

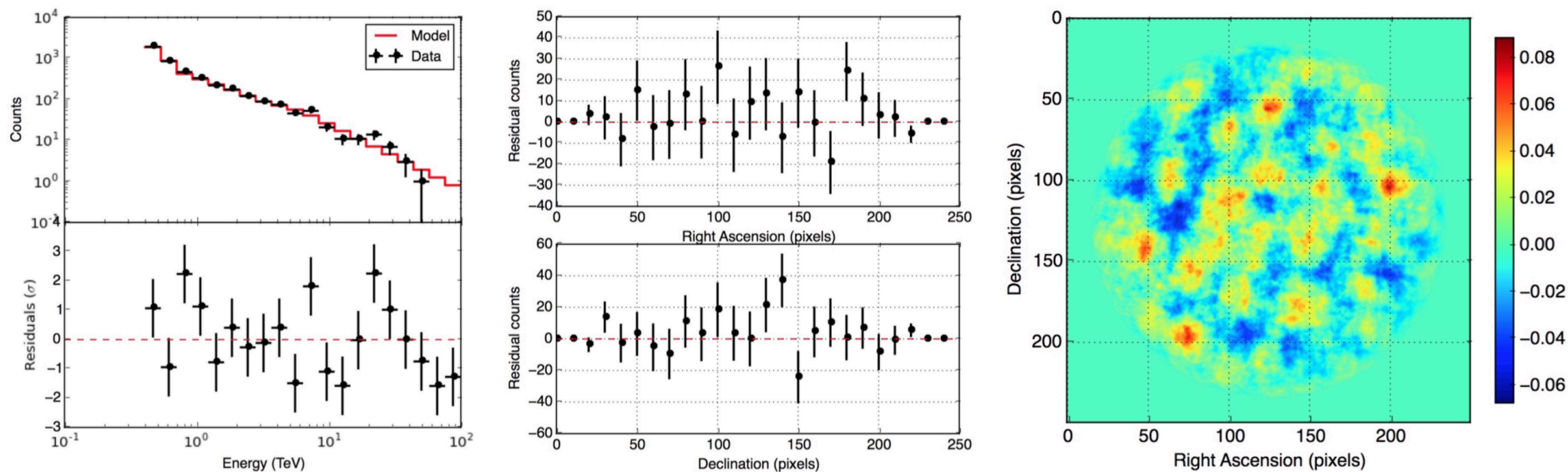
# H.E.S.S. support project

- Release 1.6.0 should fully support analysis of DR1 data
  - Adapt code to DR1 data
    - No IRF background template in DR1
    - Add any missing tools/scripts for DR1 analysis workflows
  - Code testing on DR1 for all analysis types
    - unbinned
    - stacked,
    - On/Off
  - Add / update User tutorials
    - [http://cta.irap.omp.eu/ctools-devel/users/tutorials/hess\\_dr1/](http://cta.irap.omp.eu/ctools-devel/users/tutorials/hess_dr1/)

# Developments for H.E.S.S. DR1 support

- Add analytical background model for H.E.S.S. DR1
  - New GammaLib classes
    - GCTAModelBackground – general factorised CTA background model
    - GCTAModelSpatial – spatial component of factorised background model
    - GCTAModelRadial now derives from GCTAModelSpatial
    - GCTAModelSpatialGradient – implements linear gradient over FoV
    - GCTAModelSpatialMultiplicative – allows to multiply spatial models
  - Study of H.E.S.S. DR1
    - Spatial
      - GCTAModelSpatialMultiplicative
        - » GCTAModelRadialGauss
        - » GCTAModelSpatialGradient
    - Spectral
      - GModelSpectralNodes (8 nodes)
  - Run-wise model generation by csbkgmodel

