Laboratoire d'Annecy-le-Vieux
de Physique des Particules

ICRC contributions

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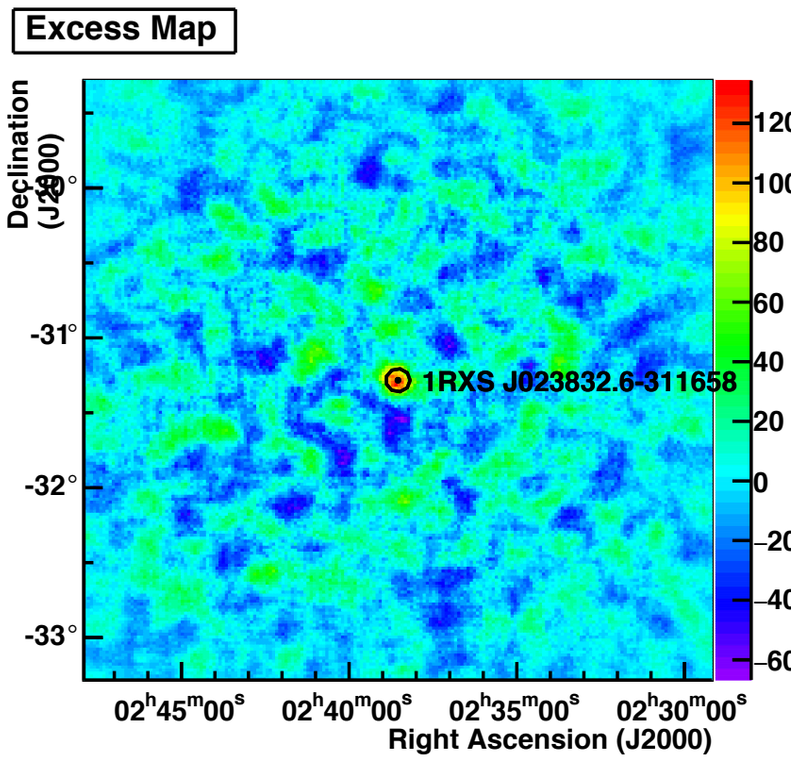
H.E.S.S analysis: 1RXS J023832.6-311658

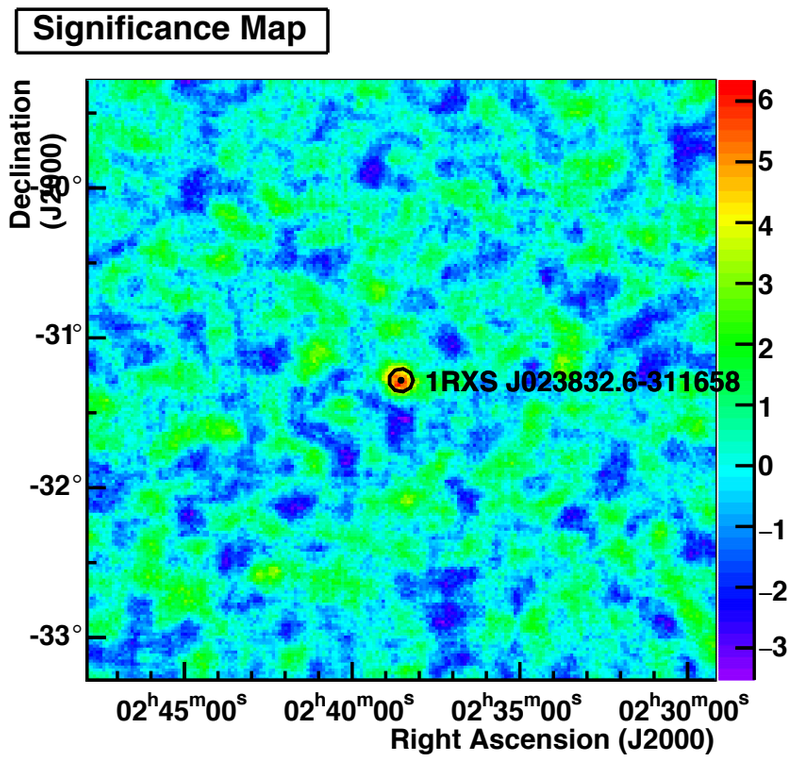
- Interesting source with hard TeV spectrum
- Good candidate to study IGMF
- Simulation of observed photons distributions

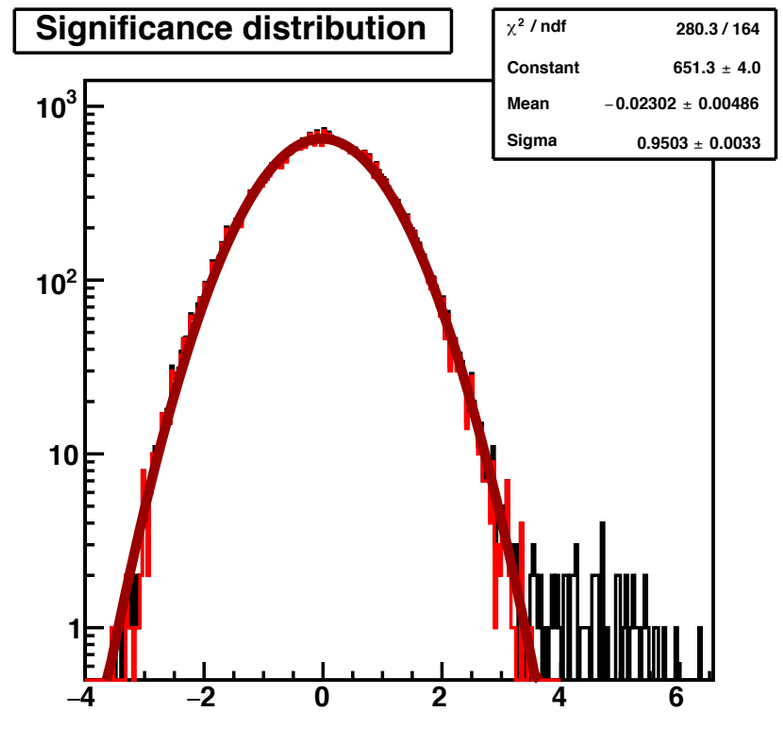
- H.E.S.S analysis: 1RXS J023832.6-311658

