

Gammapy: a science tool prototype for CTA

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<http://gammapy.org/cta.html>

Gammapy & CTA

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CTA

Introduction

The [Cherenkov Telescope Array](#) (CTA) is the next generation ground-based observatory for gamma-ray astronomy at very-high energies. Gammapy is a prototype for the CTA science tools (see [2017arXiv170901751D](#)).

This page provides a little bit of information and links to useful resources concerning simulation and analysis of CTA data with Gammapy. Most of the pages we link to here require a CTA user account to access the information.

Getting started

To learn how to use Gammapy for CTA analysis, use the [Gammapy tutorials](#). We suggest you do the "Getting started with Gammapy" one first, and then continue with "CTA first data challenge (1DC) with Gammapy" and "CTA data analysis with Gammapy" and finally the "CTA 2D source fitting with Sherpa".

If you have questions, please post on the Gammapy CTA mailing list or contact the Gammapy coordination committee (see [Gammapy contacts page](#))

Please note that Gammapy is a very young project and is under heavy development. At the moment we are participating in the CTA first data challenge, fixing issues and adding new functionality for CTA.

Resources

- [CTA first data challenge \(CTA DC-1\) page](#) This page contains information about data, sky models, links to forums for discussion and checks, ...
- [cta-analyses](#) - a private repository on Github that we use to share analysis scripts and notebooks that use CTA-internal data and IRFs. The main purpose is to make it easy to collaborate on issues and code. Eventually results should be shared on the official CTA pages of course! To get access, send an email to [Roberta Zanin](#) or anyone else that you know that is involved in Gammapy and CTA.
- If you're doing simulations or analysis for CTA with Gammapy and would like to discuss your results or get help, please join the [gammapy-cta-l](#) mailing list, the regular Gammapy calls, as well as the CTA DC-1 calls and relevant CTA PHYS meetings!

mailing list never used!: gammapy-cta-l@in2p3.fr

Data

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- Prod3b IRFs (now publicly available)
(Karl's talk in a while)
- DC1 data
 - New set of AGN in wobble mode
- DL3 data format
(Christoph's talk in a while)

Ongoing activities

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- Analysis of DC1 data
 - Results for the closing out document
 - Science WGs

Galactic	Cosmic Ray	Extragalactic	Transient	Dark Matter	Intensity Interferometry	Tool assessment
Preparing for the Galactic Plane Survey - catalogs and source identification (Y. Gallant and J. Cardenzana)	Study of Galactic diffuse emission (L. Tibaldo)	Extragalactic survey (B. Fraga, level 1: sensitivity, i.e., minimum flux level at which a source is detected, level 2: dN/dS)		DM analysis of the Galactic Centre Survey - (L. Yang, G. Zaharijas)		Bright isolated point source - Cas A
Extended sources in DC1: Resolving RXJ 1713-3946 (F. Acero)	Fermi Bubbles ()	Long-term monitoring (A. Babic), level 1: catalog of long-term light-curves, level 2: duty cycle, the minimum resolved variability time scale, power spectrum		DM line searches with the Galactic Centre Survey (E. Hatlen)		Bright source in crowded region - GC
Periodic sources in DC1: Studying Gamma-ray binaries with CTA (M. Chernyakova)		High-quality spectra (J. Lefaucheur), level 1: catalog of spectra of sources detected at 5 sigma above tau=1, level 2: EBL normalisation		Analysis of dwarf spheroidal galaxies (N. Hiroshima)		Bright extended source - RX J1713
Pulsars in DC1: What can we see? (A. Burdakov)						Faint extended source - HESS J1702-420
						Bright variable source - PKS 2155

- Assessment of tool capabilities and limitations

https://forge.in2p3.fr/projects/data-challenge-1-dc-1/wiki/Current_capabilities_and_limitations_of_the_analysis_tools

- Preparation of analysis pipelines for catalogs
- Preparation of new models for the Galactic sky

