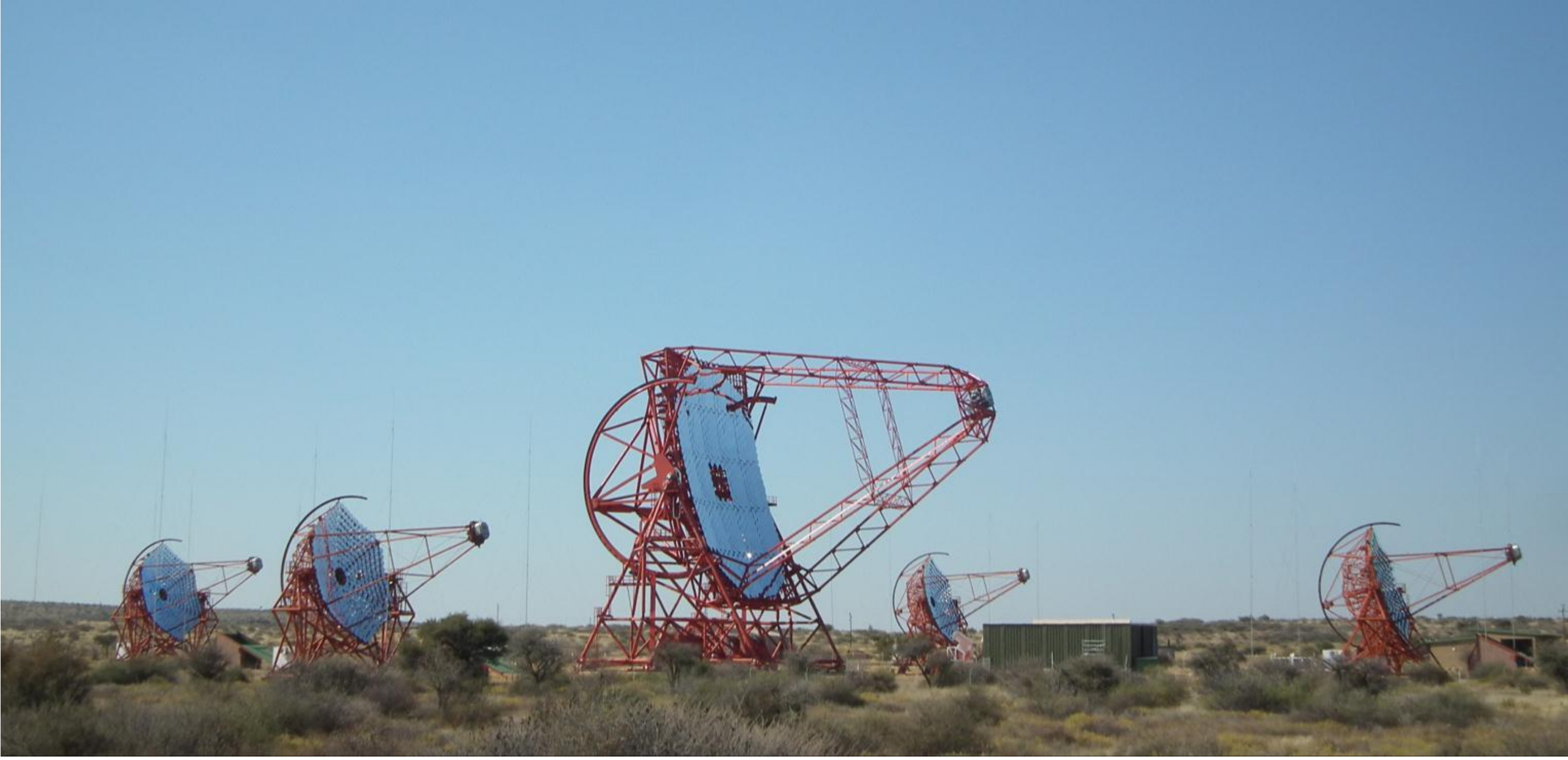


Feedback from the H.E.S.S. collaboration

Michael Mayer

HESS data in FITS

- HESS data in FITS available for 2 chains (each with multiple cut configs)
- Follow structure in https://gamma-astro-data-formats.readthedocs.io
- Some issues with PSF parametrisation, noisy IRFs

HESS data in FITS

- HESS data in FITS available for 2 chains (each with multiple cut configs)
- Follow structure in https://gamma-astro-data-formats.readthedocs.io
- Some issues with PSF parametrisation, noisy IRFs
- Only HESS I data until 2013 - current effort to include latest data
- Biggest challenge: background modelling, MC stats (large phase space)

