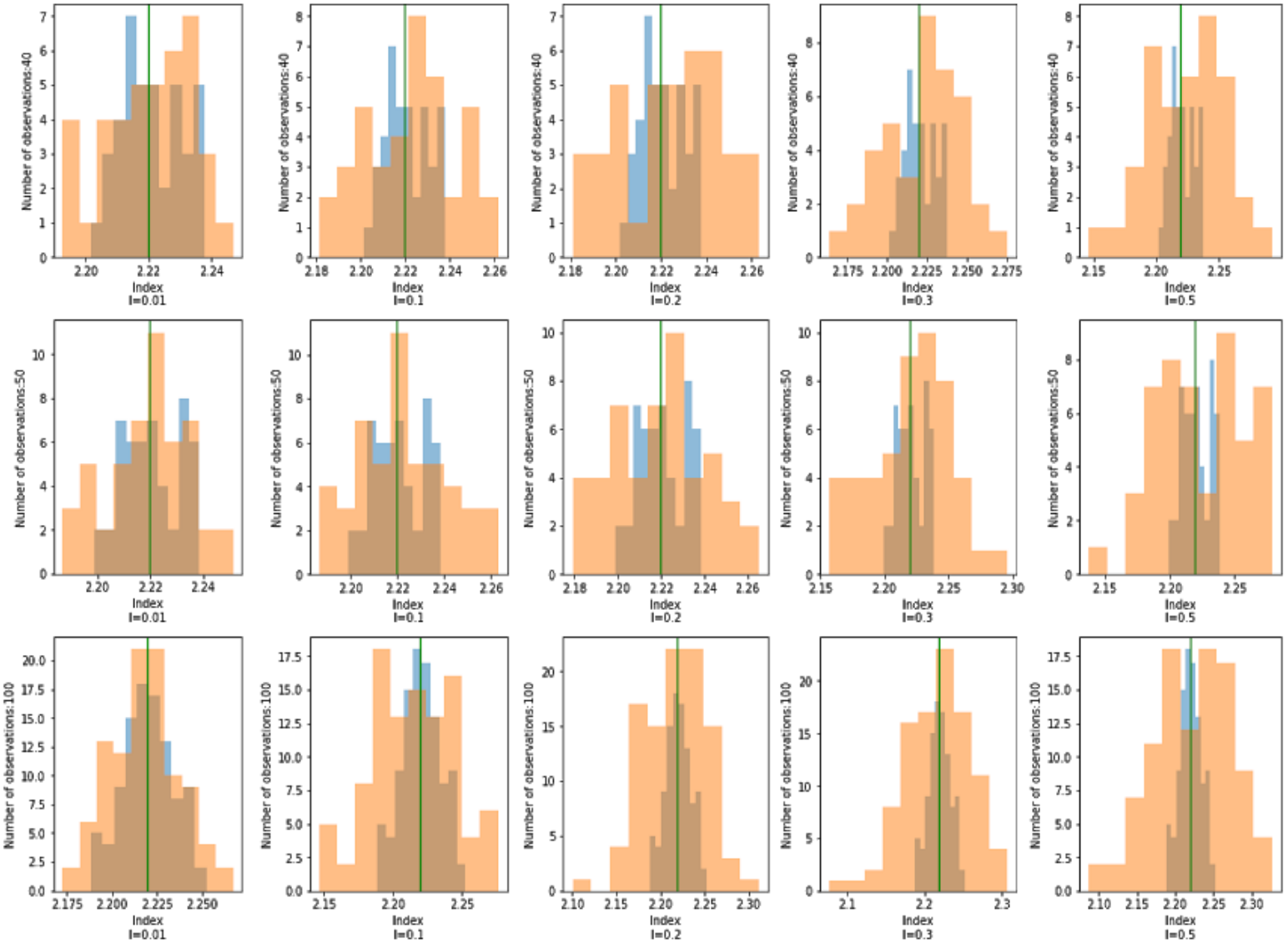
