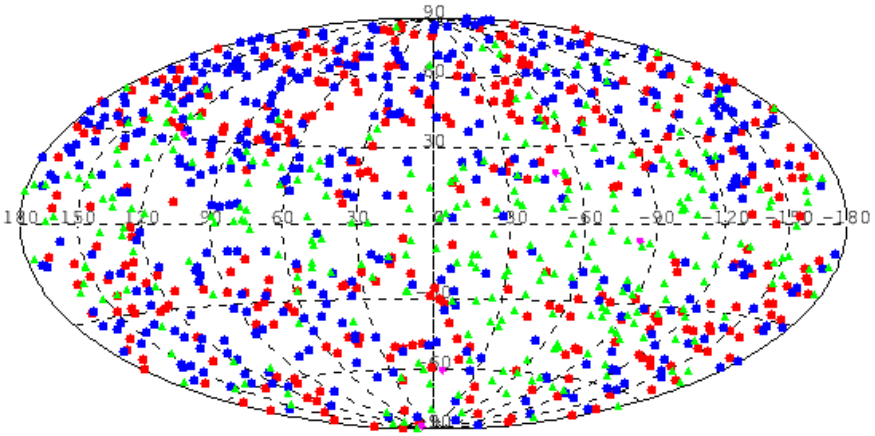
2FGL and Other Catalogs



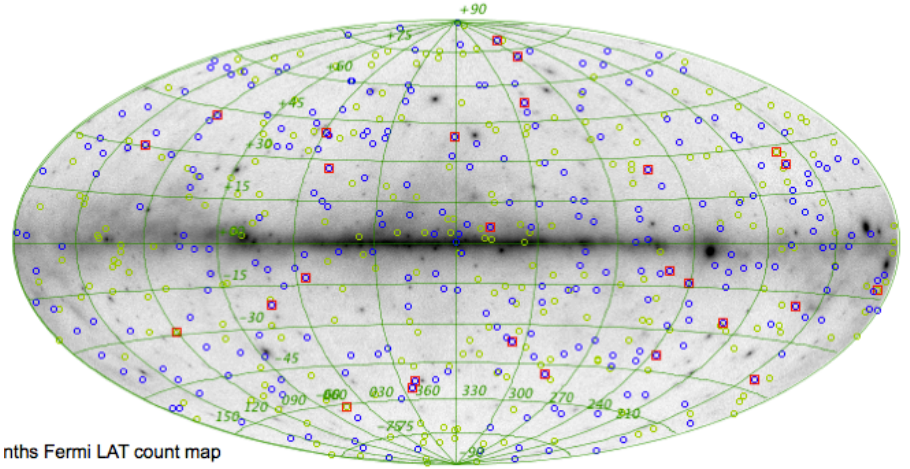
2FGL Catalog



2nd Pulsar Catalog



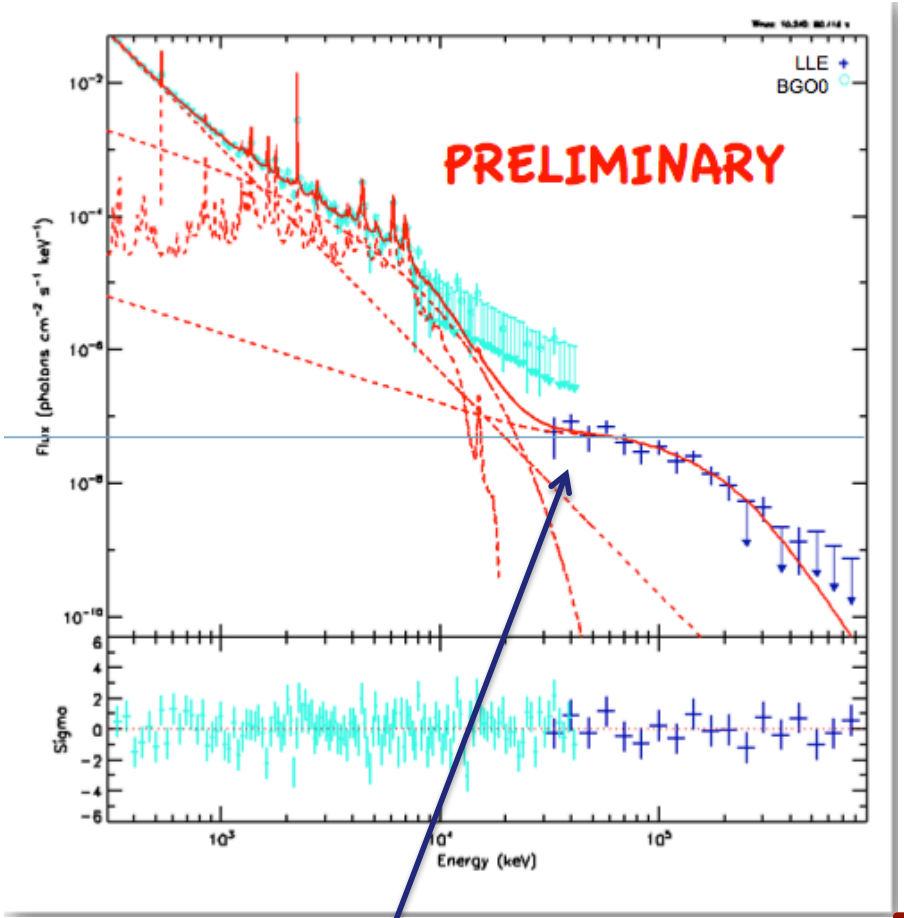
2 LAT AGN Catalog



GRB Catalog

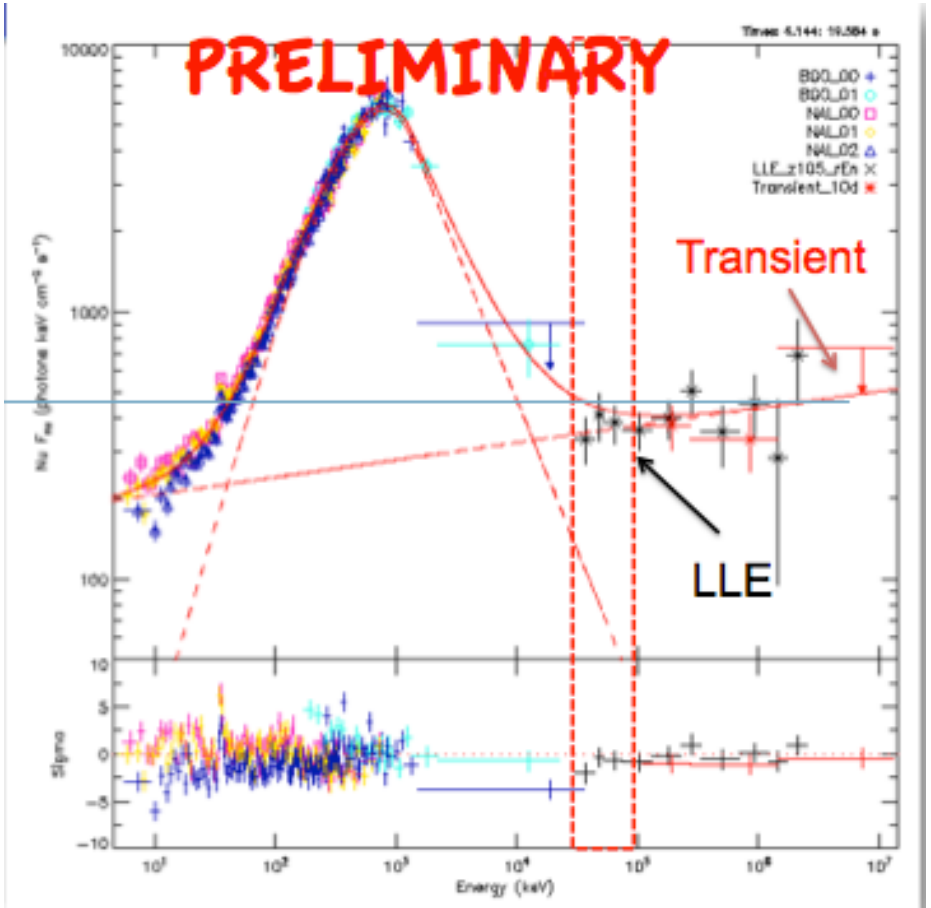
LAT Low Energy (LLE) analysis