# csbkgmodel results



Spectral and spatial residuals for one empty field run

# Proposed topics for this sprint

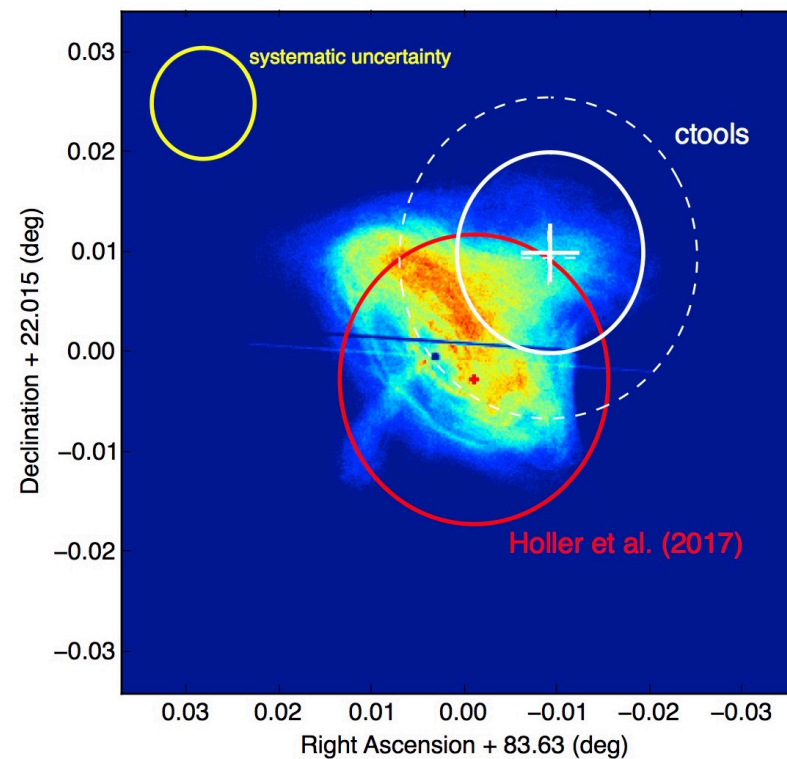
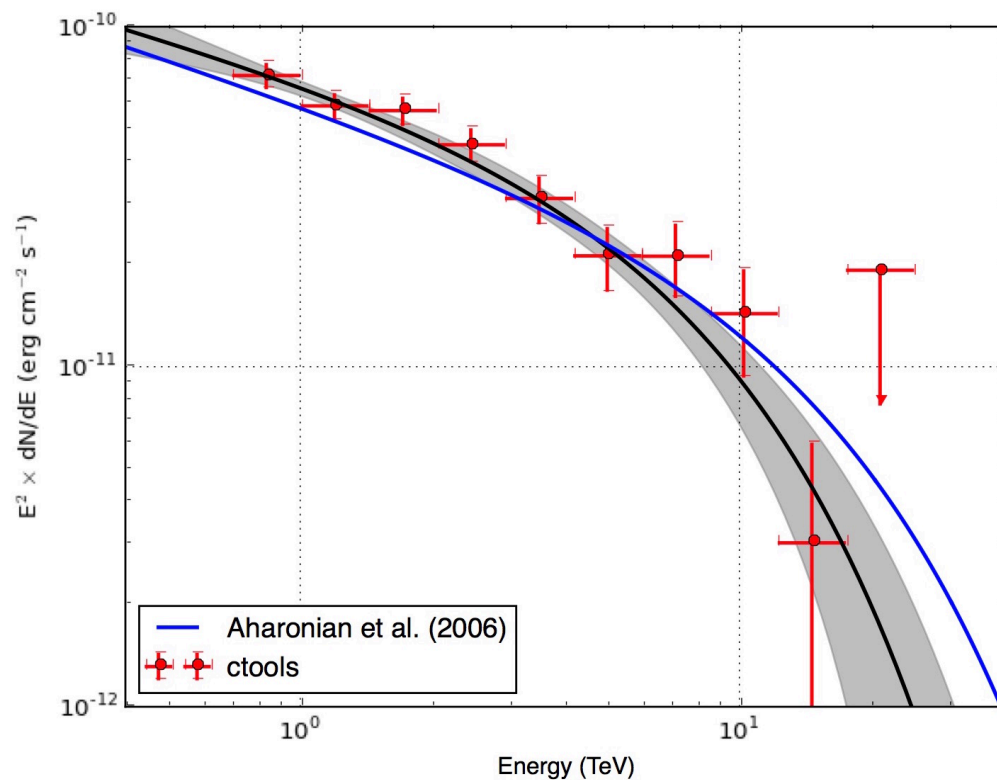
- Use of model background instead of IRF background
  - On/Off analysis
    - GCTAOnOffObservation (#2710)
    - csphagen, cslightcrv, obsutils.py (#2711)
  - Stacked analysis
    - it may work already, but needs to be checked
    - Probably needs an iterative analysis method
- Analyse all H.E.S.S. observations for all analysis types
  - Off observations (quality of background model)
  - Crab observations (spectrum, extension)
  - MSH 15-52 observations (spectrum, morphology)
  - RX J1713 observations (spectrum, morphology)
  - PKS observations (spectrum, light curve)
- Analysis tutorials (#2712)

# DR1 ctools paper

- Goal
  - Demonstrate that 3D analysis reliably works for H.E.S.S. data
    - First successful unbinned analysis of H.E.S.S. data
    - First spectro-morphological fits, showcase of analysis impact
  - Provide reference results
    - Analysis scripts will be put on GitHub
    - Comparison to literature values
  - Illustrate multi-wavelength analysis capabilities
    - Combined H.E.S.S. – Fermi analysis of Crab data
    - Other sources?
  - Reference publication for ctools release 1.6.0