DC1: required results

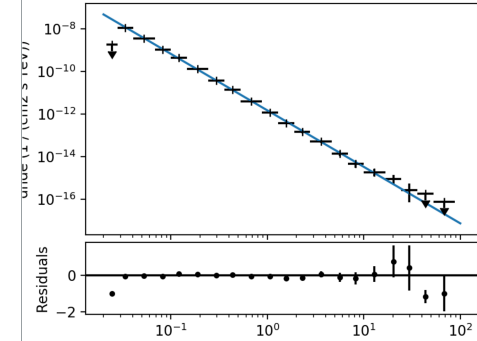
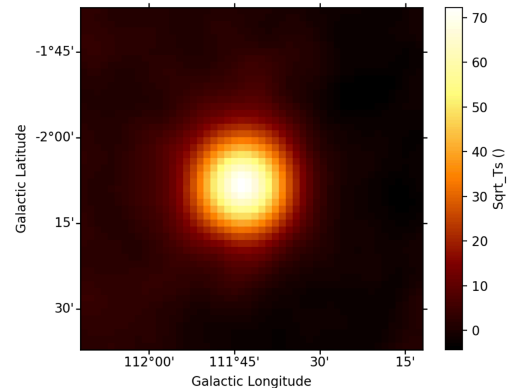
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Goal	Object	motivation	analyzer
Tools	RXJ 1713	Bright extended	Fabio
Galactic	W28	Extended, template	Andrea Giuliani
Tools	Cas A	Weak point-like	Emma
Tools	HESS J1702	Weak mildly extended	Roberta
Tools	GC	Caotic region	Giovanni De Cesare
Tools	TeV 1224+212	Variable, point-like	Julien
Galactic	LS 5039	Lightcurve	Lab
Galactic	Pulsars		?
Galactic	GPS	catalog	Yves
CR	Wd1		-
CR	Diffuse	diffuse emission	-
Extragal		catalog	Julien
DM	Lines		-

DC1: required results

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1D + 2D analysis



- 3D is strongly recommended. Feasible? Let's see the progresses of this week.
- Not needed all the analyses required by the Science WGs

GPS pipelines

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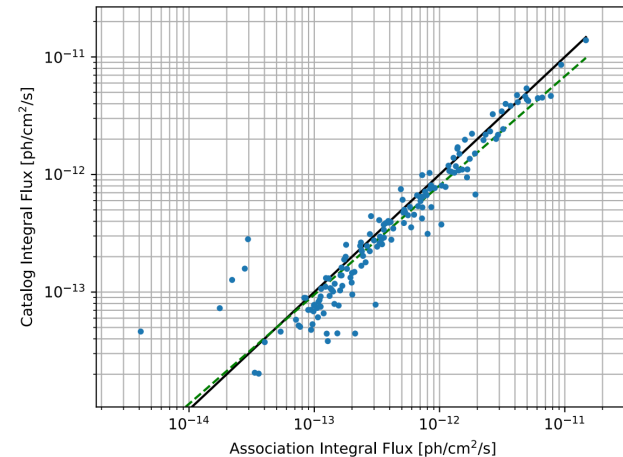
- Pipelines are working

(see Yves's talks, latest: https://indico.cta-observatory.org/event/1731/contributions/15208/attachments/12900/15287/20180201_SurveyPipelineUpdate_DC1.pdf)

- Comparison tool exists

- TODO:

- Study missed associations
- Effect of diffuse
- Understanding outliers
- General framework for pipeline including AGNs (this week?)



Deadlines

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- External deadlines:
 - First preliminary results by mid of March 2018
 - Final results for April meeting in Barcelona (18-20 April)
 - Closing-out document to be delivered at Paris CM (14-18 May)
- Internal (gammapy-team) deadlines:
 - **Result status report at 2018-02-16 call** (5-10')
<https://github.com/gammapy/gammapy-meetings/tree/master/2018-02-16>
 - **Post results by end of February here:**
<https://github.com/gammasky/cta-analyses>