SOL2010-06-12T00:57 M2 X-ray Flare



Lots of A_{eff} at energies below reach of standard event classes

GRB 090902B



Too much data to export it via FSSC
LAT team is developing burst data products akin to GBM products to export for LLE
Public release later this year

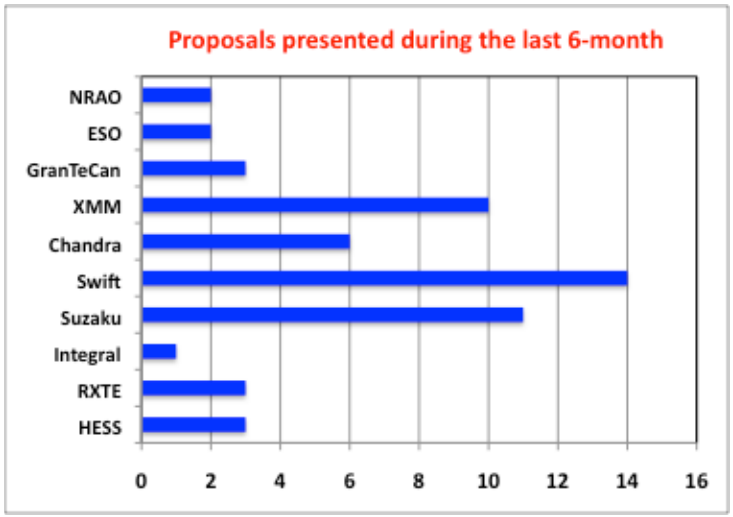
Multi-wavelength activities

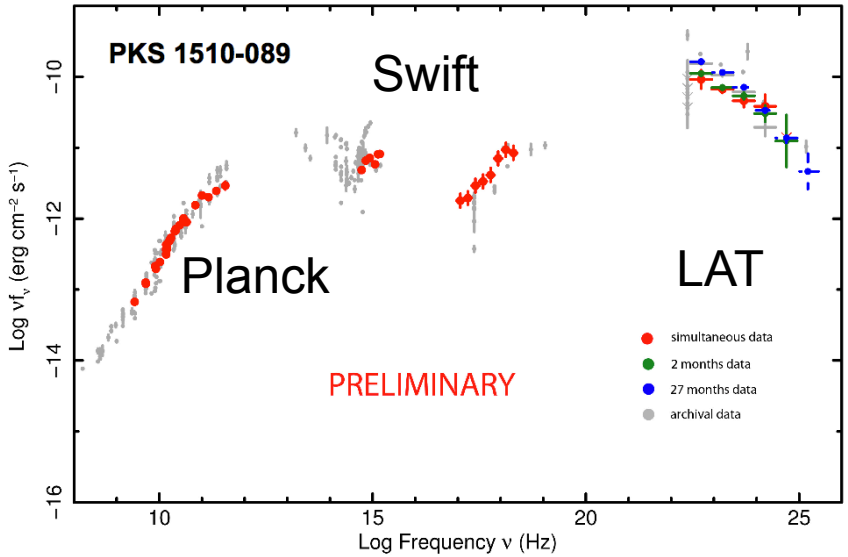
- **Increasing number of common projects with HESS,VERITAS, MAGIC**

https://confluence.slac.stanford.edu/display/SCIGRPS/Multiwavelength+Planning+-+Short+Term