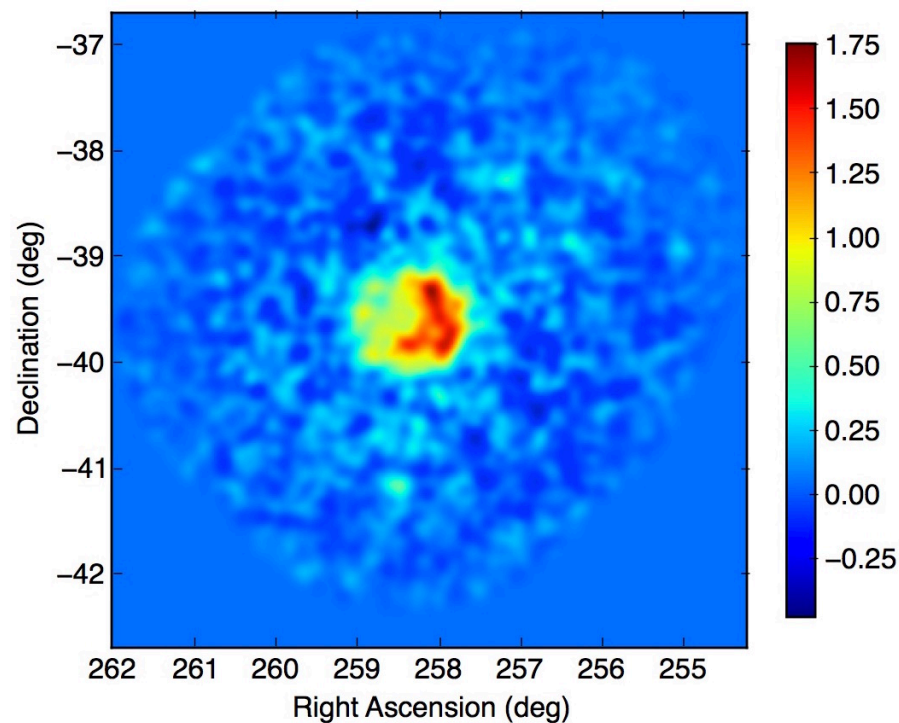
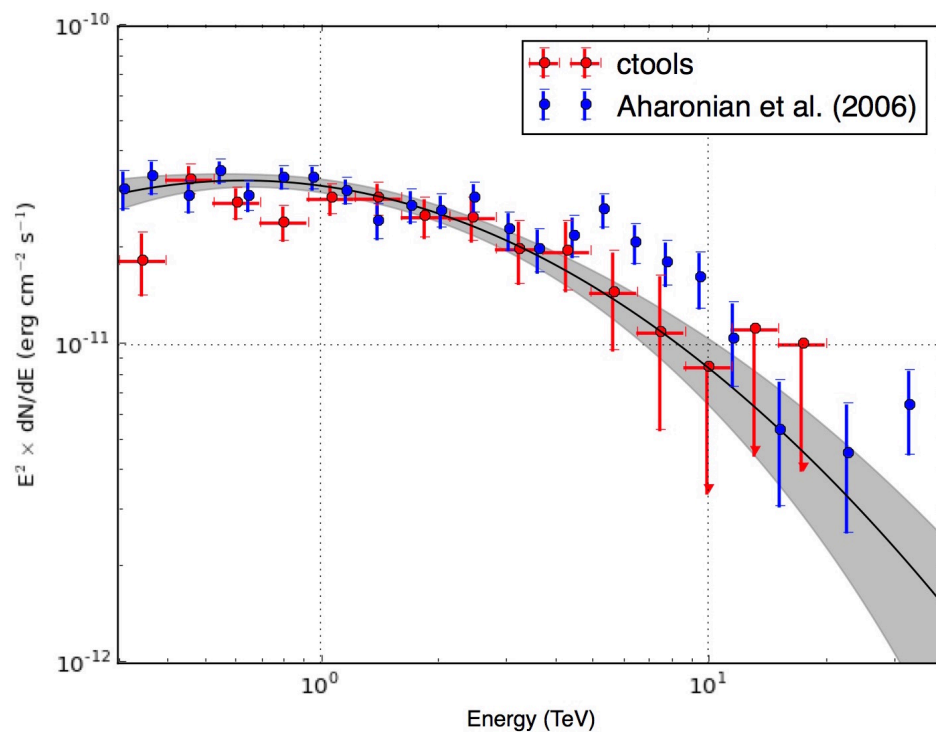
# DR1 ctools paper

Example: Crab SED and morphology fit (unbinned)



# DR1 ctools paper

Example: RX J1713.7 SED and sky map (unbinned)



# DR1 ctools paper

- Time scale
  - Aim for submission before Christmas
  - ctools 1.6.0 release in parallel to paper submission
- Author list
  - Everyone participating in this coding sprint
  - Everyone else who contributed code over the last year