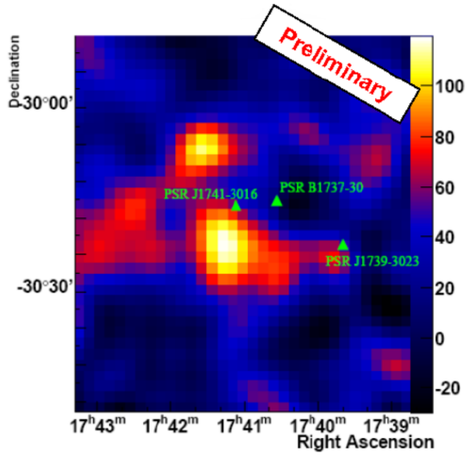
HESS data in FITS

- HESS data in FITS available for 2 chains (each with multiple cut configs)
- Follow structure in https://gamma-astro-data-formats.readthedocs.io
- Some issues with PSF parametrisation, noisy IRFs

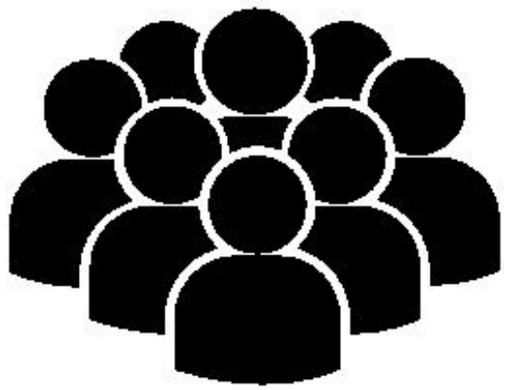
Started exploring run-wise simulations: FITS exporter will adapt