Stereo std

Source detection





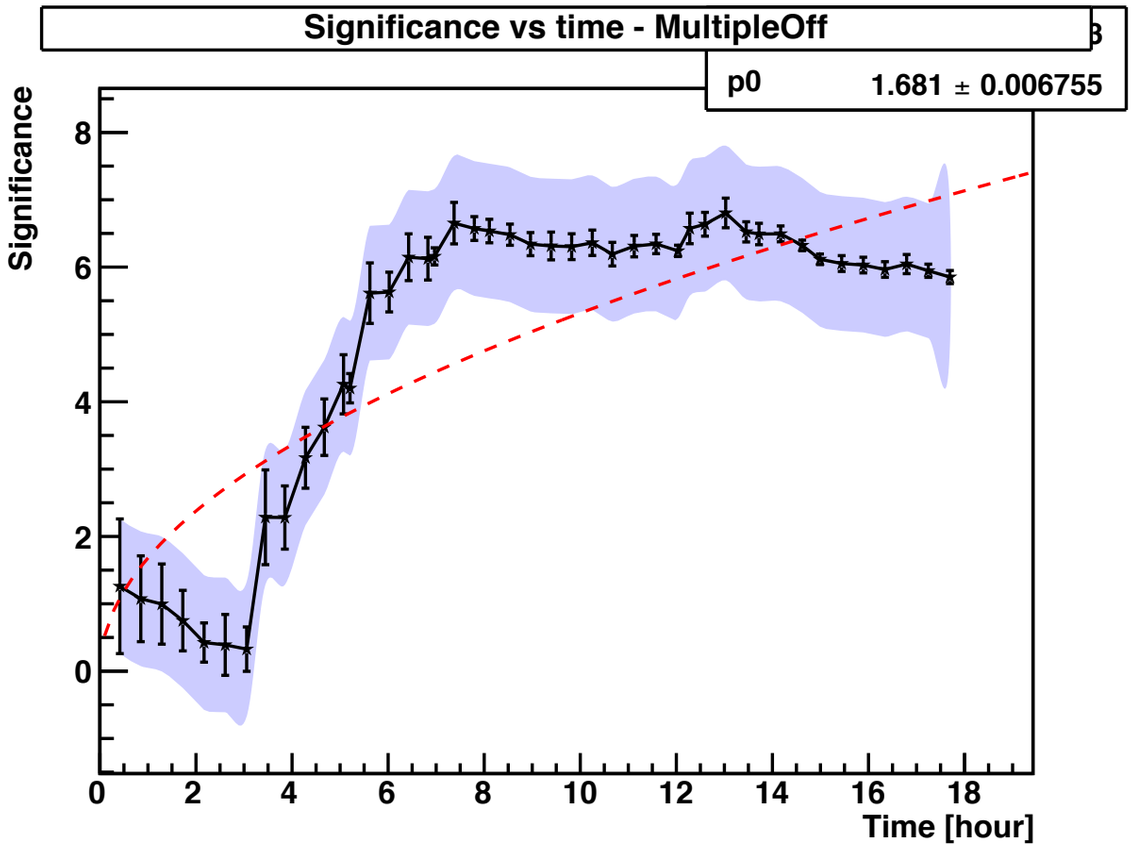


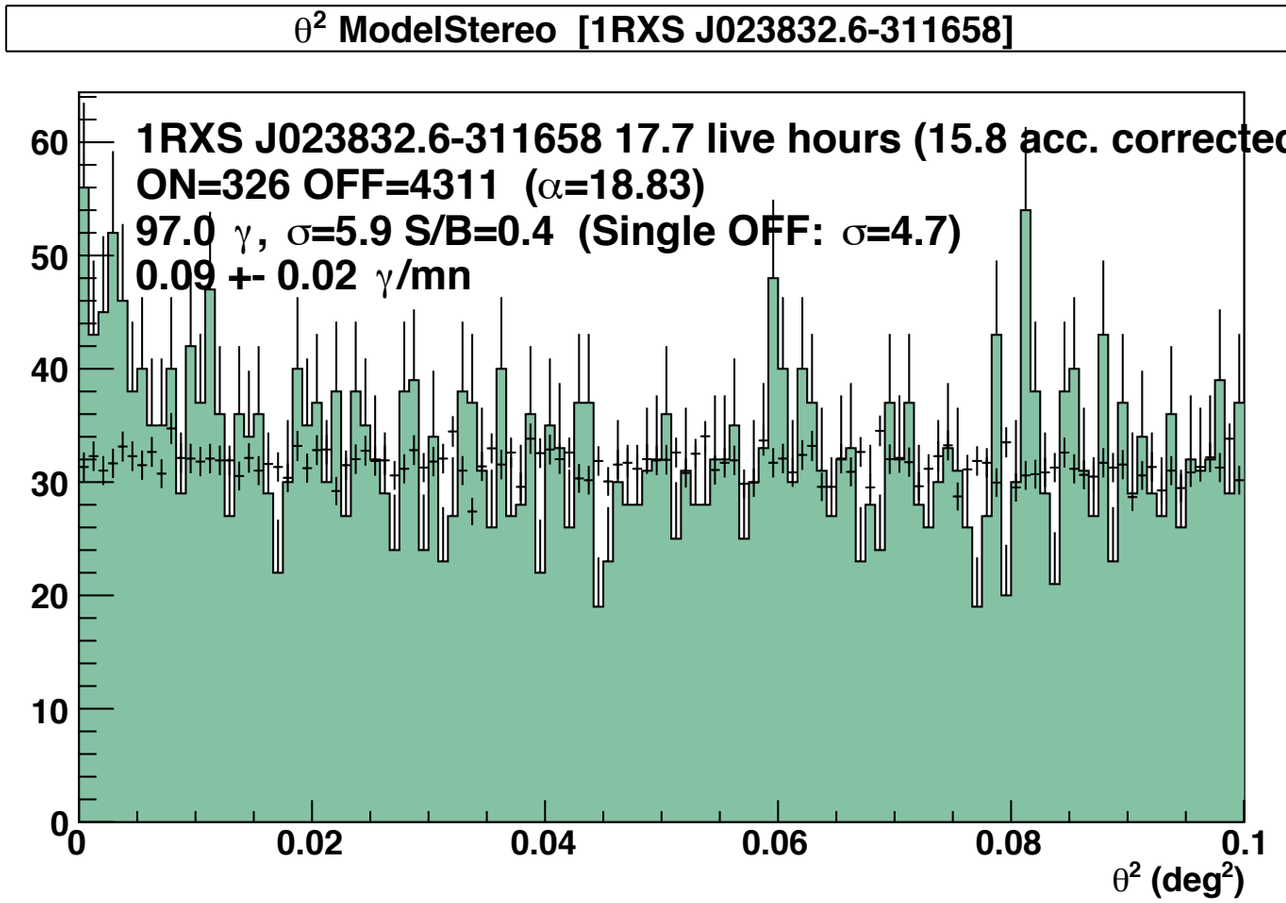
- Source clearly visible on sky maps and significance distribution
- Background well normalized