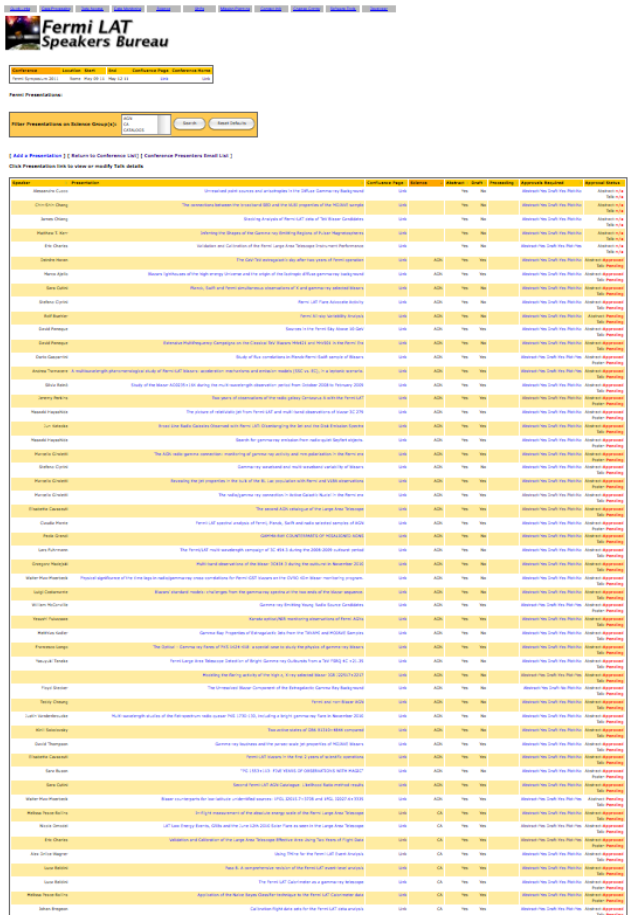
Source Name	Impact
PKS 1424+240	Yes, based on BSL
RBS 0413	No, was already a TeV target
VER J0521+211	Yes, VERITAS made their own sky map
1ES 0502+675	Yes, based on BSL
1ES 0414+009	No, but consulted Fermi
PKS 0447-439	Yes, based on BSL
IC 310	Yes, Neronov analysis of Fermi data
VER J0648+152	Yes, TeV candidate source list
PKS 1510-089	Yes, Fermi ATel for flare?
4C +21.35	Yes, Neronov Fermi ATel...
AP Lib	Yes, based on BLS

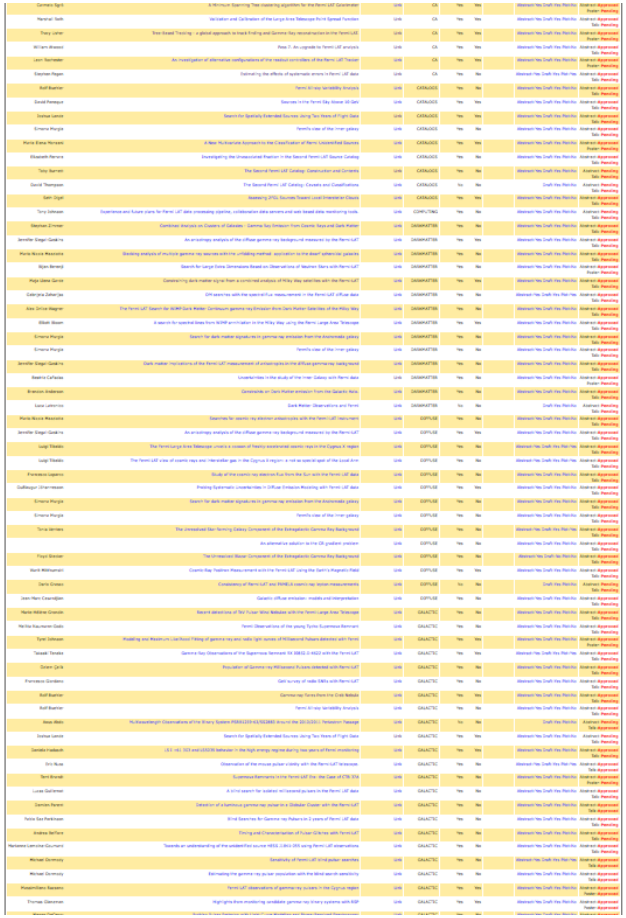
Source Name	Impact
AP Lib	Yes, based on BLS
MAGIC J2001+435	Yes, TeV candidate source list
1ES 1440+122	No, was already a TeV target
NGC 1275	Yes, based Fermi ATel for flare
B3 2247+381	Yes, TeV candidate source list
HESS J1943+213	No, Detected in H.E.S.S. galactic scan
SHBL J001355.9-185406	No, was already a TeV target
1ES 1312-423	No, H.E.S.S. serendipitous discovery near Cen A
1RXS J101015.9-311909	No, was already a TeV target
1ES 1215+303	Yes, TeV candidate source list

