Goals for DC2

1. Blazar catalog, sample definition

Source Identification in collaboration with the Catalog Group (Jürgen Knödlseder)

2. Gamma-ray statistical properties of the samples

- LogN-LogS, redshift distributions, luminosity function
- population studies: BL Lacs and FSRQs, bright radio galaxies, radio_quiet galaxies

Contribution to Extragalactic Diffuse Background?

3. General properties of GLAST-detected blazars

- spectral index
- spectral cutoffs
- luminosity and spectral variability (flux maps)
- duty cycle…

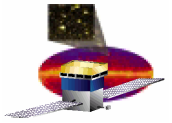
4. Specific Properties of Individual Sources

For the brightest sources: spectral evolution with time, flux
detailed spectra (cutoff, curvature)
non-simultaneous SEDs

5. Extragalactic Background Light

Rough estimate of EBL density (if enough bright, high-redshift, hard sources…)

6. Search for other Transients



Identification:

• Blazars: list of flat-spectrum radio sources (to be established before the kickoff) to be compared with the list of sources released by the catalog group?

• Radio galaxies: SLOAN survey?

Bright sources will be suitable to detailed spectral studies:
what minimum flux (i.e.how many photons) is necessary for a given study?

Use of binned analysis? Several hundreds sources above sensitivity threshold

"Quick look" :

- **simple tool based on 1-day long intensity maps**
- **provides simple variability information, a telltale about Blazar nature of a source**
- **will also provide a "sanity check"**
- **can be used for transient search**

Technicalities

Get ready before the kickoff (documentation, installation, Checkout 3 data set)

Confluence pages will be set up to share information with the rest of the collaboration

Other confluence pages more specific to our studies:
important to post information quickly for reference to others

A set of full-sky, exposure maps will be provided enabling intensity maps to be created.

Detailed maps of Galactic Diffuse Background, convolved with the IRFs will be provided, to be subtracted from the data.

Problem with your local environment? Consider testing your jobs on the SLAC farm.

"Quick-look" variability analysis

http://confluence.slac.stanford.edu/pages/viewpage.action?pageId=9189

- **Exposure maps are generated for one-day long time periods, for photon with E>100 MeV (exposure_map tool)**

- **Count maps are generated for the same time periods (1 deg.-wide pixels).**

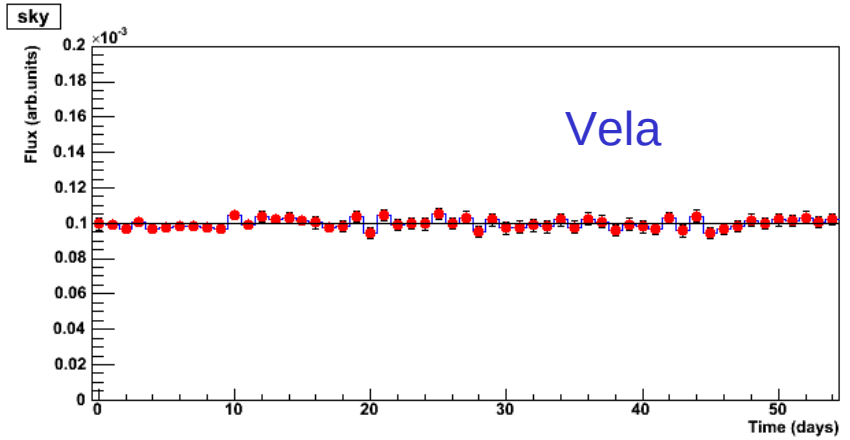
- **For a given source, the source flux for a given day is estimated as follows:**
  - **the number of photons is integrated over the pixels surrounding the source position within a fixed 2 degree radius, regardless of the photon spectral index.**
  - **this number of photon is divided by the exposure at the source position;**
  - **the resulting flux is corrected for the averaged contributions of both the galactic and extragalactic (isotropic) diffuse backgrounds. Using the Checkout 3 data set, the latter were evaluated from the maps generated with a cut on the appropriate source ID parameter present in the FT1 data.**
  - **the chi-square of the flux distribution is calculated.**

The spectral dependence must more properly handled.
This will all become much easier with the future "intensity-map" tool