ctools in HESS - some stats

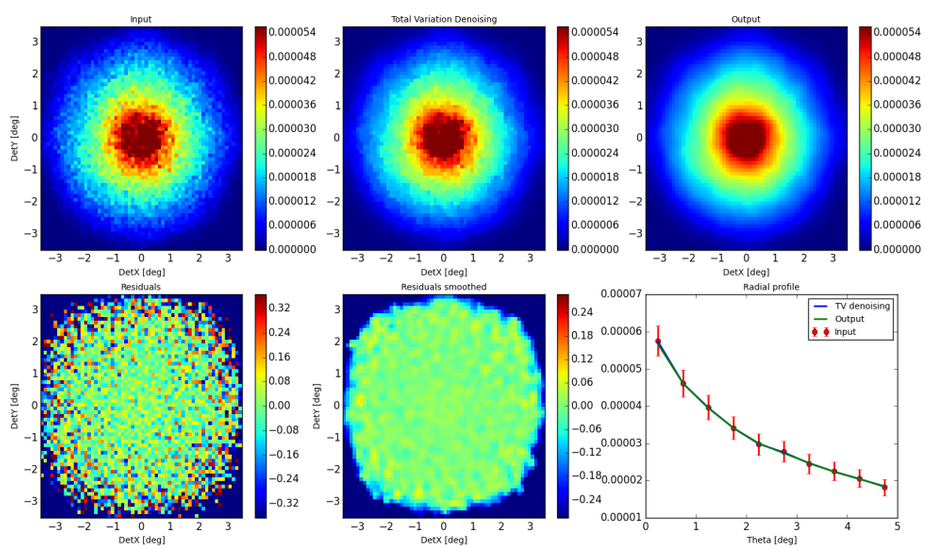
> 7 Projects



> 18 people

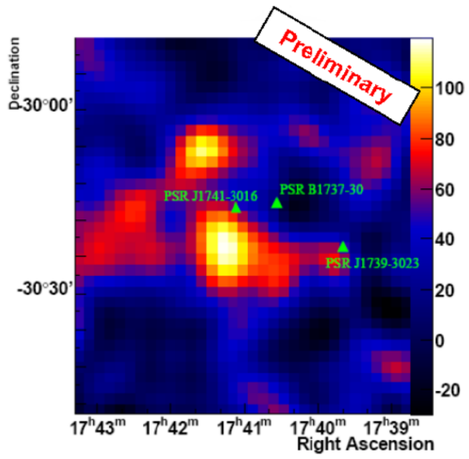


∞ Questions

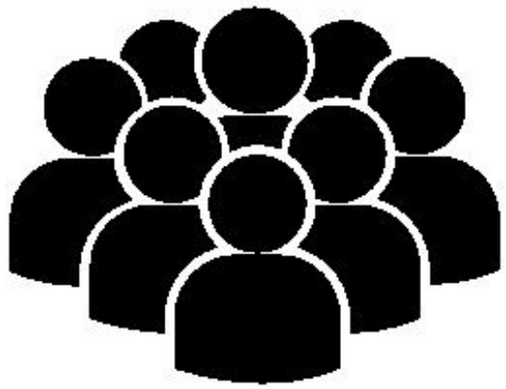


ctools in HESS - some stats

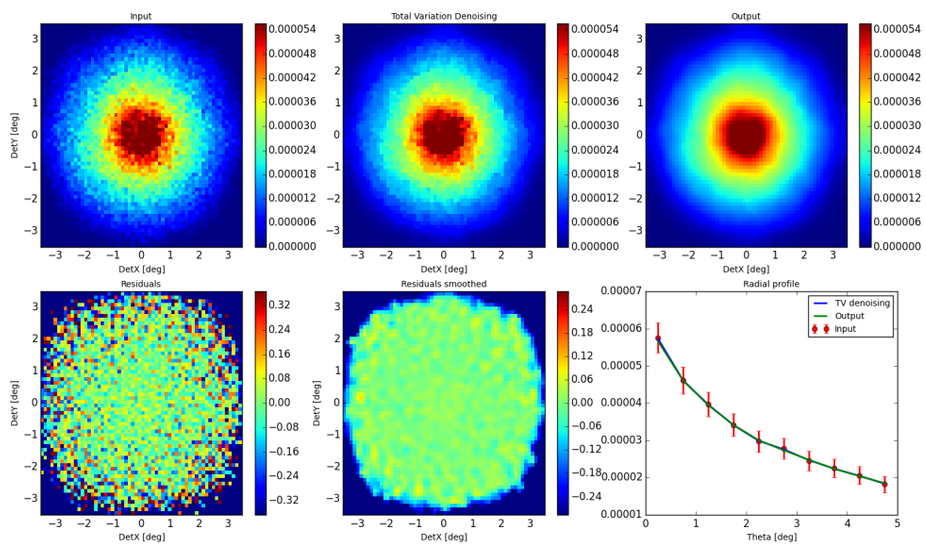
> 7 Projects



> 18 people



∞ Questions

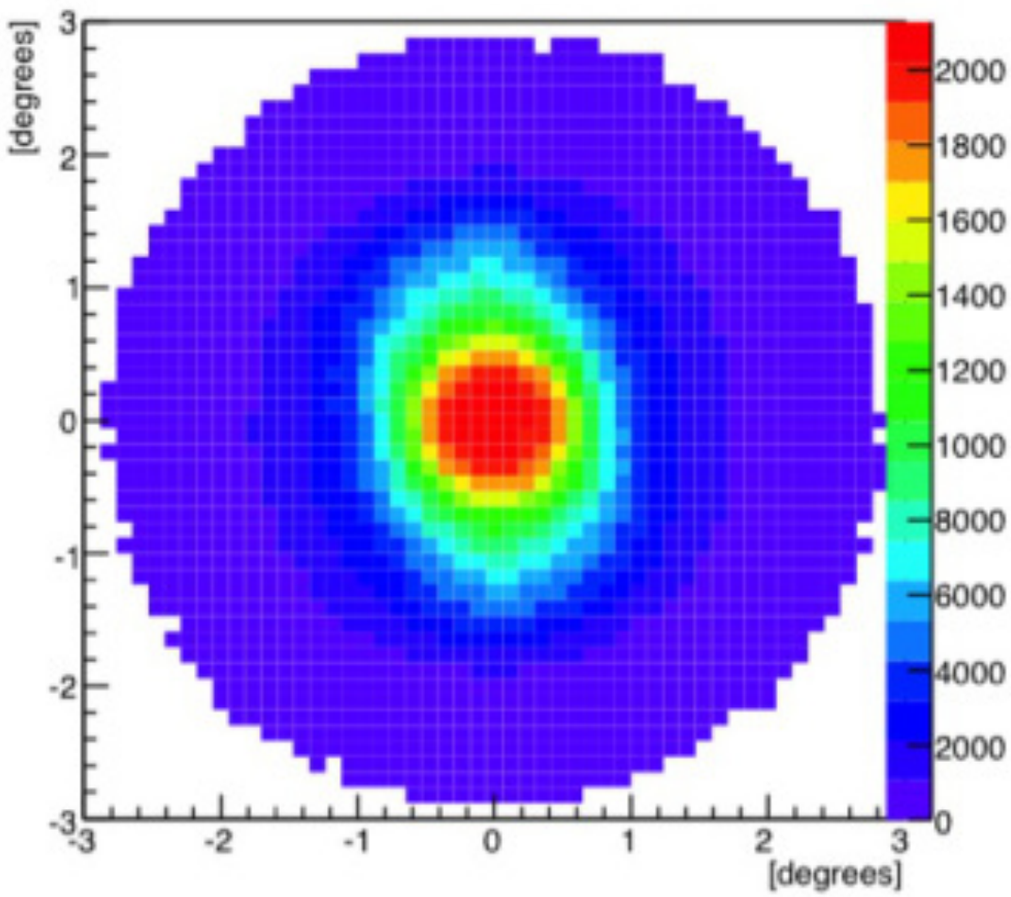


Output

0 publications

Feedback from MAGIC at DESY

IRFs need a phi dependence for MAGIC



- MAGIC acceptance and effective area asymmetric
- Background rotation and coordinate transform become important
- Hard to create useful background model

Explore likelihood ratio test statistics (Klepser 2011)

Specific Feedback from users in HESS

Mismatches

Parameter file

```
#######################################
#
#                       CTA Science Ana
#
# -----------------------------------
#
#  File:       csspec.par
#  Version:    1.1.0
#
#  Author:     Juergen Knoedlseder
#              Jurgen.Knodlseder@irap.om
#              IRAP
#
#  Purpose:    Parameter file for the cs
#
#######################################