- H.E.S.S analysis: 1RXS J023832.6-311658

Source detection

Stereo std





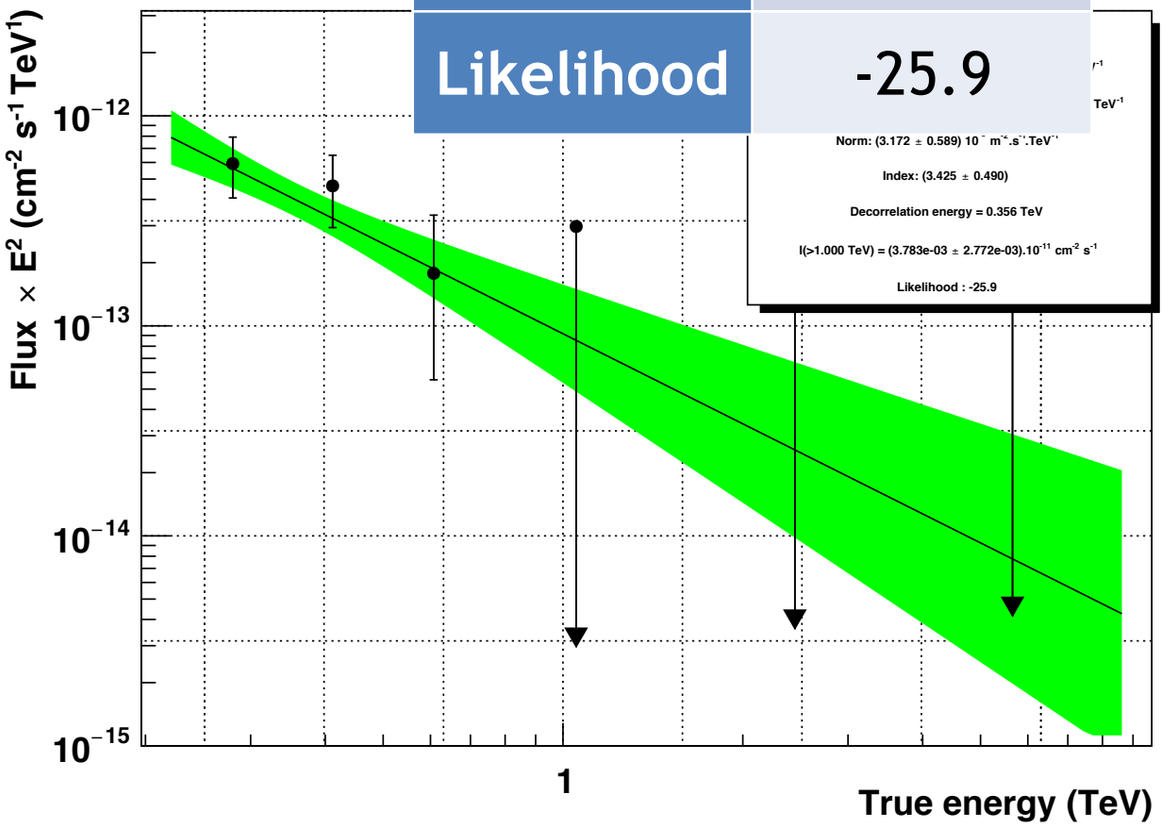
- source detected with 6 sigma significance
- 15.8 live hours after acceptance correction