Correction for exposure

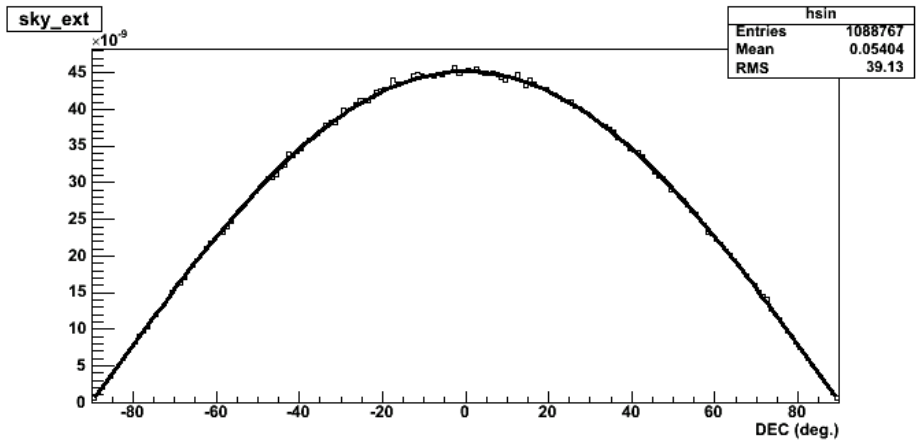
Checks that exposure correction is OK (SAA, coordinate system)

Flux for Vela is constant as a function of time

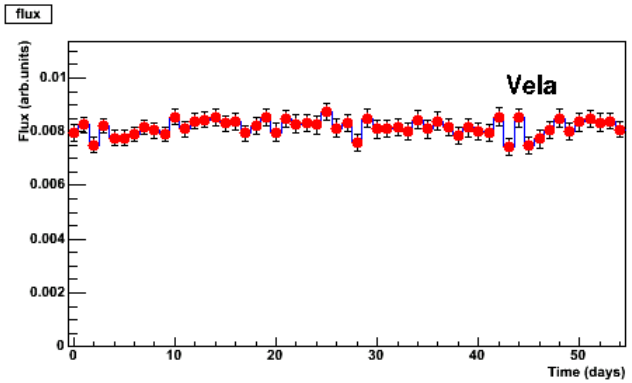


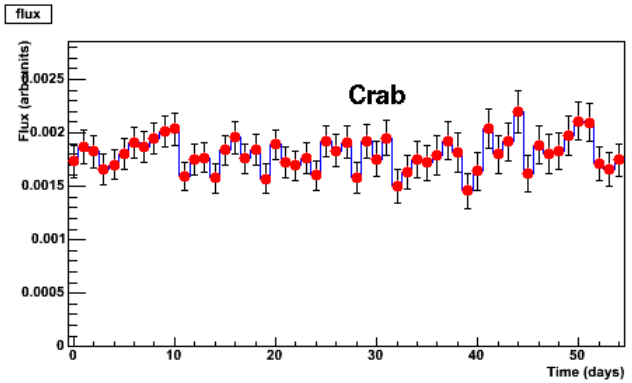
Flux of extragalactic diffuse background is isotropic

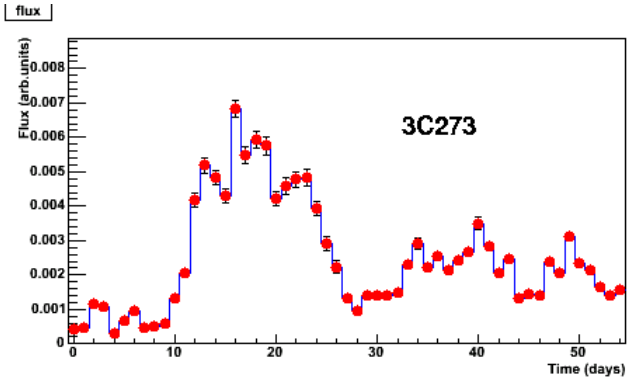
$dF/d\theta_{DEC} \;\alpha\; \cos(\theta_{DEC})$

