

Simulations activities in Bari

Di Venere L., de Palma F.

Bari

6-2-2018

Outline

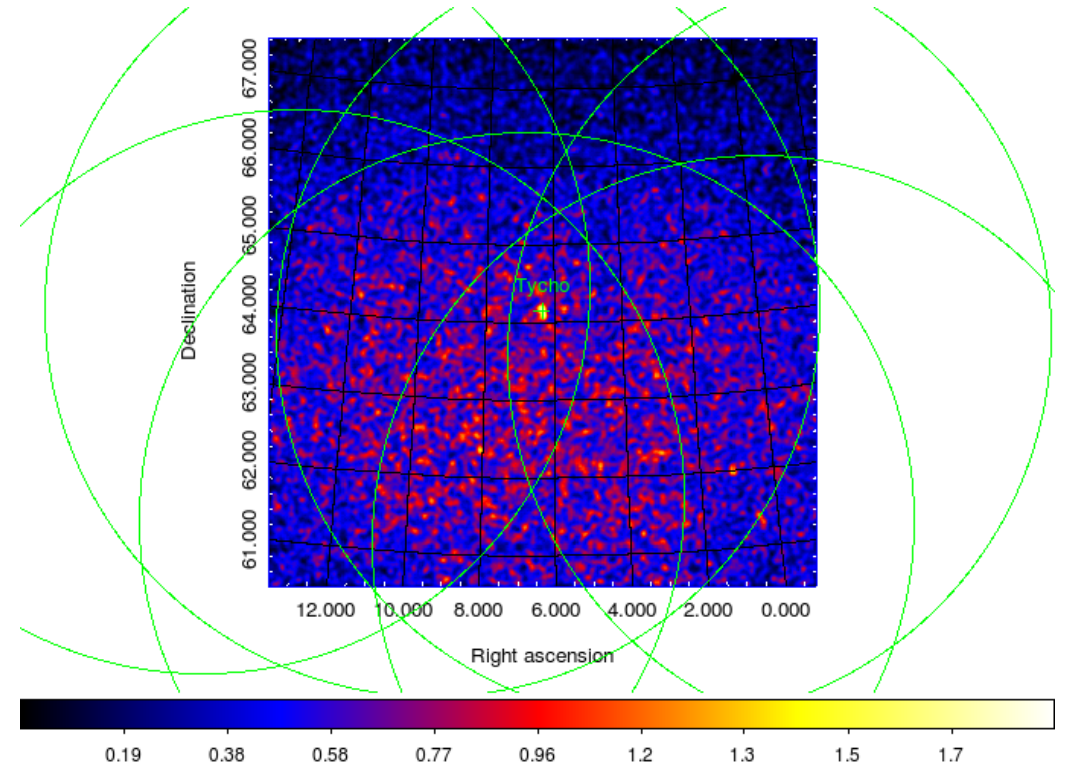
- High level simulation with ctools
 - SNR analysis of DC1 data
 - Ad-hoc simulations to study different spectral and spatial shapes
- MC activity
 - Be involved in MC simulations for SCT

Ctools analysis

- Test case: Tycho SNR
- Binned likelihood analysis:
 - Definition of spatial and spectral binning parameters
 - Create binned count cube
 - Calculate exposure cube and psfcube
 - Calculate bkgcube for a given background model
 - Calculate edisp cube (if edisp is enable) (slow)
- Likelihood fit (ctlike)
- Residual map (csresmap)
- Spectral Energy Distribution (csspec)