- H.E.S.S analysis: 1RXS J023832.6-311658

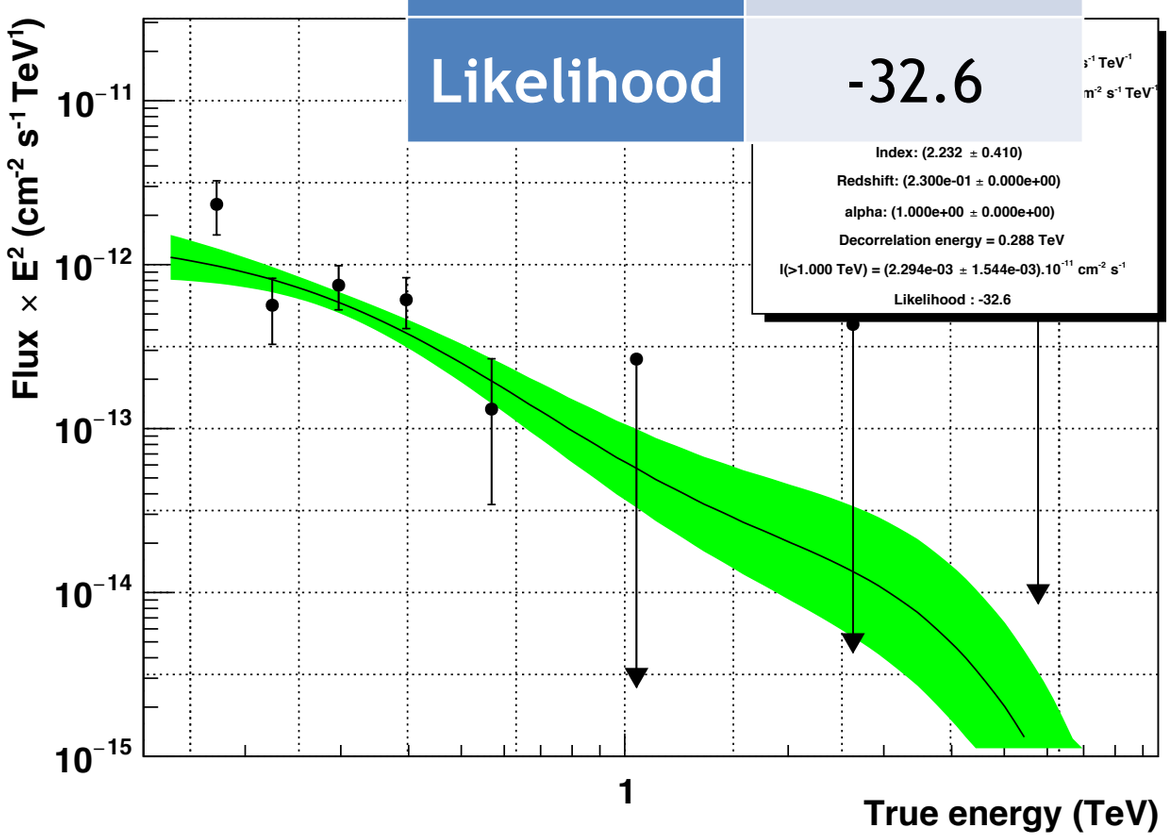
Source characteristics

Stereo std

Power law	
Γ	3.4 +- 0.5
Likelihood	-25.9



PL corrected for EBL	
Γ	2.2 +- 0.4
Likelihood	-32.6

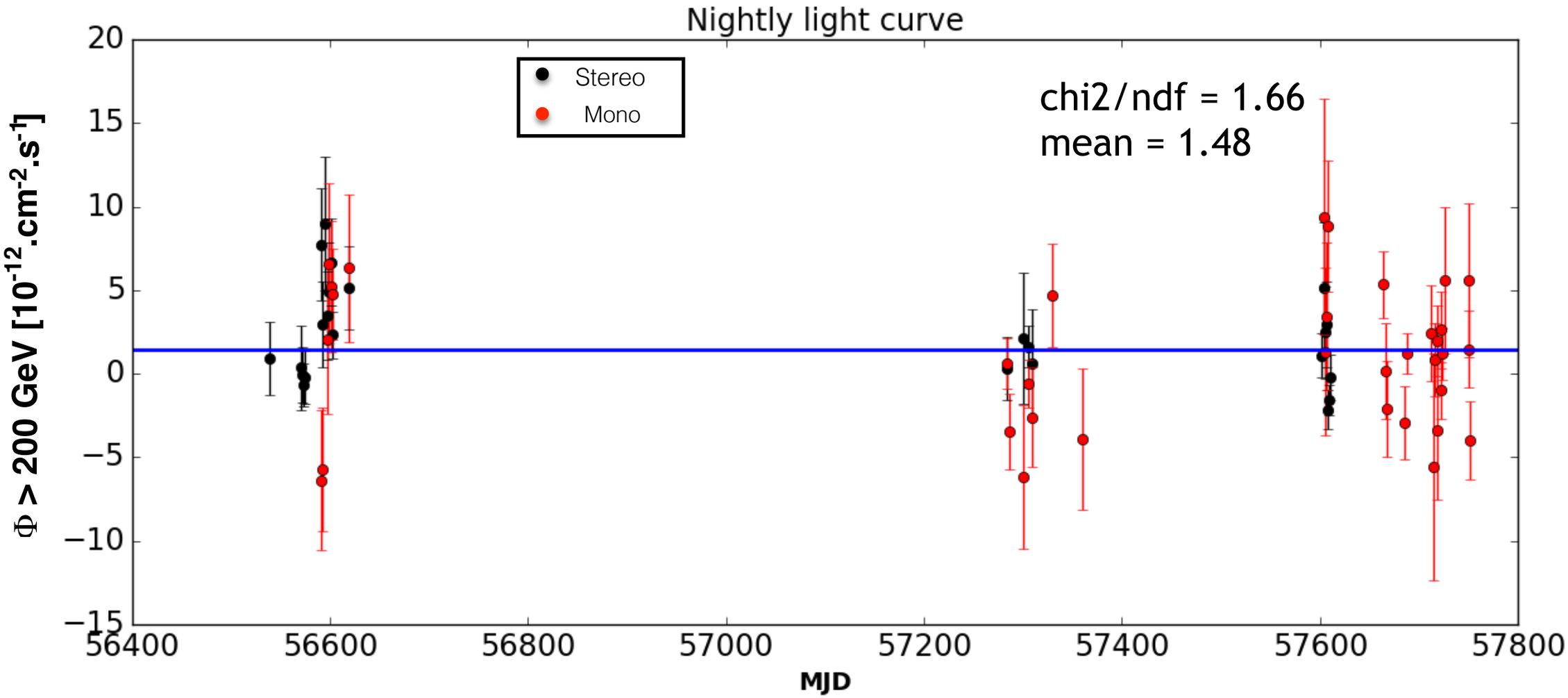


- Hard spectral index around TeV energies (~2.2)