#
# Input and output parameters
#============================
inobs,      f, a, events.fits,,, "Input
inmodel,    f, a, $CTOOLS/share/models/c
srcname,    s, a, Crab,,, "Source name"
expcube,    f, a, NONE,,, "Input exposur
psfcube,    f, a, NONE,,, "Input PSF cub
edispcube,  f, a, NONE,,, "Input energy
bkgcube,    f, a, NONE,,, "Input backgro
caldb,      s, a, prod2,,, "Calibration
irf,        s, a, South_0.5h,,, "Instrum
edisp,      b, h, no,,, "Apply energy di
outfile,    f, a, spectrum.fits,,, "Outp
```

Documentation

General parameters

`(inobs = NONE) [file]`

Input event list, counts cube or observation definition XML file.

`inmodel [file]`

Input model XML file.

`srcname [string]`

Name of the source in the source model XML file which should be used for sensitivity computation.

`outfile [file]`

Name of the source spectrum output file.

`expcube [file]`

Exposure cube file (only needed for stacked analysis).

`psfcube [file]`

PSF cube file (only needed for stacked analysis).

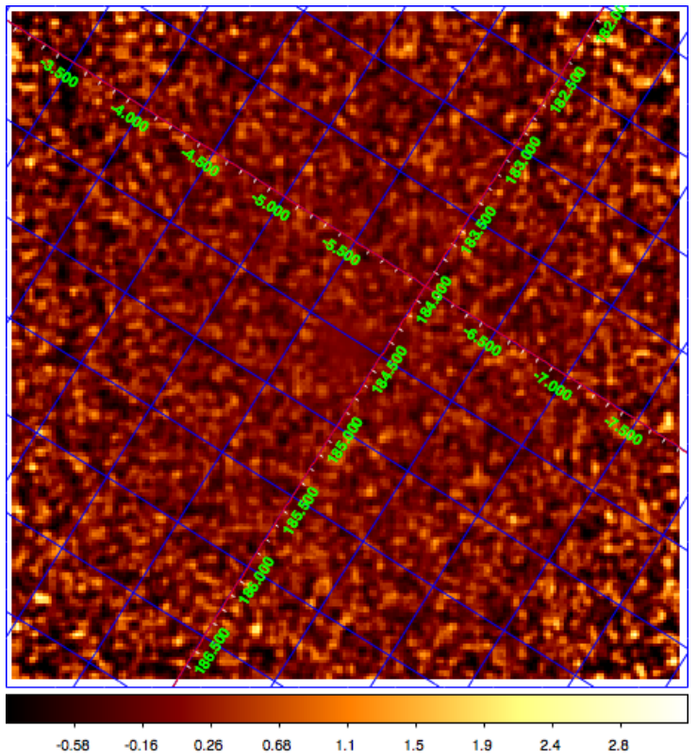
`bkgcube [file]`

Background cube file (only needed for stacked analysis).

