An open **catalog** for **gamma-ray** astronomy

Introduction

gamma-cat is an open data collection and source catalog for TeV gamma-ray astronomy.

The idea and implementation is similar to the other open domain-specific astronomy catalogs (see https://astrocats.space)

- Fully **open access**.
  Download all data and use as you like
- Fully **open collaboration**.
  Request or add data directly on Github
- Simple data formats for data entry. No complex database, just a collection of text files under git version control.

Data Formats

- At the moment, the data collection in gamma-cat consists of YAML and ECSV text files, which are easy to read and write for humans as well as machines.
- YAML is a hierarchical data format that allows easily storing information about an observation or spectral and morphology parameters. Load / dump from Python is one line:
  >>> data = yaml.load(open("data.yaml"))
- ECSV is a CSV table with a commented YAML header at the start. We use it for spectral points and light curves.
  >>> from astropy.table import Table
  >>> Table.read("table.ecsv", format="ascii.ecsv")
- The development of schemas, i.e. defining the exact content and semantics of the data files is work in progress.

Scope & Status

- We have basic information on all known TeV sources, as well as fitted spectral and morphology model parameters, spectral points and lightcurves for many sources.
- Most available data is from HESS and VERITAS, there is some from MAGIC and previous instruments (e.g. HEGRA, Whipple). We want to be complete, but need help (see below)!
- At this time, no data from Fermi-LAT or HAWC. At least HAWC could be added, but the motivation to add it is smaller, as a machine-readable 2HWC catalog exists.
- Scripting is work in progress, no good documentation yet. But some things are implemented, e.g. try this:
  >>> from gammapy.catalog import source_catalogs
  >>> print(source_catalogs["gamma-cat"]["Vela Junior"])
- Note that gamma-cat is very different from TeVCat.
  TeVCat is a website with no data / catalog download option.
  gamma-cat is a fully open data collection and catalog.

Links

- Project on Github: github.com/gammapy/gamma-cat
- The gamma-cat catalog data can also be viewed at gamma-sky.net, see description on the right.

gamma-sky.net
A portal to the gamma-ray sky

Introduction

gamma-sky.net is a website for exploring the gamma-ray sky.

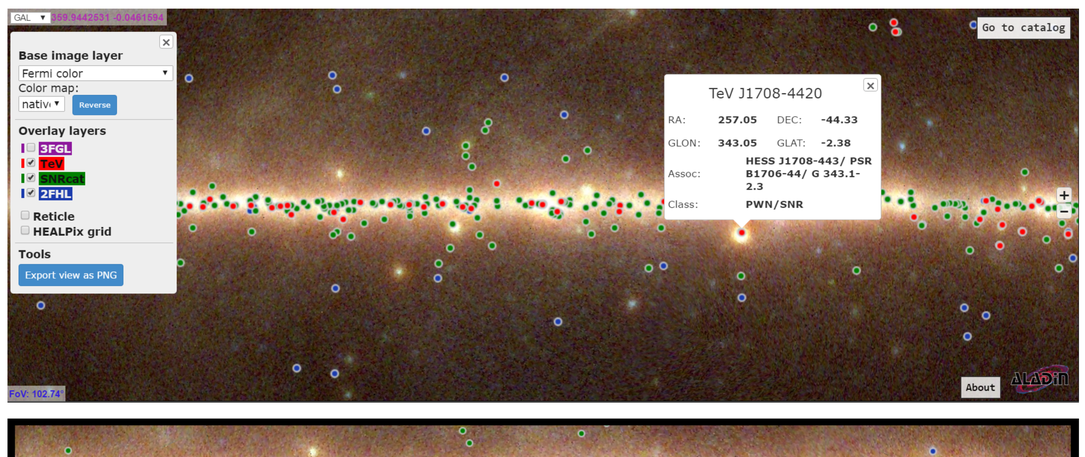
If you haven't seen it, go try is now: **http://gamma-sky.net**

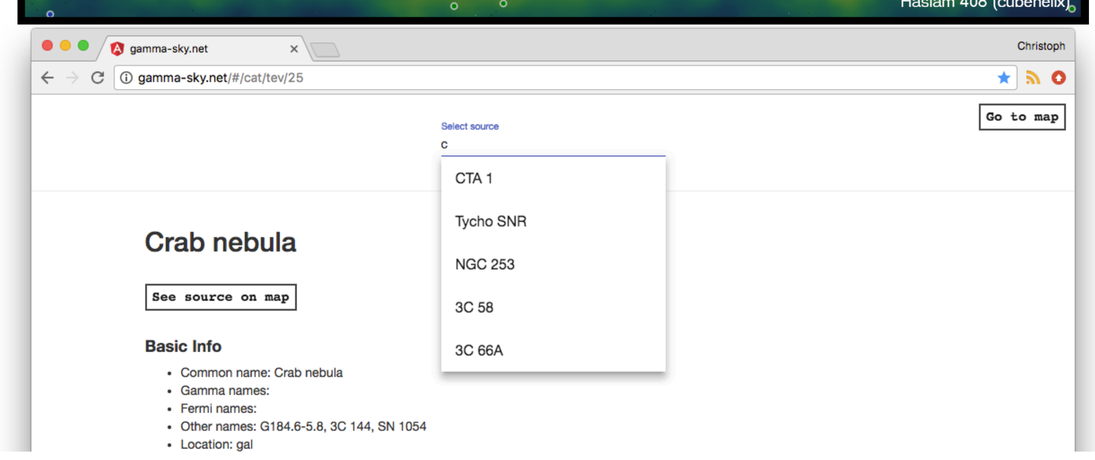
Currently the website features a "map view" for gamma-ray and multi-wavelength images and a "catalog view" where you can search for a gamma-ray source and look up some info about it.

- The map is interactive (pan & zoom), using the Aladin Lite widget serving image data in HiPS format from CDS.
  See http://aladin.u-strasbg.fr/hips/
- The currently available gamma-ray catalogs are gamma-cat, 3FGL and 3FHL, we also have markers for SNRCat.
- More info in Gamma2016 proceeding: 2017AIPC.1792g0005V

Status & Wishlist

- gamma-sky.net was implemented by Arjun Voruganti as a intern project in summer 2016 and 2017.
- It's an open-source project on Github, deployed as a static webpage (Angular & Python scripts) via Github pages.
- **Contributions welcome!**
- Specifically short-term this would be great: add 2HWC catalog & Fermi-LAT high-energy sky images in HiPS format (with a Python script using Gammapy and the new Python hips package)





Help wanted

Both gamma-cat and gamma-sky.net are young, work in progress projects. They aren't funded, so to flourish and survive, they need a few people contributing (data entry, Python coding) and maintaining (defining data format schemas, Python coding, reviewing pull requests, writing documentation and a paper), i.e. giving some of their time. Specifically if you or your student needs a collection of archival TeV data, using gamma-cat and doing data entry for the missing parts could be an option to get something for your study, and provide something back to the community. Devoting some time to gamma-cat could also be of interest to existing IACTs (HESS, MAGIC, VERITAS) at their end of life, to create an archive of their measurements.

Why present gamma-cat and gamma-sky.net at this CTA PHYS meeting? gamma-cat was used for the "known TeV sources" part of the CTA 1DC GPS sky model. gamma-sky.net or a similar webpage with an interactive map could be used to display the CTA sky (simulated for now, later real data) to the general public.