Gammapy v2.0: New features and plans

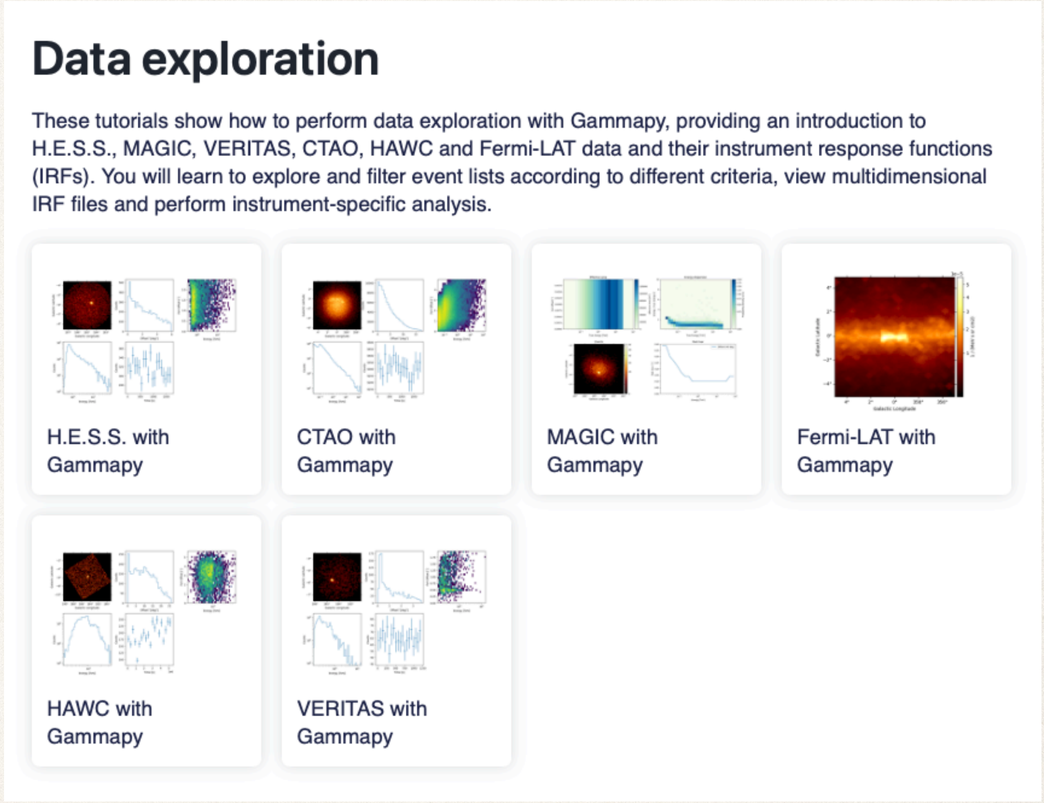
Gammapy dev team: gammapy-ld-l@in2p3.fr

User call: 22/09/2025

Development cycle since 1.0

- Gammapy v2.0 **released on 26/08/2025**
  - Will be maintained for the next development cycle (~ 2yrs)
  - ***No more bug fixes for 1.x versions***
- Almost 3 yrs since the last LTS
  - Gammapy v1.0: 10/11/2022
  - 3 major releases, and 2 bug fixes
  - ~ 31 new contributors (~ 10 very regular developers)
  - Presented at ~11 major conferences, ~ 15 schools/hand-on sessions
- Many new features:
  - Analysis validated for most gamma-ray telescopes: CTAO, VERITAS, H.E.S.S., MAGIC, LST1, HAWC, SWGO, Fermi-LAT
  - Separation of Internal Data Model from the GADF
  - Performance improvements with multi-processing
  - Meta-data handling
  - Enhanced multi-instrument joint likelihood
  - Improved timing analysis
  - Addition of parameter priors
  - Estimator for energy dependent morphology

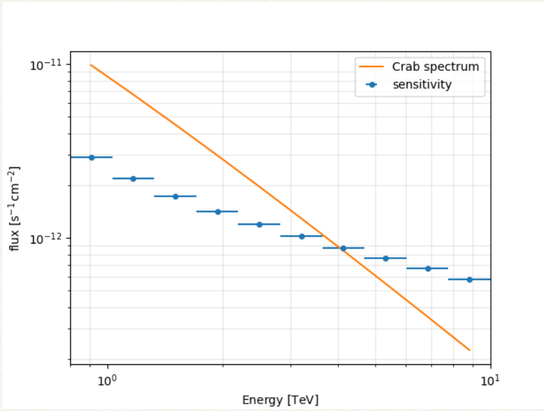
Project Manager: B. Khelifi
Lead dev: A. Donath, R. Terrier, Q. Remy, A. Sinha
Documentation in-charge: K. Feijen
CI and DevOps: N. Pigoux and D. Morcuende
General website : H. Stapel