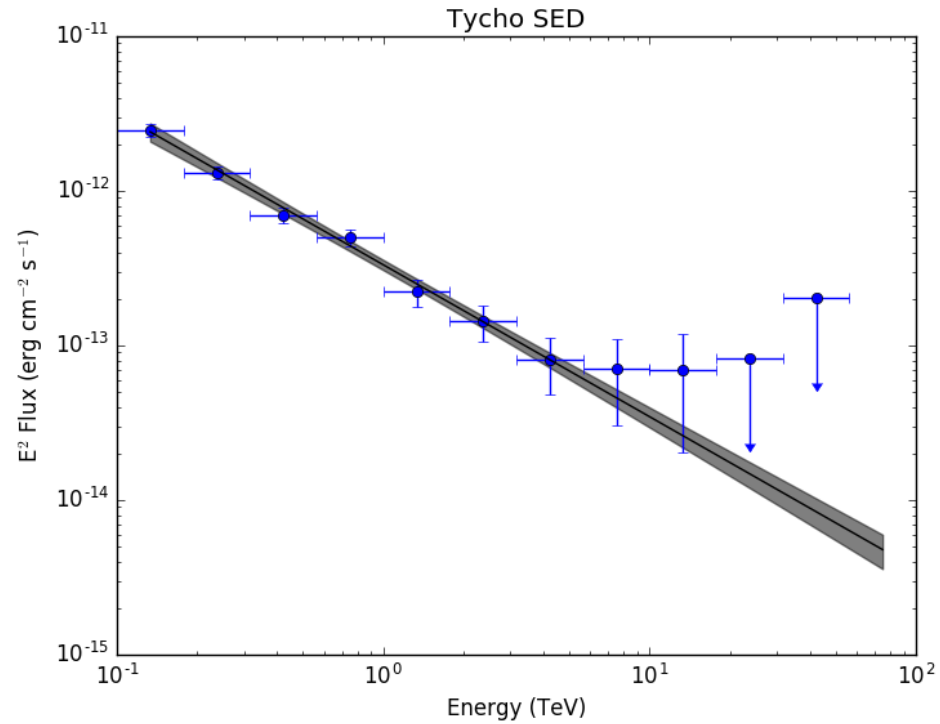
Data selection

- Energy: 0.1-100 TeV
- ROI: 5° radius
- IRFs = North_z40_50h, North_z20_50h



Count map @1 TeV

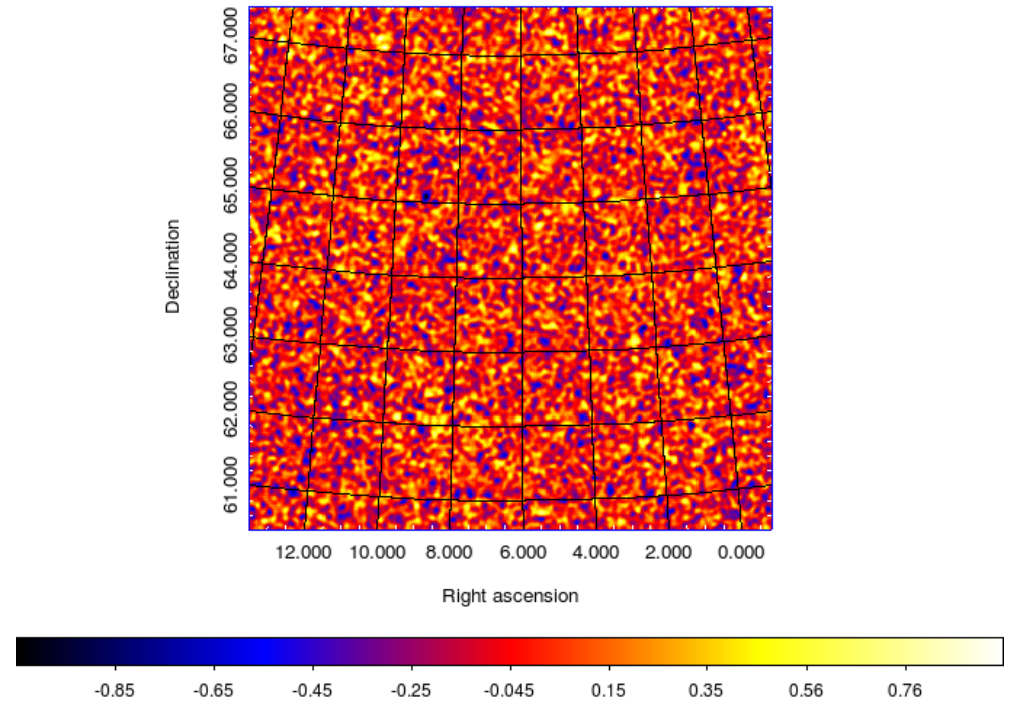
Fit results



Prefactor: (2.05 ± 0.15)e-19 (2.2 e-19 simulated)
Index: 2.98 ± 0.05 (2.92 simulated)

Residual map

- Smoothed with kernel 0.05 deg
- 'SUBDIVSQRT' algorithm



Detailed study (in progress)

- Items:
 - Detect extension
 - Study spatial shape (shell?) ?
 - Source confusion ?
- Simulate data
 - Background: CTAIrfBackgorund + galactic IEM
 - SNR: point-source/disk , power-law/curved spectrum
- Recover spectrum and significance for different observing times
- Test extension

Machine learning for SCT (and/or LST)

with F. de Palma and P. Da Vela

- Start from MAGIC MC/data (few people already working on NN in MAGIC)
- Test different packages (scikit, TensorFlow and TMVA) for the gamma/hadron separation
- First step: Deep neural network
- Next step: convolutional neural network on camera images
- Work already done in SCT (O. Hervet, D. Nieto, G. Maier)