- H.E.S.S analysis: 1RXS J023832.6-311658

Source characteristics

Stereo + Mono std

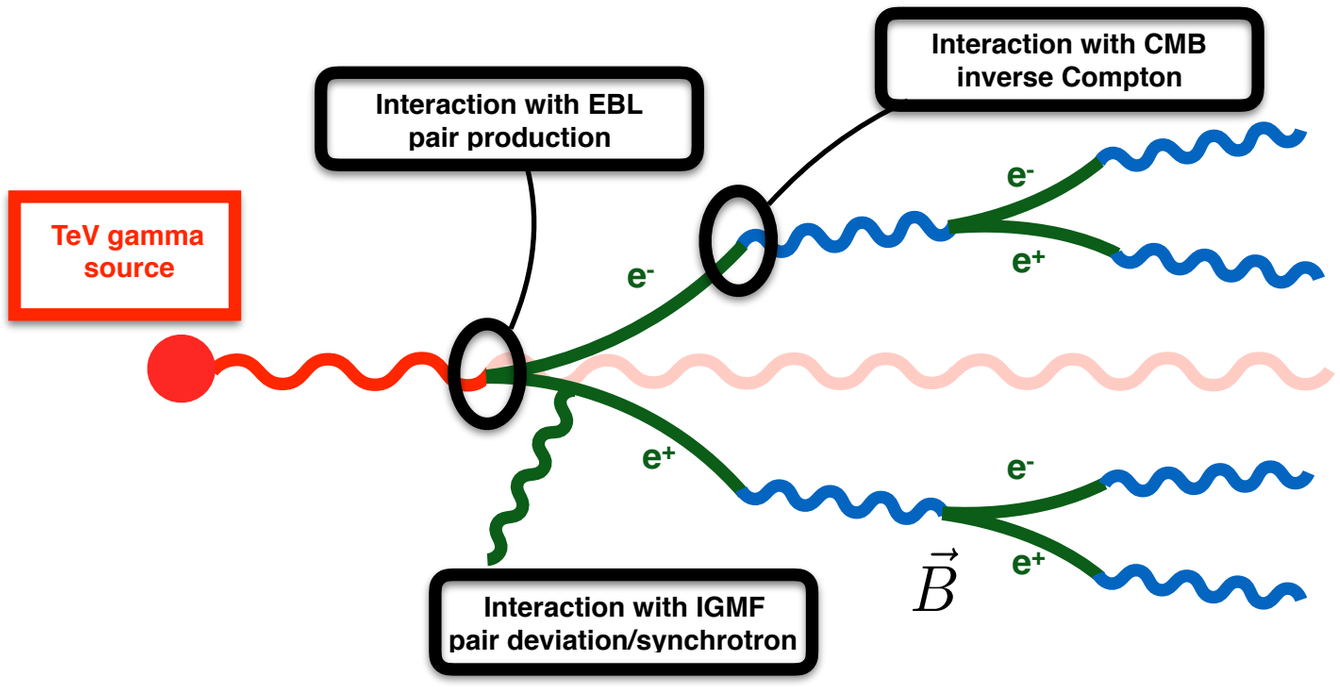


- Light curve compatible with a steady emission

- H.E.S.S analysis: 1RXS J023832.6-311658

Source characteristics

The characteristics are suitable to study cosmological showers



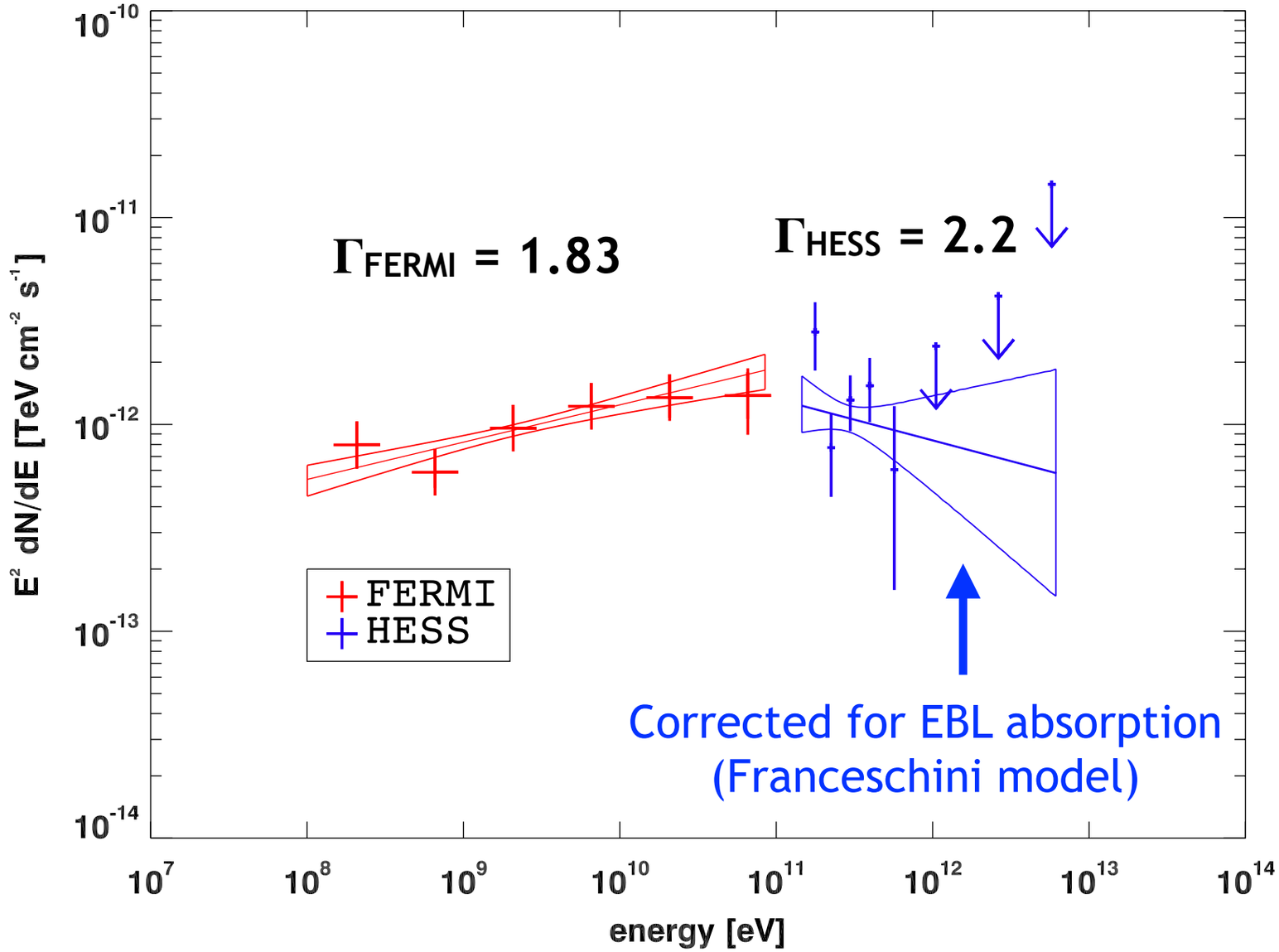
- Known and important redshift (z = 0.23): Strength of the absorption
- Hard spectrum (2.2) at TeV energies: cascade generation
- Low variability: steady emission is assumed to calculate the cascade