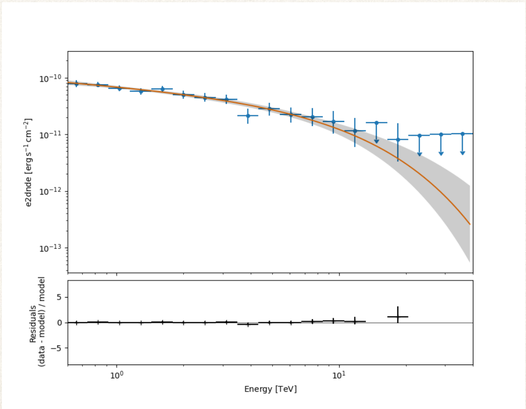


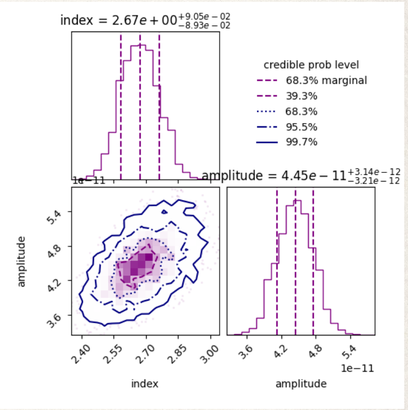
See full changelog at: https://docs.gammapy.org/2.0/release-notes/v2.0.html

Major new features since 1.3

- All estimators can create a *flux_sensitivity* now
  - Minimum detectable flux for the given data and analysis
  - Calculation based on Asimov dataset following Cowan et all 2011 https://arxiv.org/abs/1007.1727
  - Joint sensitivity can be computed if all data from same instrument (eg: different event type)
- Error bands computed using multi-normal sampling of spectral parameters
  - Takes into account all correlations between parameters
  - Can be slow for models where vectorization is not possible (eg: Naima models)
- Support for nested sampling with Bayesian analysis
- Added pulse profiles for the 3rd Fermi Pulsar Catalog
- Allow configuration of statistic on a dataset using `FitStatistic` class

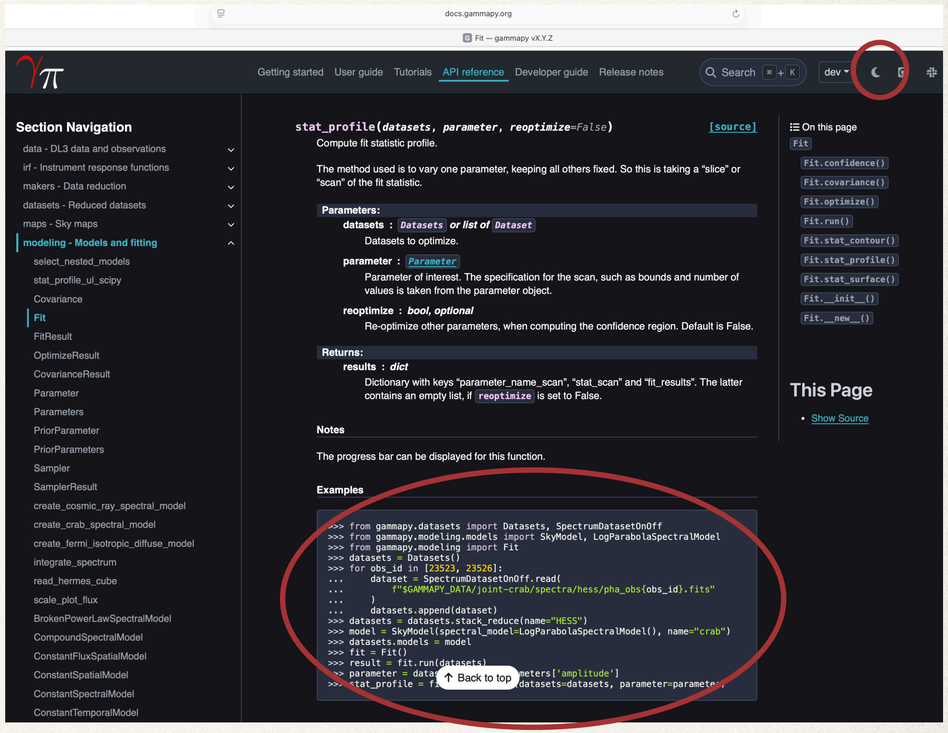






Improved documentation

- Fresh look and feel
  - Updated appearance with cleaner CSS and **dark theme support** 🌙
- Easier learning path
  - Tutorials reordered for better flow & clarity based on user feedback
  - Code examples now embedded directly in doc-strings
- New tutorials explaining specific science cases:
  - How to compute flux upper limit for non-detected sources
  - Constraining parameter limits from an analysis
  - End-to-end VERITAS analysis
  - **Fermi-LAT analysis and integration with Fermi-py**
  - **Bayesian inference with nested sampling**



Upcoming development plans

- We are currently planning the next release cycle:
  - Priorities: Requirements of collaborations, maintenance and new features
  - User inputs on suggested features welcome:
    - Please consider contributing (get in touch before opening a PR)
    - All contributors will be listed as authors on Zenodo releases
- Upcoming user calls will be focussed on specific topics:
  - Background modeling: Understand approaches and experiences from different experiments
  - Dark matter analysis: Need to build a WG on this, collect feedback on available functionalities
  - Please get in touch if you want to attend/comment

gammapy-ld-l@in2p3.fr