H.E.S.S. data analysis with Gammapy

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(for the Erlangen FITS group)

Gammapy coding sprint
Madrid, October 1, 2018

ERLANGEN CENTRE
FOR ASTROPARTICLE
PHYSICS

FAU FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG

H.E.S.S.

H.E.S.S. public test data release

`https://www.mpi-hd.mpg.de/hfm/HESS/pages/dl3-dr1/`

- Idea:
  - provide "real" IACT data in open FITS format for the first time
  - support development of open-source science tools

- Data:
  - Level 3
    — event lists
    — instrument response functions
  - Well-studied sources
    — Crab nebula (1.9h)
    — PKS 2155-304 (9.8h)
    — RX J1713.7-3946 (7h)
    — MSH 15-52 (9.1h)
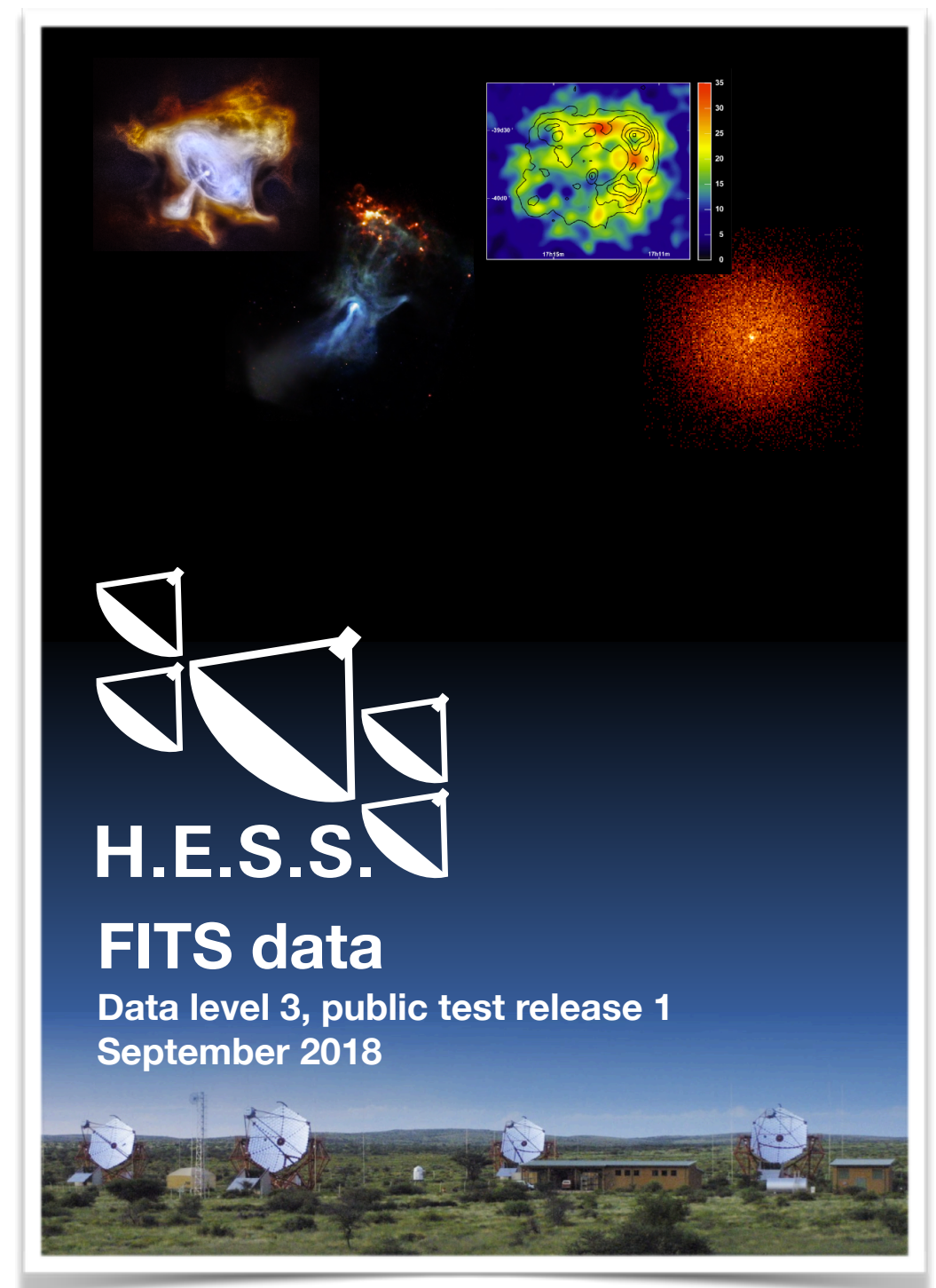
H.E.S.S.
FITS data
Data level 3, public test release 1
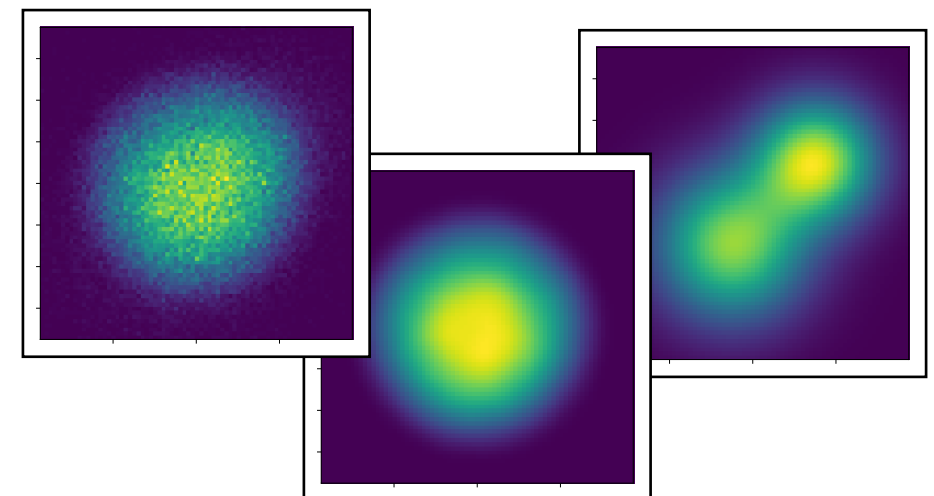September 2018