- H.E.S.S analysis: 1RXS J023832.6-311658

Intrinsic spectrum

Use FERMI & HESS data

IGMF study

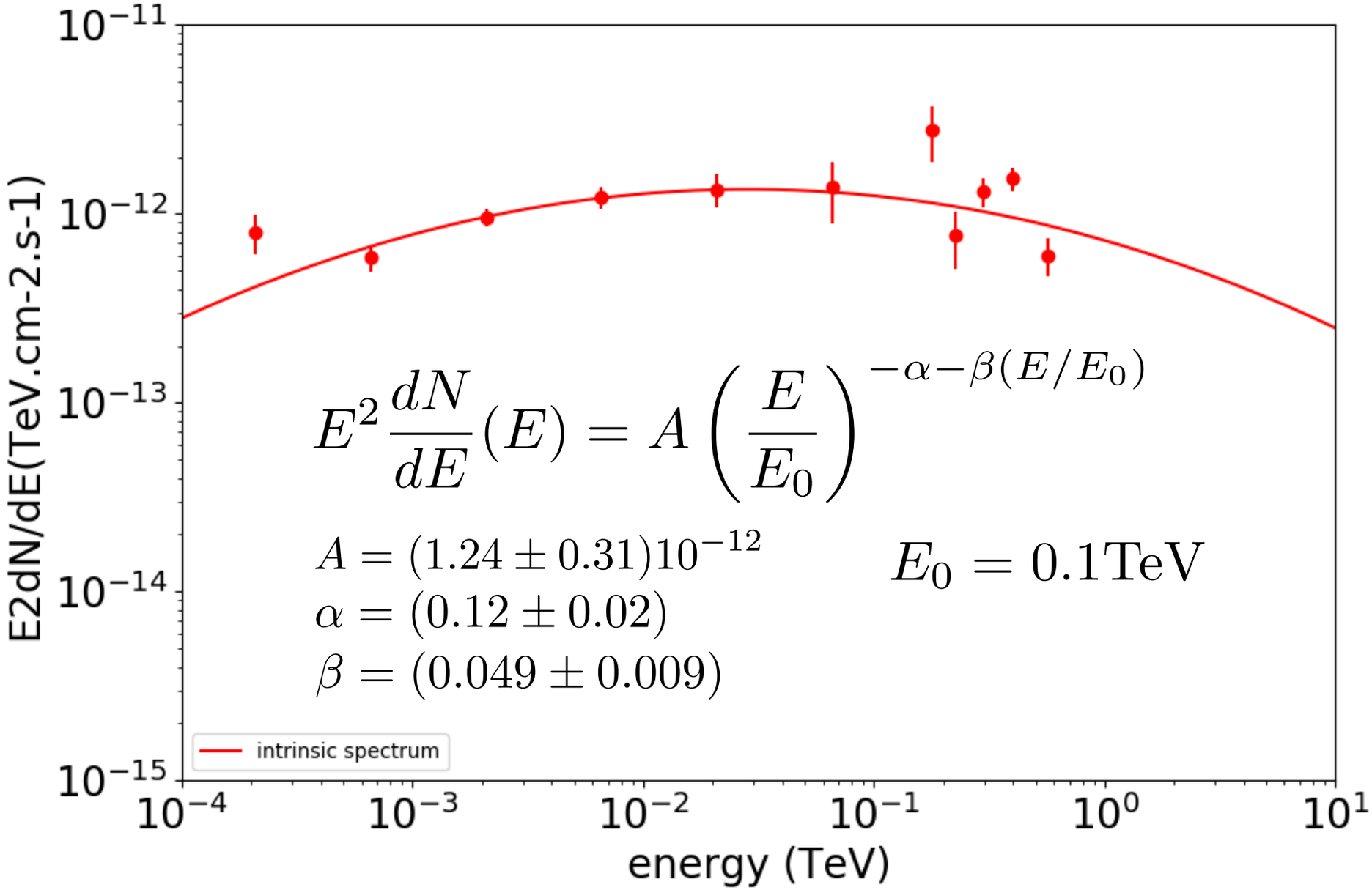


IGMF study

- H.E.S.S analysis: 1RXS J023832.6-311658

Intrinsic spectrum

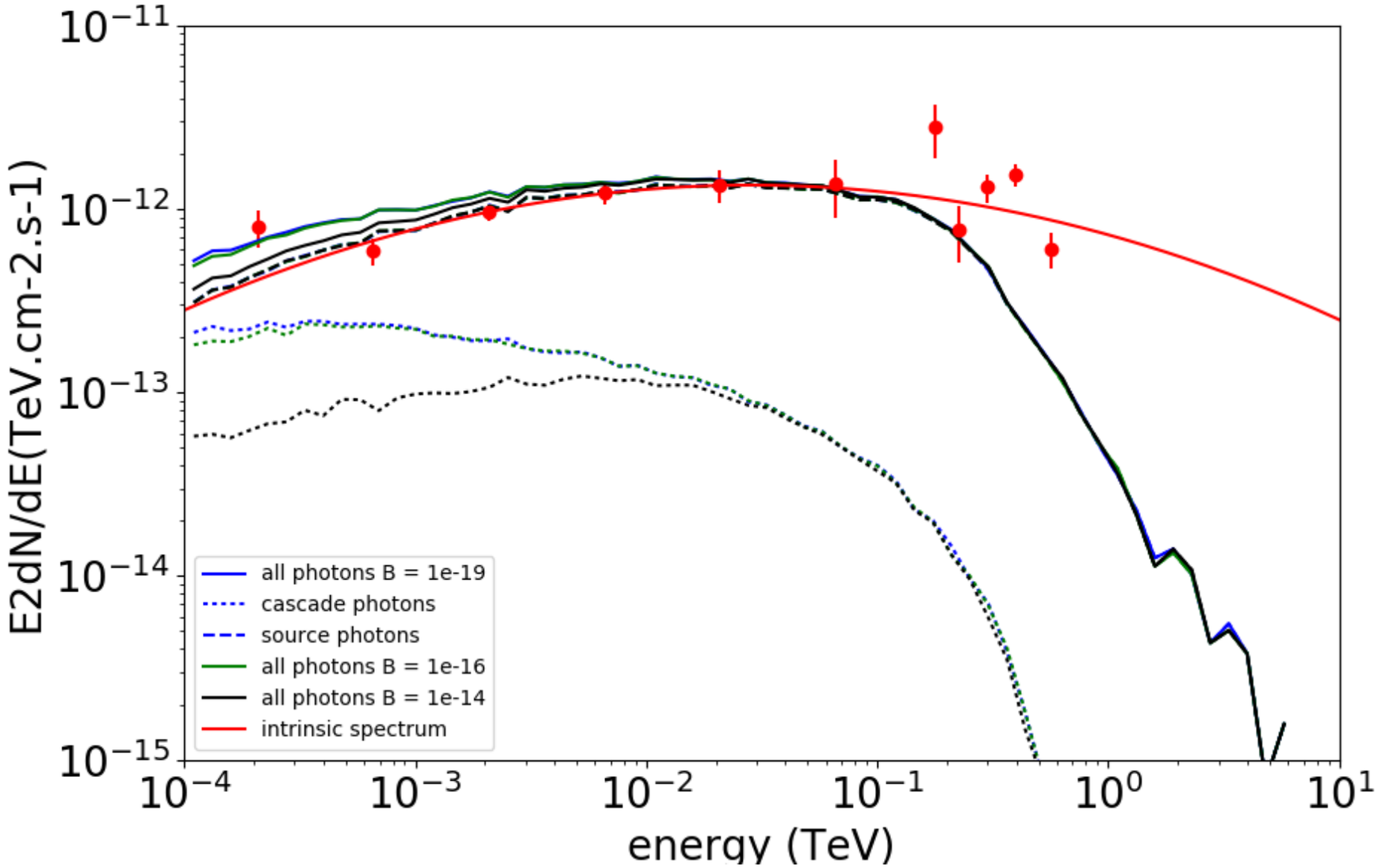
CTATools-like spectrum modeling



- H.E.S.S analysis: 1RXS J023832.6-311658

IGMF study

Simulation of observed photons Fitoussi 2017



- H.E.S.S analysis: 1RXS J023832.6-311658

Source detection

Source characteristics

IGMF study

Test different IGMF configurations compared to hypothesis

Exclusion regions for IGMF values

Gamma-ray Propagation Task Force

Study cosmological effects on GR propagation

Sub tasks

- EBL
- Axion-Like Particles
- IGMF
- LIV
- Intrinsic Spectra

CTA capabilities

Simulation &Analysis