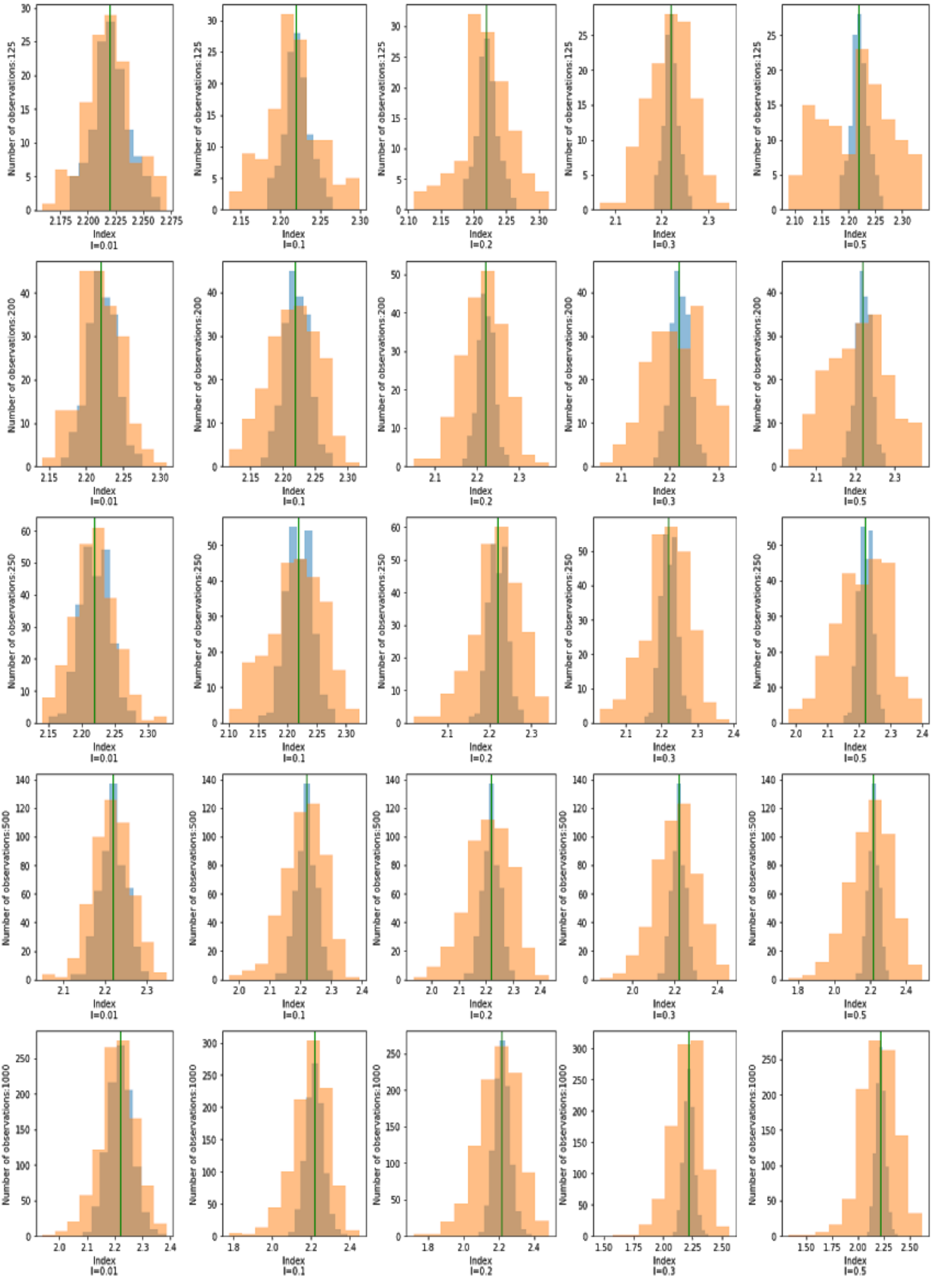
Spectral Analysis

