



# **Spectrum Analysis with different models**



# Changes Made from Previous Analysis

- In the recent analysis I did not construct the Events file instead used the required IRF file to do the analysis. Here I have used South\_z20\_50h.fits irf file to do the analysis.
- Earlier I provided the model parameters, pointing location, background parameters in xml to create events file using ctools where we also added IRF details, energy range, and livetime. In recent analysis I provided only model parameters, energy range, livetime and IRF details for analysis.
- My results did not vary if I provided different position for the source and also gave me opportunity to run analysis for more number of observation to get the variation in reconstructed model.



## Expected Results

- Here I try to get results for two different models PowerLaw and Exponential-cut-PowerLaw.
- I provide required parameters for both the models with appropriate energy range (30GeV - 100TeV) and enough livetime(since our source are weak sources, i.e; 48 hrs) along with the standard IRF file (South\_z20\_50h) provided by Gammapy.
- The expected result when run for many number of observation should provide us with the gaussian distribution of different parameters of reconstructed model i.e; gaussian distribution of index and flux for Powerlaw and gaussian distribution of index, flux and lambda for Exponential-cut-PowerLaw.

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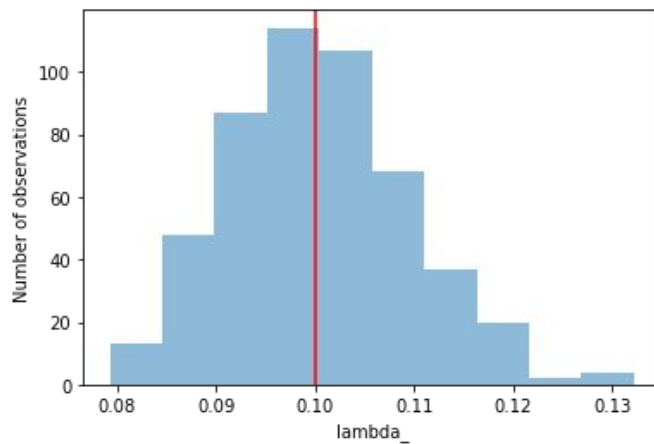
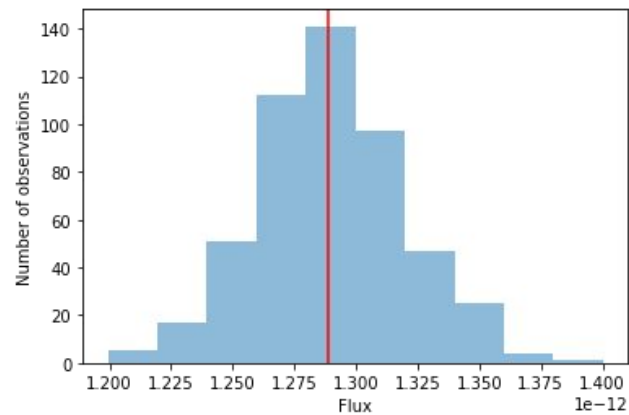
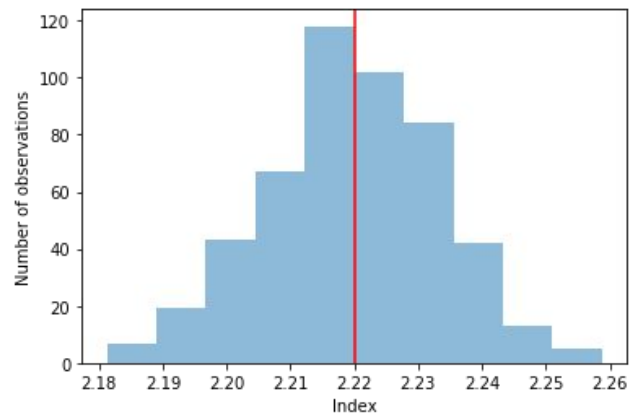
**Results for M82:**