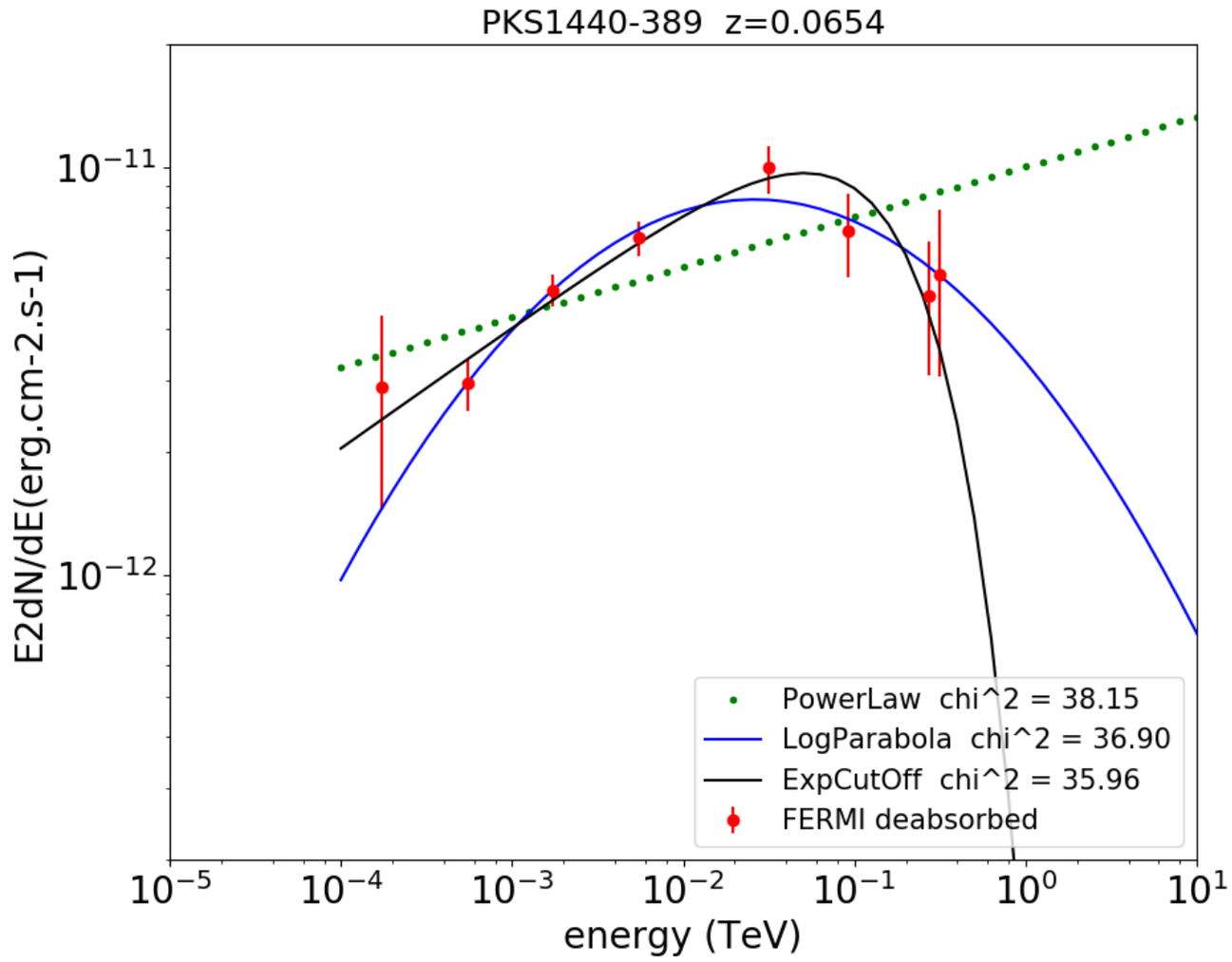
- GammaPy
- CTATools
- …

- CTA GPROPA task force: **CTATools**

Intrinsic Spectra
& Extrapolation

Using FERMI data

- GeV data corrected for EBL absorption
- Here using Franceschini model
- No spectral shape is assumed
- chi squared values or likelihood corresponding to each model are computed
- **Extrapolation is performed using the model giving the best agreement**

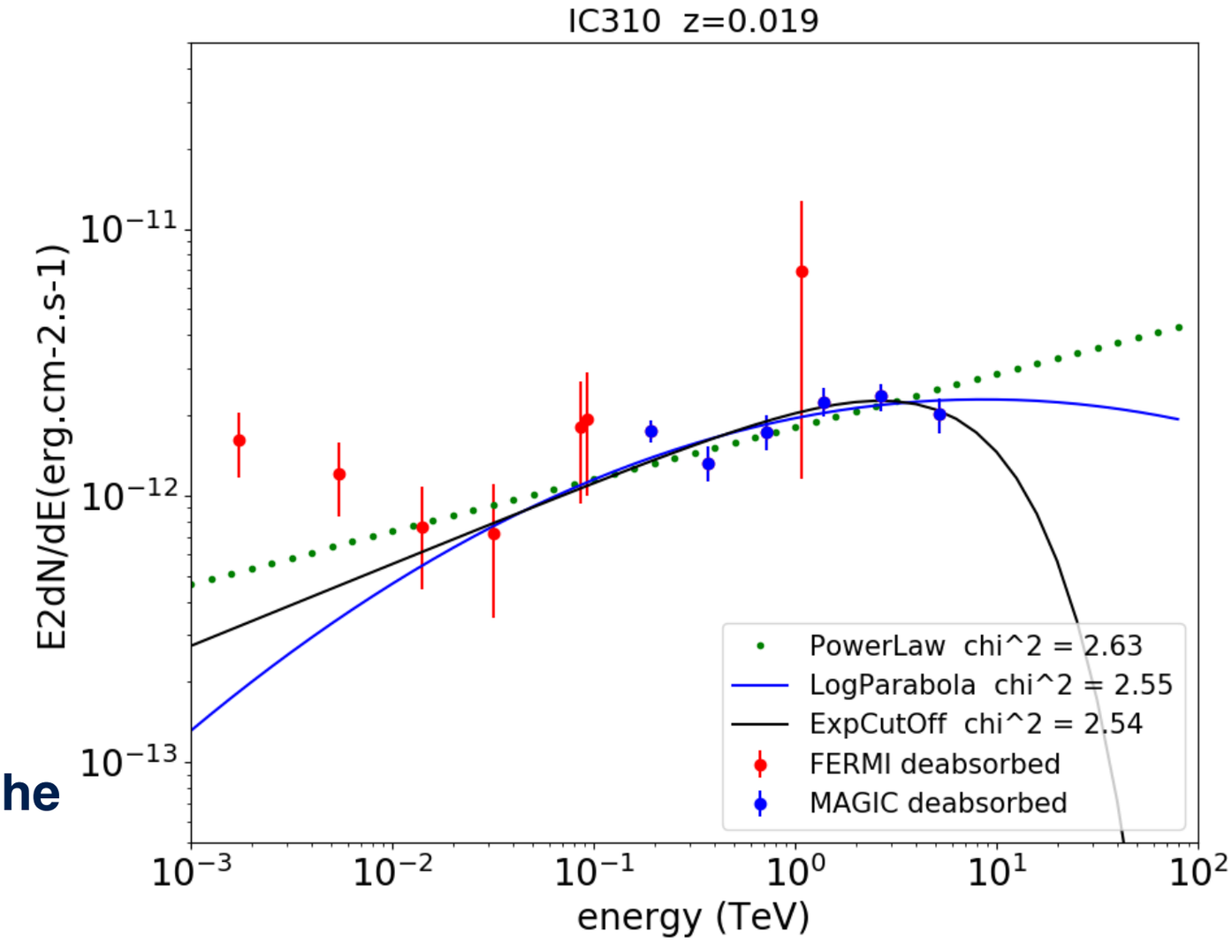


- CTA GPROPA task force: **CTATools**

Intrinsic Spectra
& Extrapolation

Using FERMI and TeV data

- GeV + TeV data corrected for EBL absorption
- Here using Franceschini model
- No spectral shape is assumed
- chi squared values or likelihood corresponding to each model are computed
- **Extrapolation is performed using the model giving the best agreement**