Maybe tie code and docs more together (e.g. during compilation)

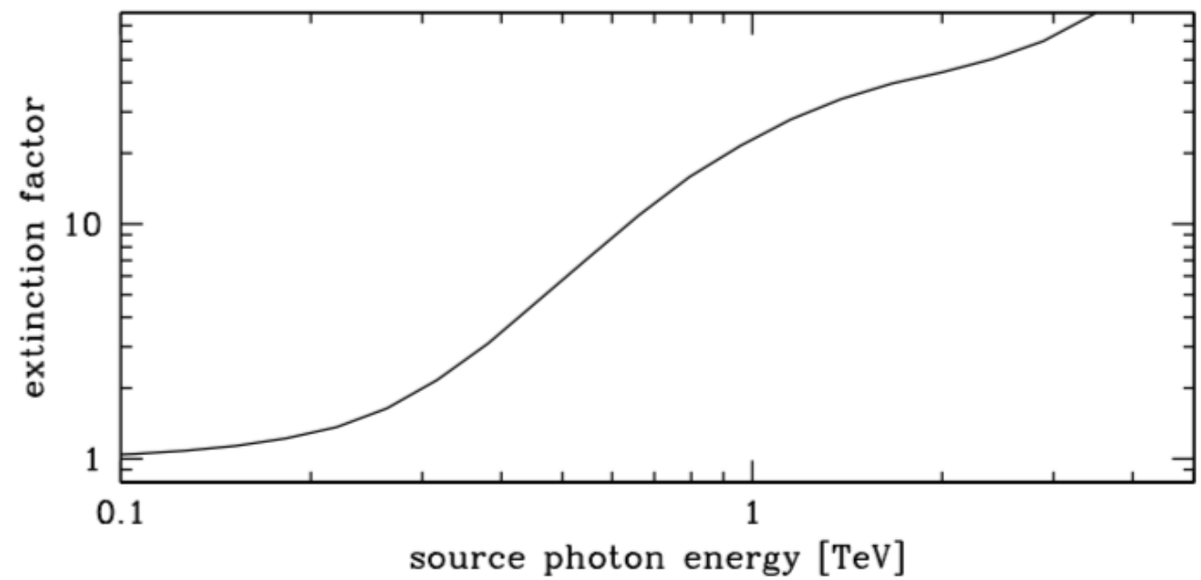
Tool to compute residual significance map

- Currently you can have
  - residual TS map
  - residual counts map (SUB, SUBDIV, SUBDIVSQRT)
- Implement e.g. Li&Ma significance map to see negative fluctuations