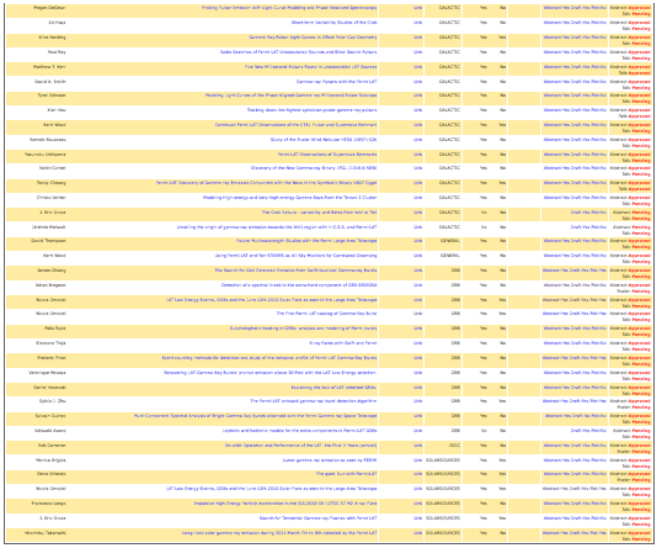




Over 150 LAT Team Contributions


Fermi LAT Speakers Bureau

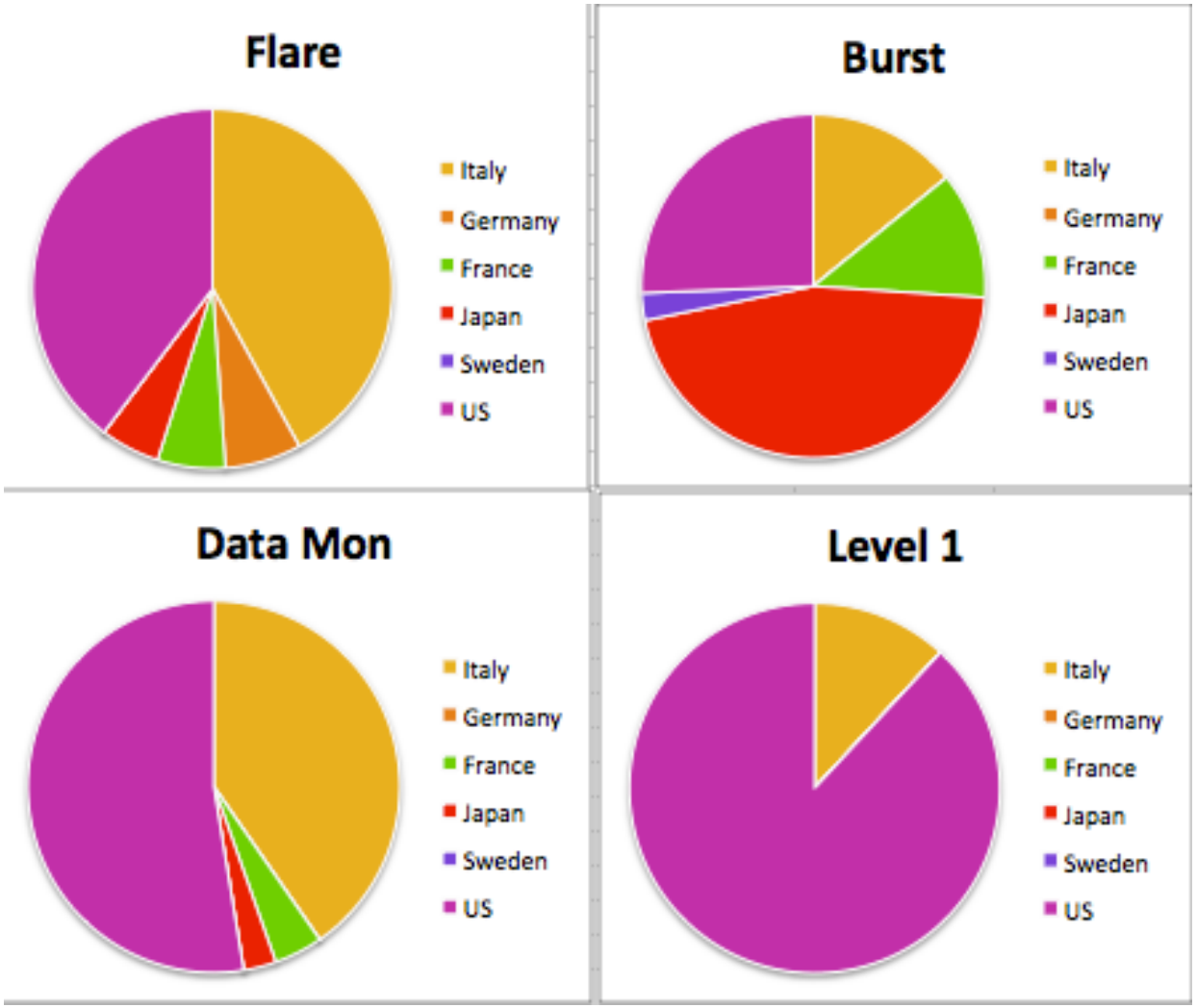




Snapshot of Speakers' Bureau Web Page for Fermi Symp. 2011

Writing, reviewing and iterating all of these contributions would have been impossible without dedicated and tireless work of science groups lead and numerous collaborators who served as internal reviews

Shift Taking Status



Flare Advocate Shifts

Burst Advocate Shifts

Data Monitoring Shifts

L1 Pipeline Shifts

Internal Documentation and Web pages

- Efficient transfer of information a challenges for large collaborations
- Ongoing revision of all web site.

  - **Single login for all sites**
    - **Confluence, glast-ground sites, Pub Board, ...**