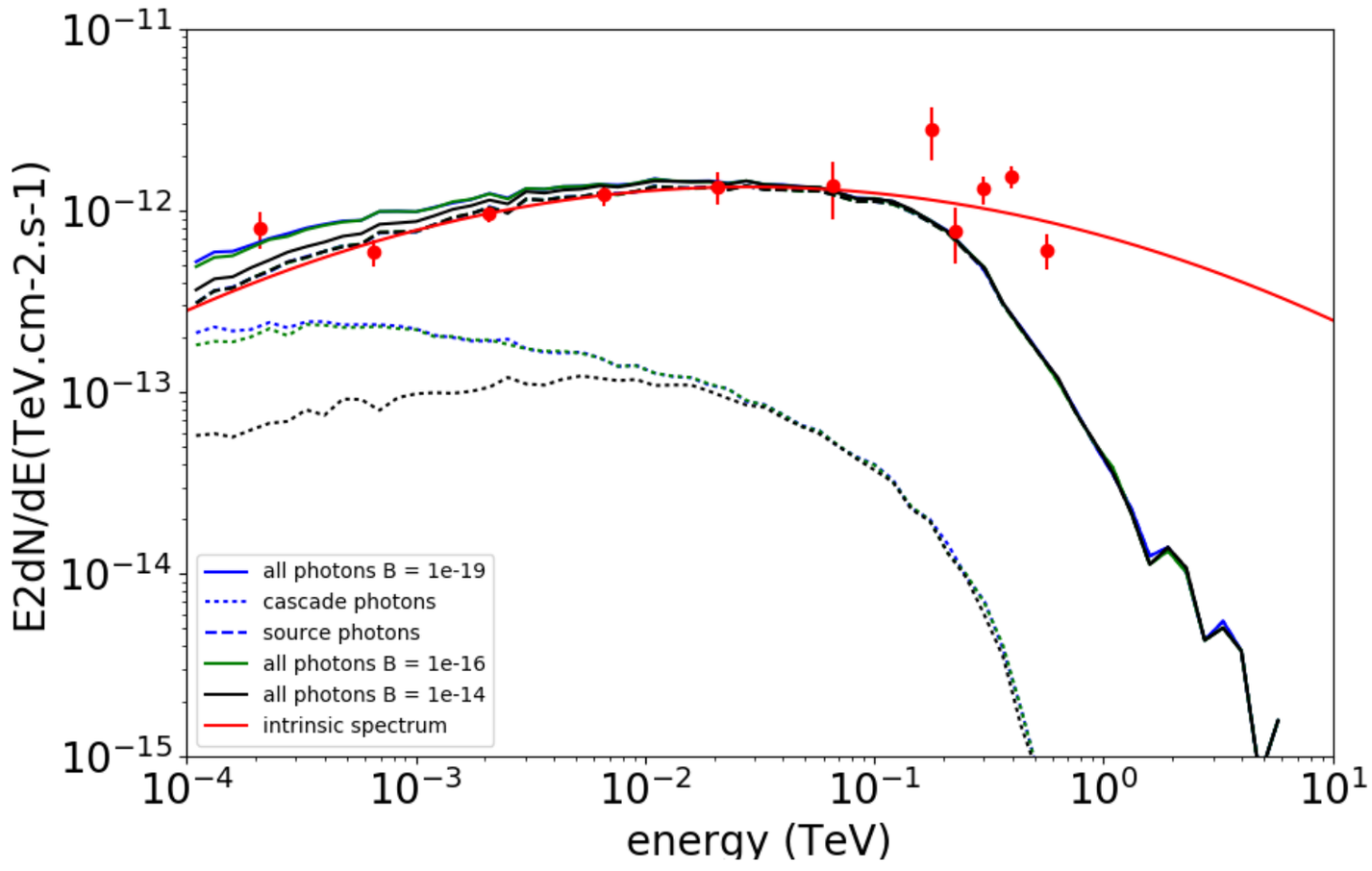


- CTA GPROPA task force: **CTATools**

IGMF study

Fitoussi 2017 integrated

- Simulate distributions of observed photons for a large set of sources
- Using CTA IRFs
- CTA capabilities to probe IGMF



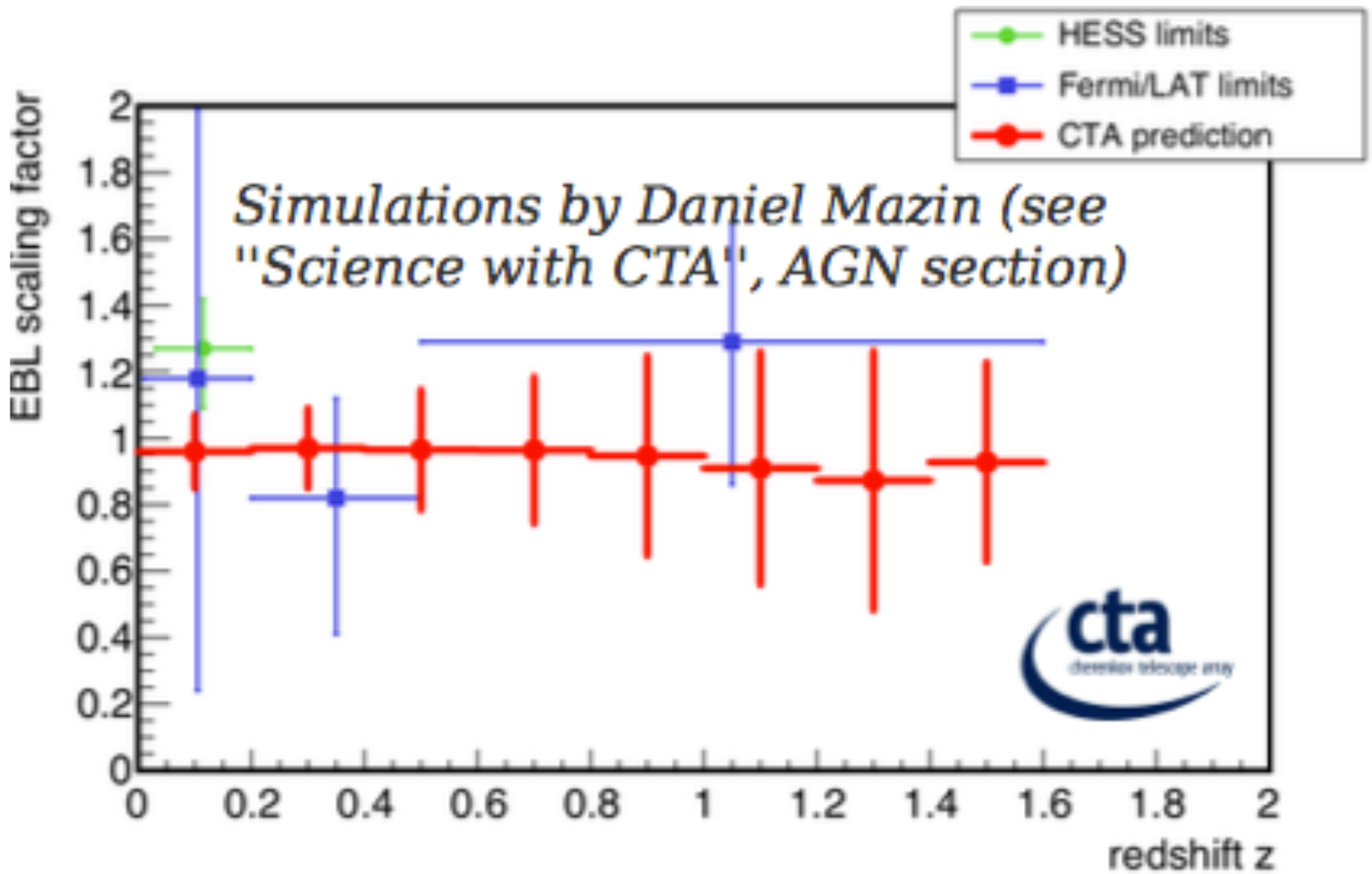
- CTA GPROPA task force: **CTATools**

EBL

- Join fit of EBL and intrinsic emission

$$\phi_z(E) = \phi_{\text{int}} \times e^{-\alpha \times \tau(E,z,n)}$$

- Fit normalization factor
- Reconstruction of the scaling factor for different models



- CTA GPROPA task force:

CTATools science:

- EBL
- Axion-Like Particles
- IGMF
- LIV
- Intrinsic Spectra

Content of the contribution to be determined soon

CTATools macros:

- EBL models
- IGMF simulation
- Intrinsic Spectra
- Ctools simulation
- CTA IRFs
- Analysis (Plots,…)
- Read FERMI catalogues