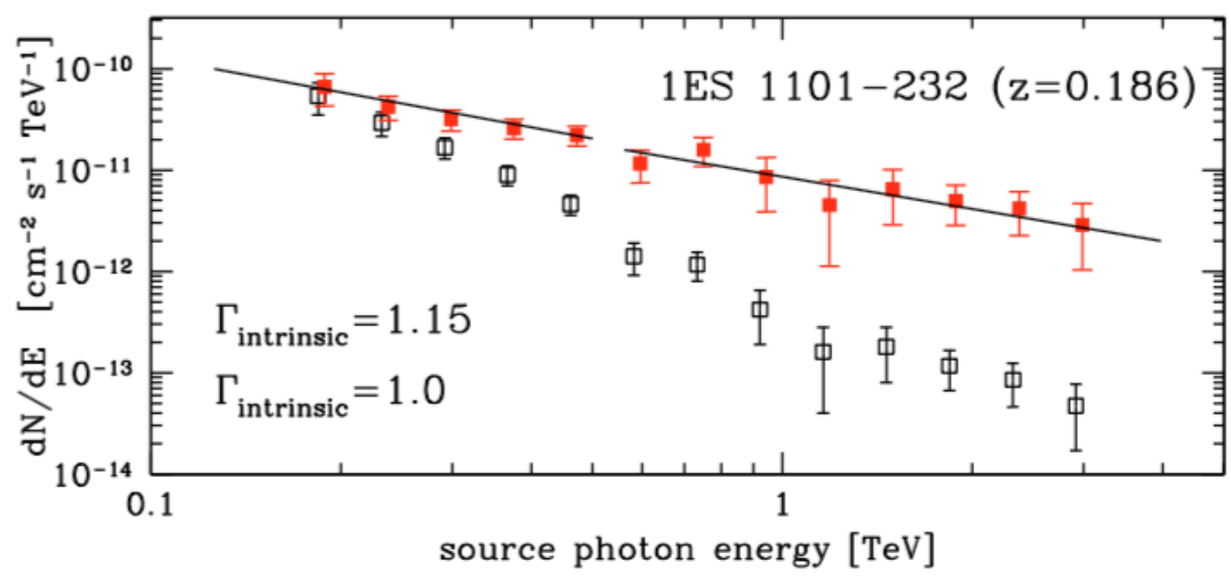


Implement EBL Models

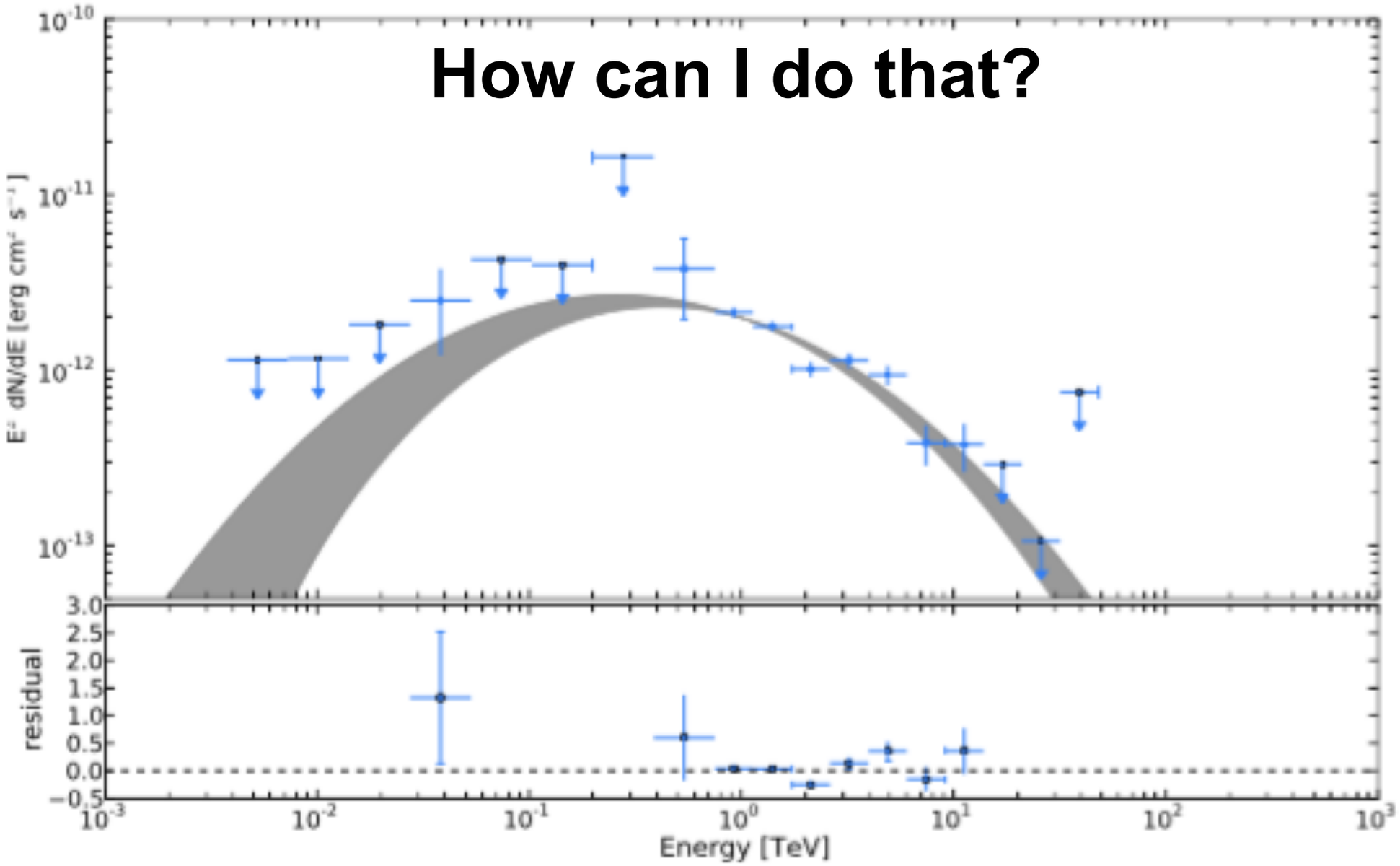
- PowerLaw * EBL
- LogParabola * EBL
- any GModelSpectral * EBL



- PowerLaw * Filefunction
  (for LIV, Axions, …)



Documentation how to combine Fermi and HESS data



Strongly negative TS values

- Some fits provide strongly negative TS values of individual sources (binned vs unbinned)