H.E.S.S. FITS paper

- Aims:

  - Establish the use of open-source analysis tools in H.E.S.S.

  - Explore template (3D) analysis based on field-of-view background model

    (also see my presentation from the last sprint: link)
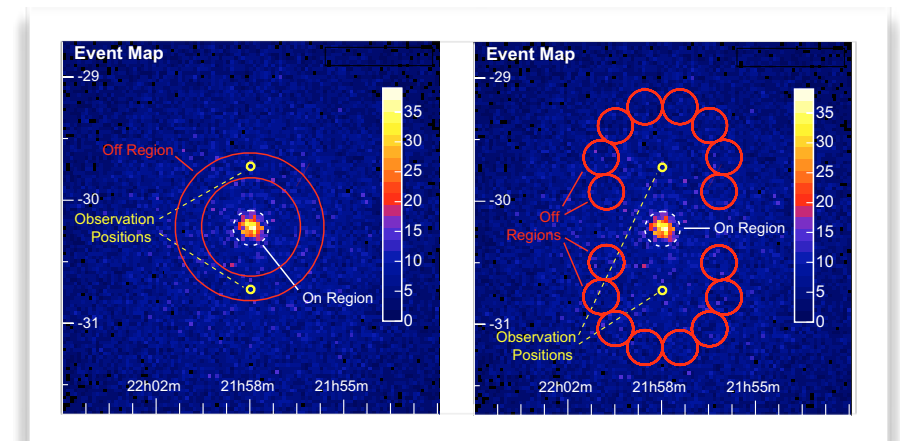
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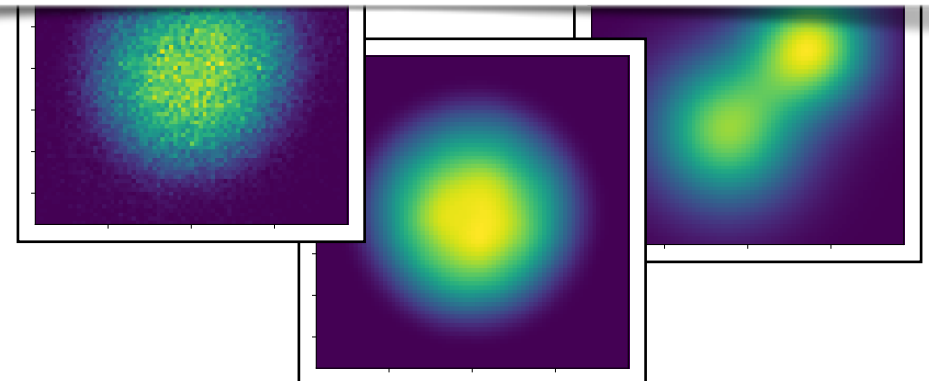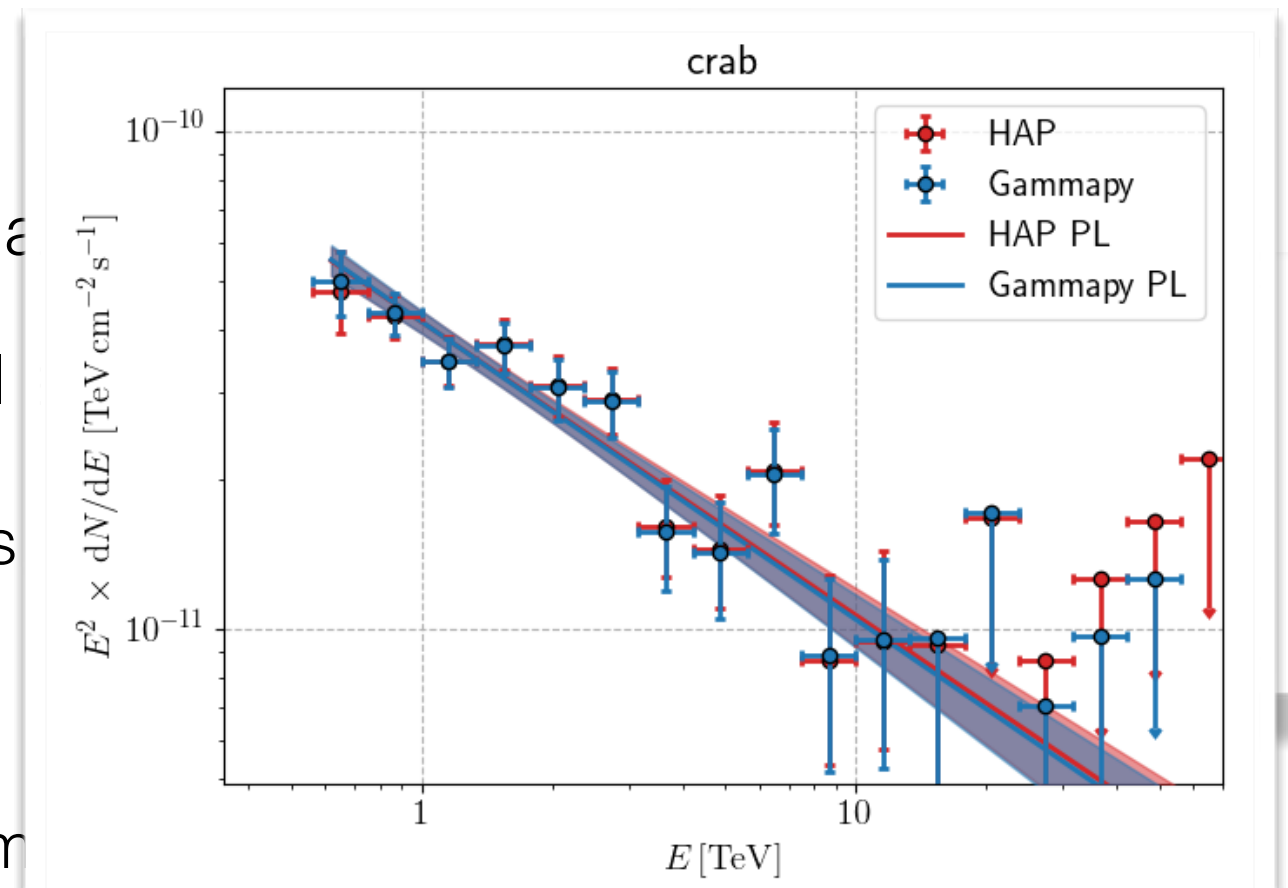
- ## Strategy:

  - Utilise public H.E.S.S. FITS test data set

  - Perform "classic" IACT high-level analyses
    — ring & reflected background
    — compare results to standard tools
    — validates the open-source tools

  - Perform 3D template analysis
    — construct background model from
       archival H.E.S.S. data
    — characterize background model
    — compare results to standard tools

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ready

work in progress…

Our Gammapy wish list

<u>3D analysis</u>

- support 3D background model

- fit of background model
  — normalization
  — spectrum (e.g. via a spectral "tilt")

- application of run-wise fit masks (e.g. energy threshold)

- diagnostic tools
  — TS map
  — …?

<u>1D spectrum analysis</u>

- a few points are off after switching to minuit (see <u>#1635</u>)

If I can help with any of these, let me know!