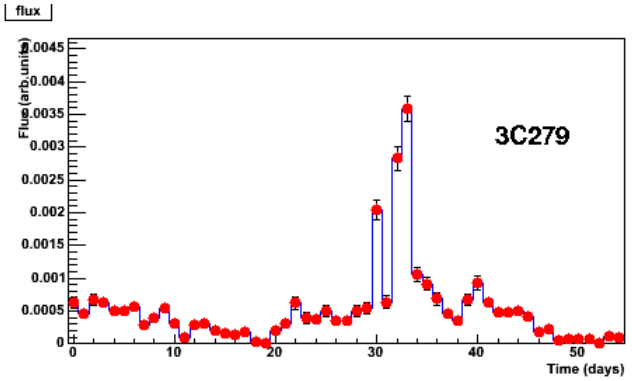


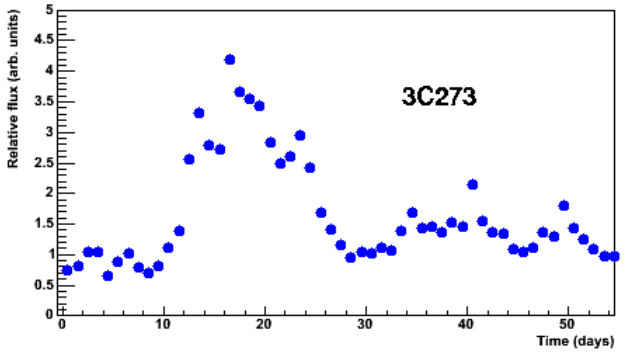
Light curves

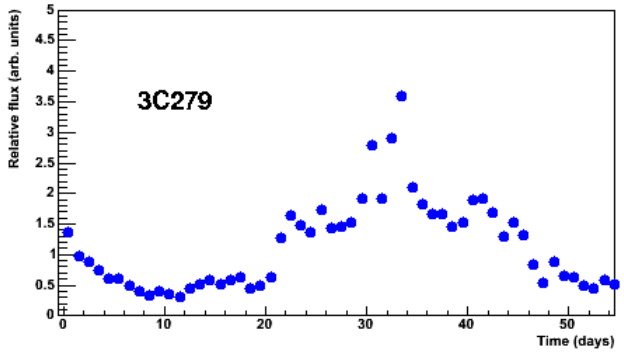






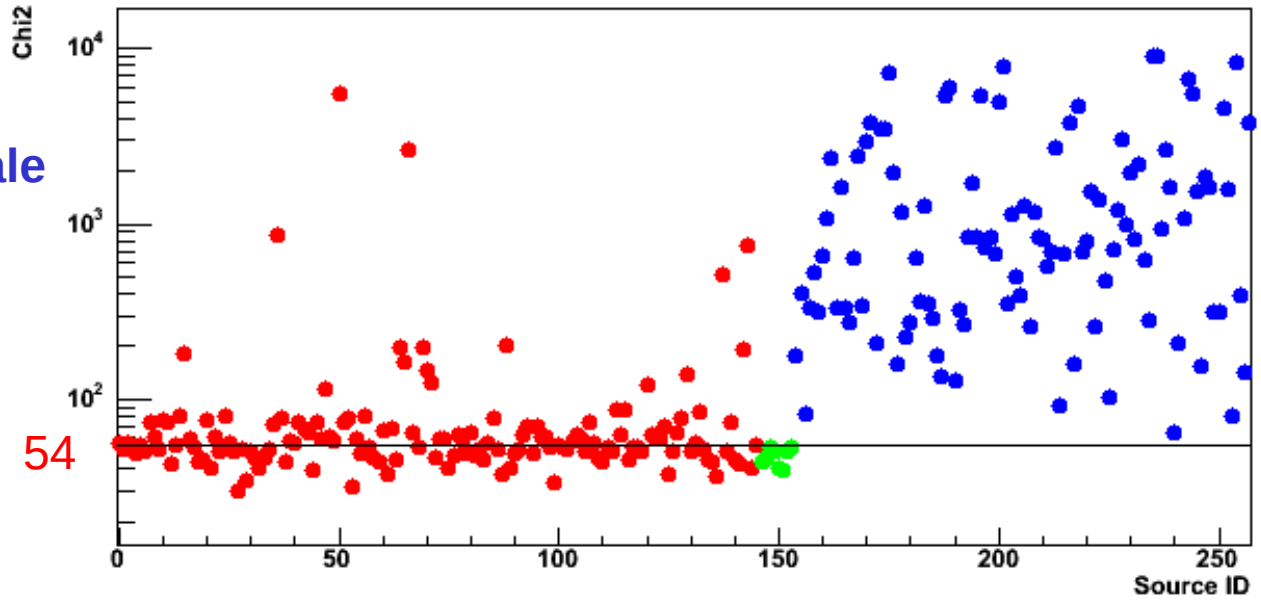






“Variability index”

Log. scale



54

red: non-variable, non-identified sources
green : pulsars
blue: blazars