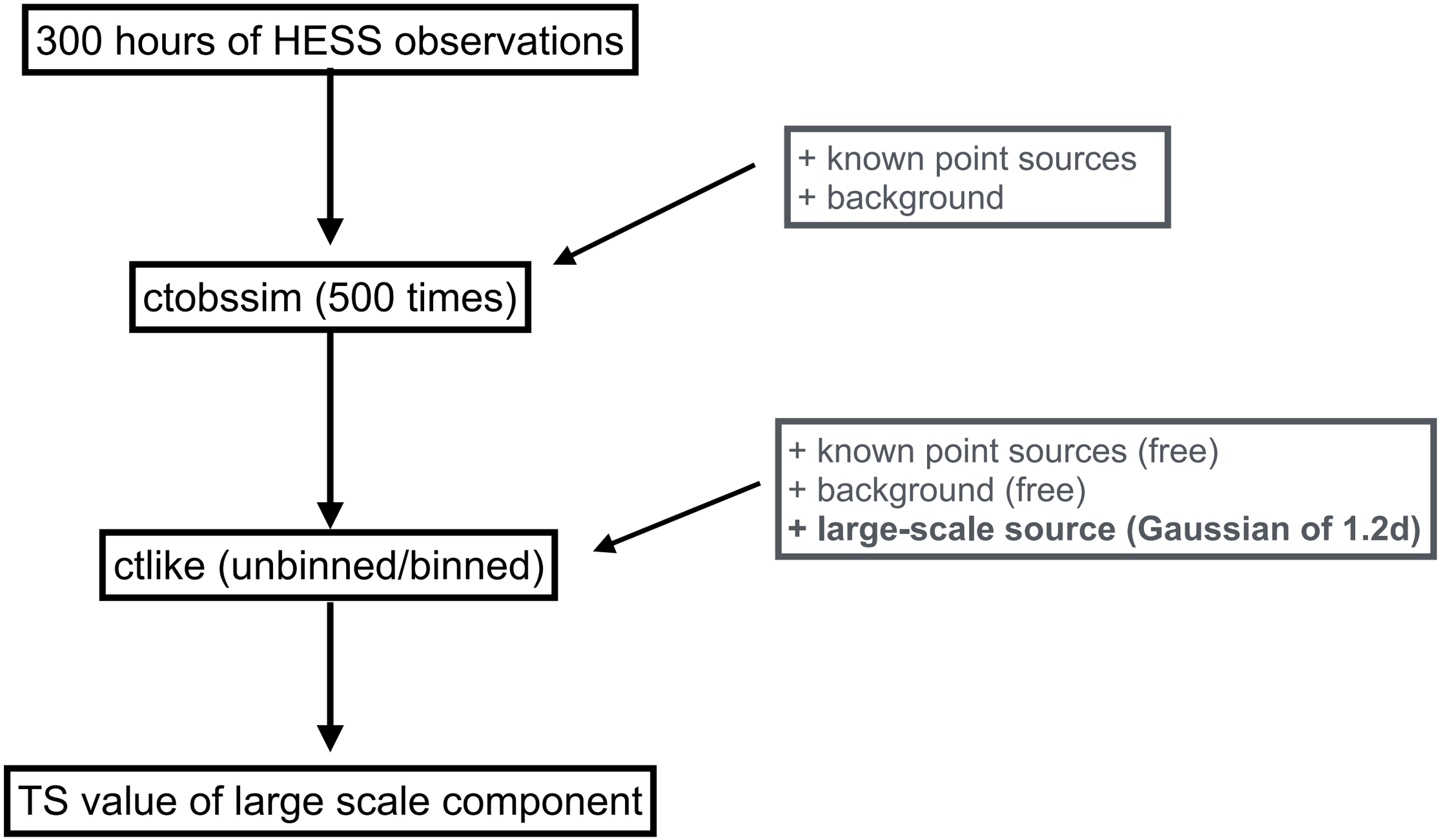
binned/stacked

```
<source name="HESSJ---" type="ExtendedSource" ts="3000.875" tscalc="1">
  <spectrum type="ExpCutoff">
    <parameter name="Prefactor" value="4.15972" error="0.245138" scale="1e-18" min="1e-09" max="1e+08" free="1" />
    <parameter name="Index" value="-2.10984" error="0.0698523" scale="1" min="-5" max="2" free="1" />
    <parameter name="Cutoff" value="6.91804" error="1.74981" scale="1e+06" min="0.0005" max="1000" free="1" />
    <parameter name="Scale" value="1" scale="1e+06" free="0" />
  </spectrum>
```

