An open catalog for TeV gamma-ray astronomy

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Abstract.
The first cosmic TeV gamma-ray source detected from the ground was the Crab nebula in 1989. Since then, TeV astronomy has seen rapid growth. By now, over 160 sources have been detected. Measurements of source position, morphology, spectrum and sometimes lightcurves have been published, mostly in individual papers. Often the source parameters are not given in a machine-readable format, and even if they are, there is no common data format.

We present an effort to collect the available data on TeV sources, and curate it into an as-uniform and as-complete as possible form, and have it freely available for download at `https://github.com/gammapy/gamma-cat`. This poster presents the project idea and status, as well as its technical implementation, which includes YAML, ECSV, JSON and FITS files and Python scripts using Gammapy (`http://gammapy.org`), and several other Python packages. A web front-end to browse this TeV source catalog and other gamma-ray and multi-wavelength data is under development at `http://gamma-sky.net`.

1. Introduction

Multi-mission analysis with Sherpa (Freeman et al. 2001)

Other projects:

- Guillochon et al. (2016) and `https://astrocats.space/`
- Carosi et al. (2015) and `http://www.asdc.asi.it/tgevcat/`
- Wakely & Horan (2008) and `http://tevcat.uchicago.edu/`

Data:

- Open gamma formats: Deil et al. (2016) and `http://gamma-astro-data-formats.readthedocs.io/`
- Lightcurves: Tluczykont et al. (2010) and `https://astro.desy.de/gamma_astronomy/magic/projects/light_curve_archive/`

- H.E.S.S. data: `http://hess.obspm.fr/` and `https://www.mpi-hd.mpg.de/hfm/HESS/pages/home/sources/`
- VERITAS data: `http://veritas.sao.arizona.edu/veritas-science/veritas-results-mainmenu`
- MAGIC data: `http://vobs.magic.pic.es/fits/`

Tools:

- PyYAML: `http://pyyaml.org/`
- Astropy: Astropy Collaboration (2013)
- Gammapy: Donath et al. (2015)
- `https://github.com/andycasey/ads`

TeV sources, see Figure 1.

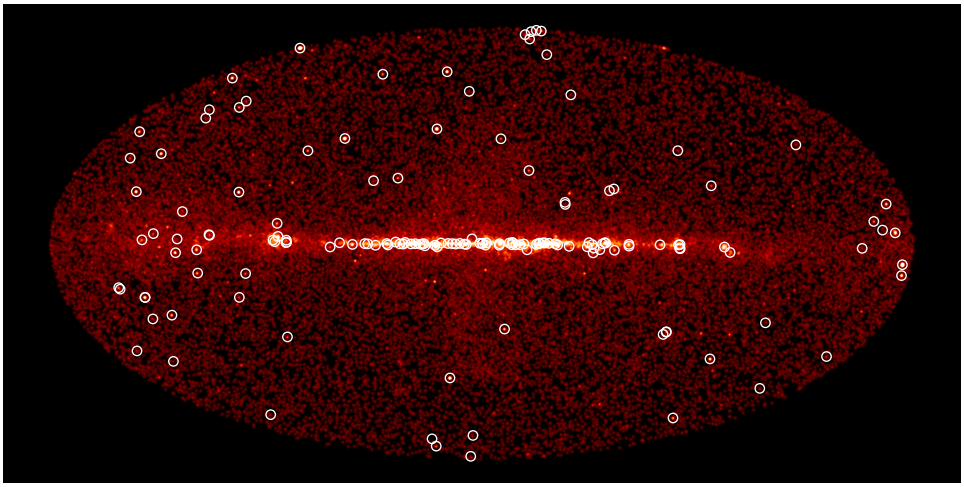

Figure 1. TeV sources (using 2FHL Fermi-LAT high-energy image as background).

2. Usage

tbd

3. Implementation

tbd

4. Examples

4.1. Spectra

Example spectrum, see Figure 2.

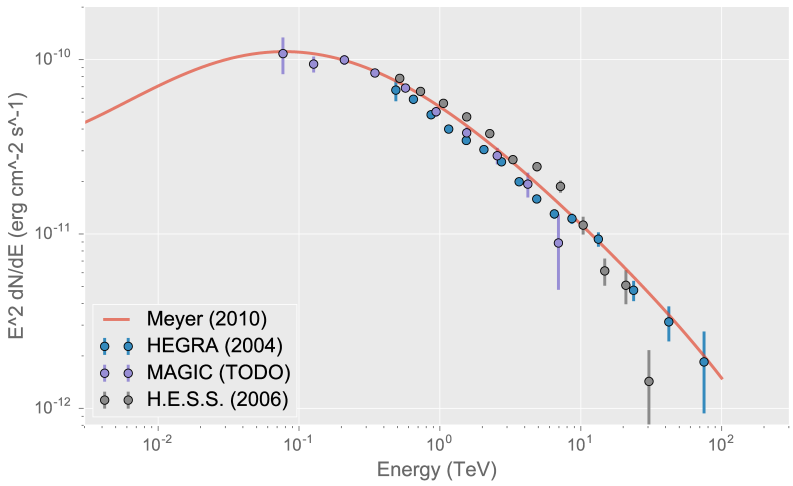

Figure 2. Spectrum example. Crab nebula.

4.2. Light curves

Example lightcurve, see Figure 3.

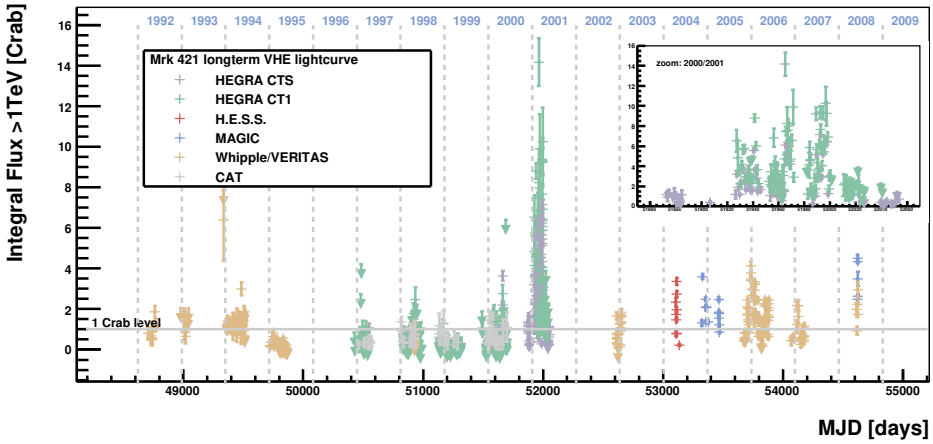

Figure 3. Lightcurve example. Mrk 421. Figure from Tluczykont et al. (2010). Data not yet available in gamma-cat.

5. Conclusions

Remember: gammacat this is useful and awesome.

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