- New Standard analysis documentation page and Workbook update

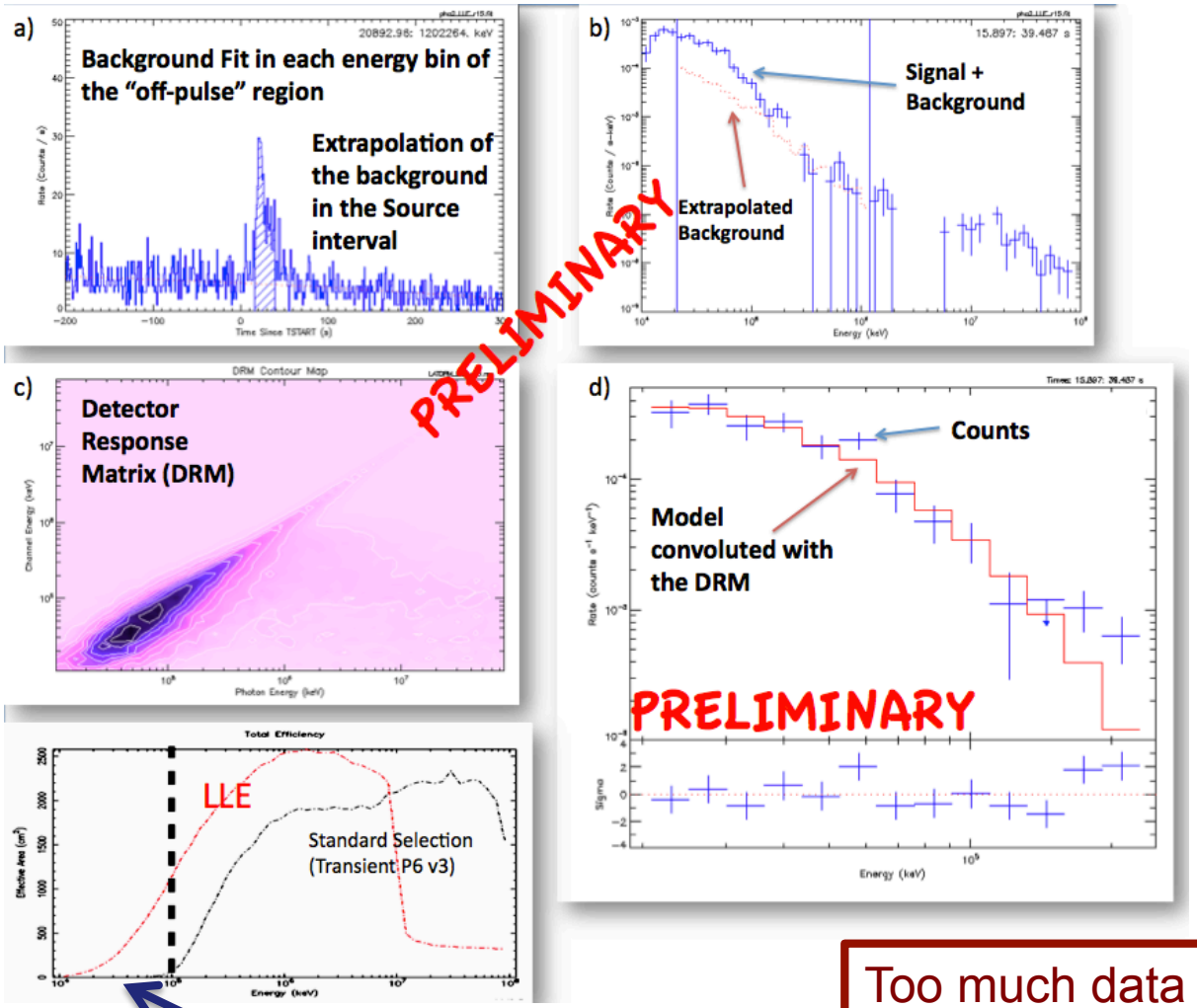
- Evaluating the possibilities to have Web based LAT data analysis

- **Two days "Hands-on" LAT Analysis and shift training for new young members at the Collaboration Meeting and not only:**
  The first "Hands-on" will be held at SLAC the week before the next Collaboration meeting in August .

Conclusions

- Organizationally, the 8 collaboration science working groups are inter-connected via common needs, cross-group membership, and collaboration service work
  - Their effectiveness in organizing a tremendous number of contributions for this symposium is a proof by example
- The collaboration has been effective in publishing papers, including a number of “high-impact” and catalog works
- We continue to build on past results

LAT Low Energy (LLE) analysis



The LAT Low Energy (LLE) analysis use an extremely loose event selection (~70% of all downlinked events) and depends on temporal sidebands to perform background subtraction

For bright transients the huge increase in A_{eff} more that compensates for the increased background

Lots of A_{eff} at energies below reach of standard event classes

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