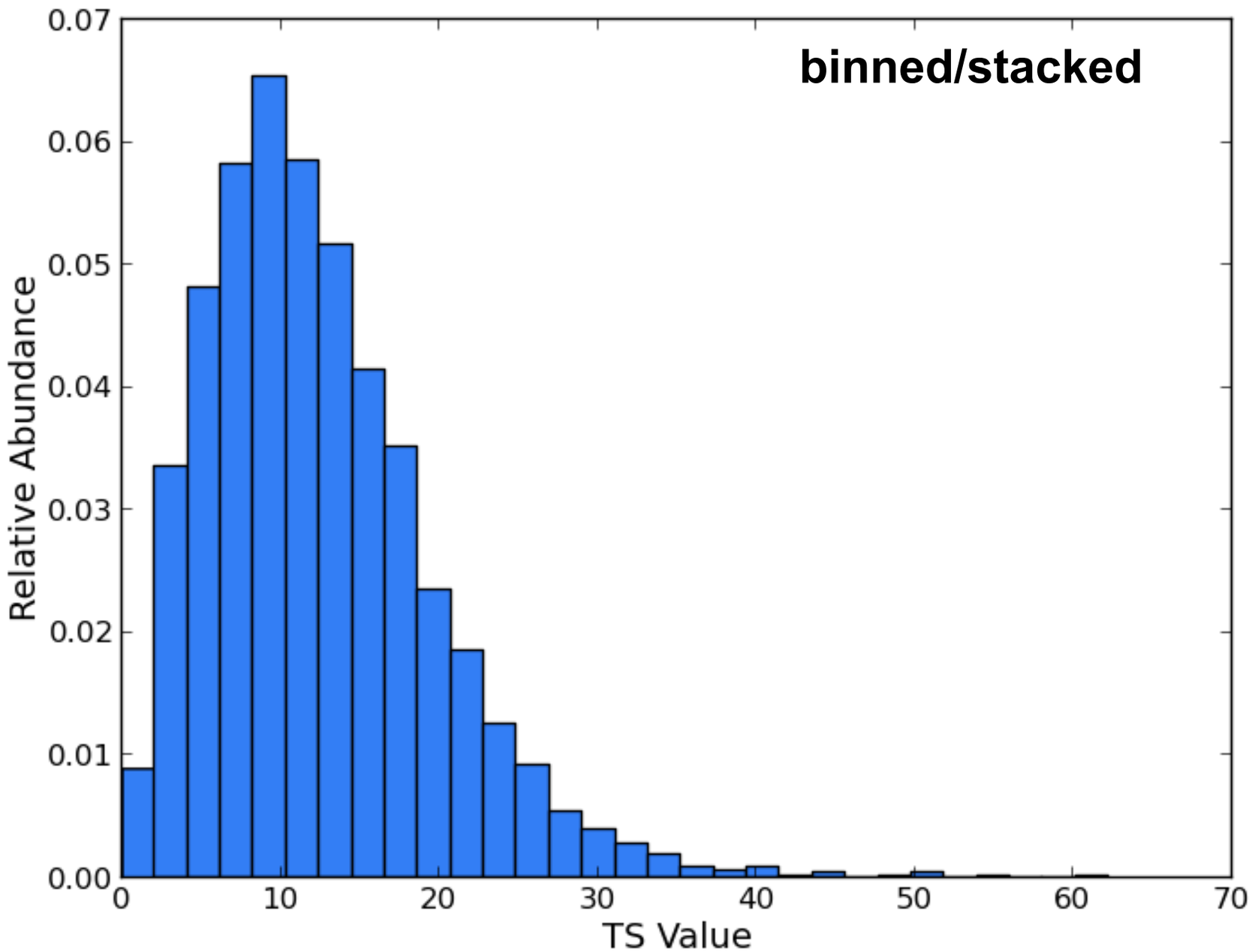
unbinned

```
<source name="HESSJ---" type="ExtendedSource" ts="-426.304" tscalc="1">
  <spectrum type="ExpCutoff">
    <parameter name="Prefactor" value="1e-09" error="0.103208" scale="1e-18" min="1e-09" max="1e+08" free="1" />
    <parameter name="Index" value="-5" error="5.34691e+07" scale="1" min="-5" max="2" free="1" />
    <parameter name="Cutoff" value="12.5971" error="2.07032e+10" scale="1e+06" min="0.0005" max="1000" free="1" />
    <parameter name="Scale" value="1" scale="1e+06" free="0" />
  </spectrum>
```

TS distribution of large-scale emission component



TS distribution of large-scale emission component



TS distribution of large-scale emission component