**Index = 2.22**

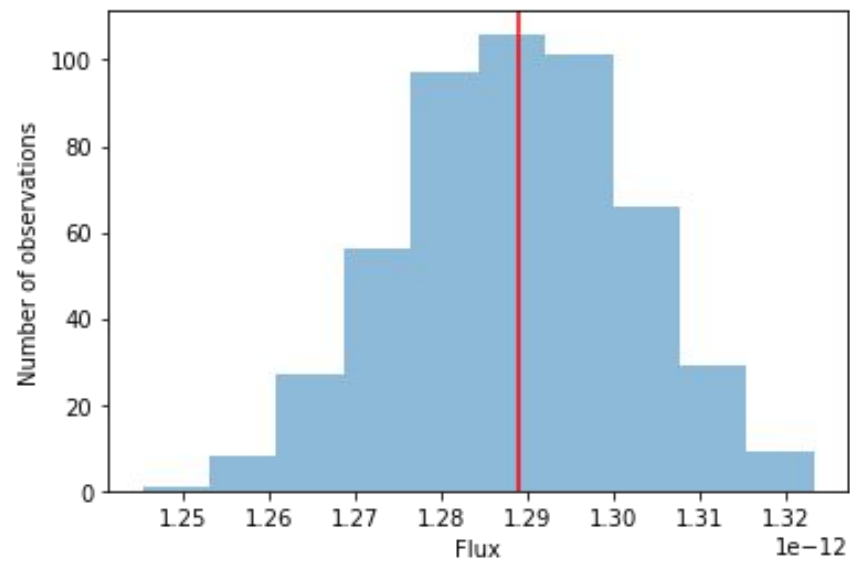
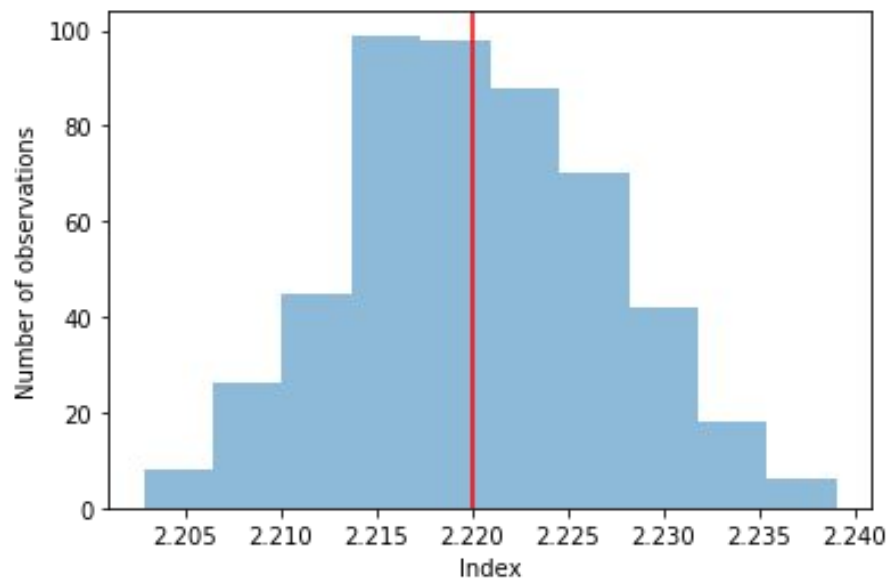
**Flux =  $1.289\text{e-}12$**

**No. of observation runs = 500**

## M82 with Exponential-cut-Powerlaw



## M82 with Powerlaw



# Results and Observations

- From graph of M82 we can see that our distribution is following gaussian pattern as expected.
- I have also got plots for  $n_{on}$ ,  $n_{off}$  and  $n_{excess}$  (1. PowerLaw, 2. Exponential-cut-PowerLaw).
- I have also got plots for other sources as well and updated them on github repository.