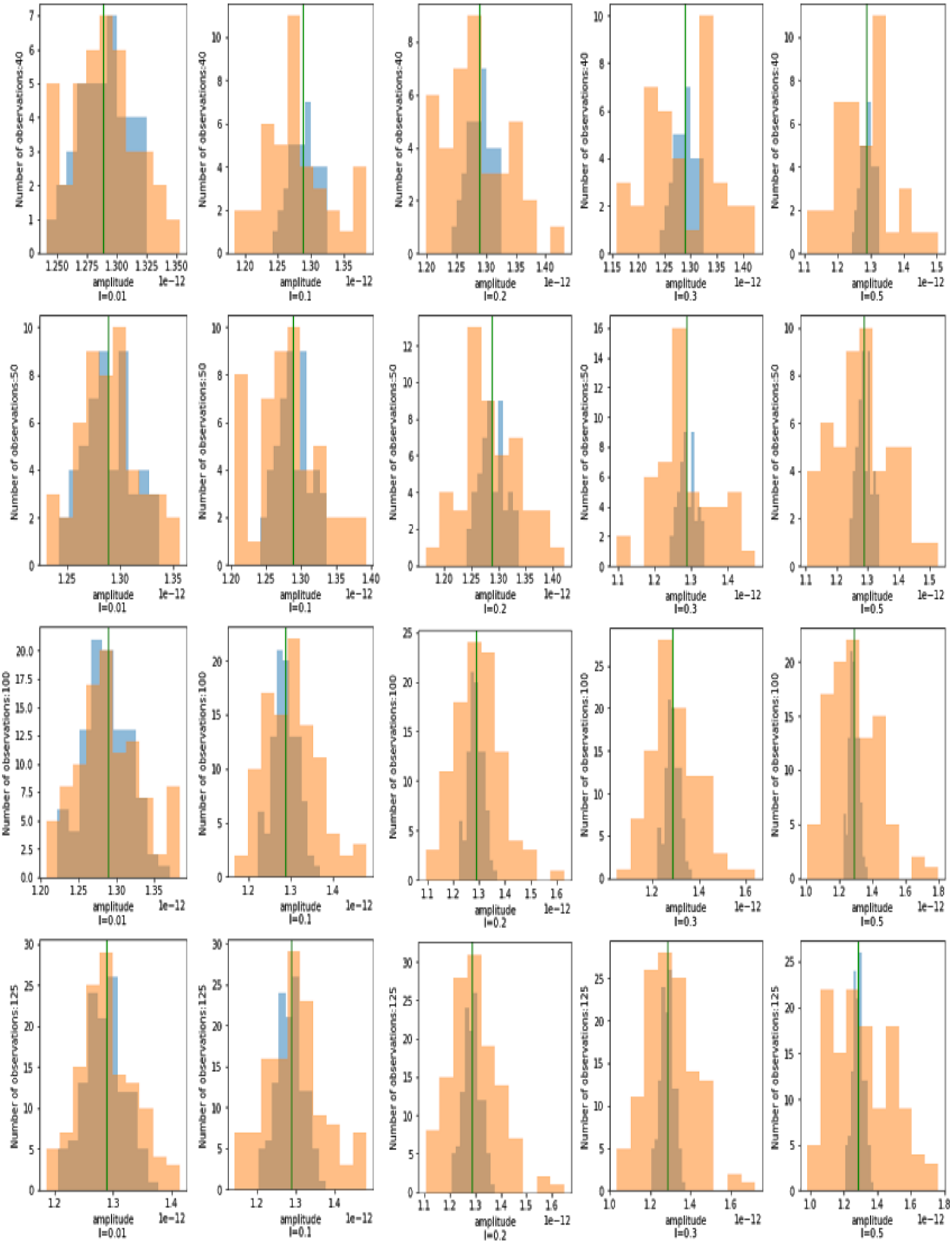
Parameters:

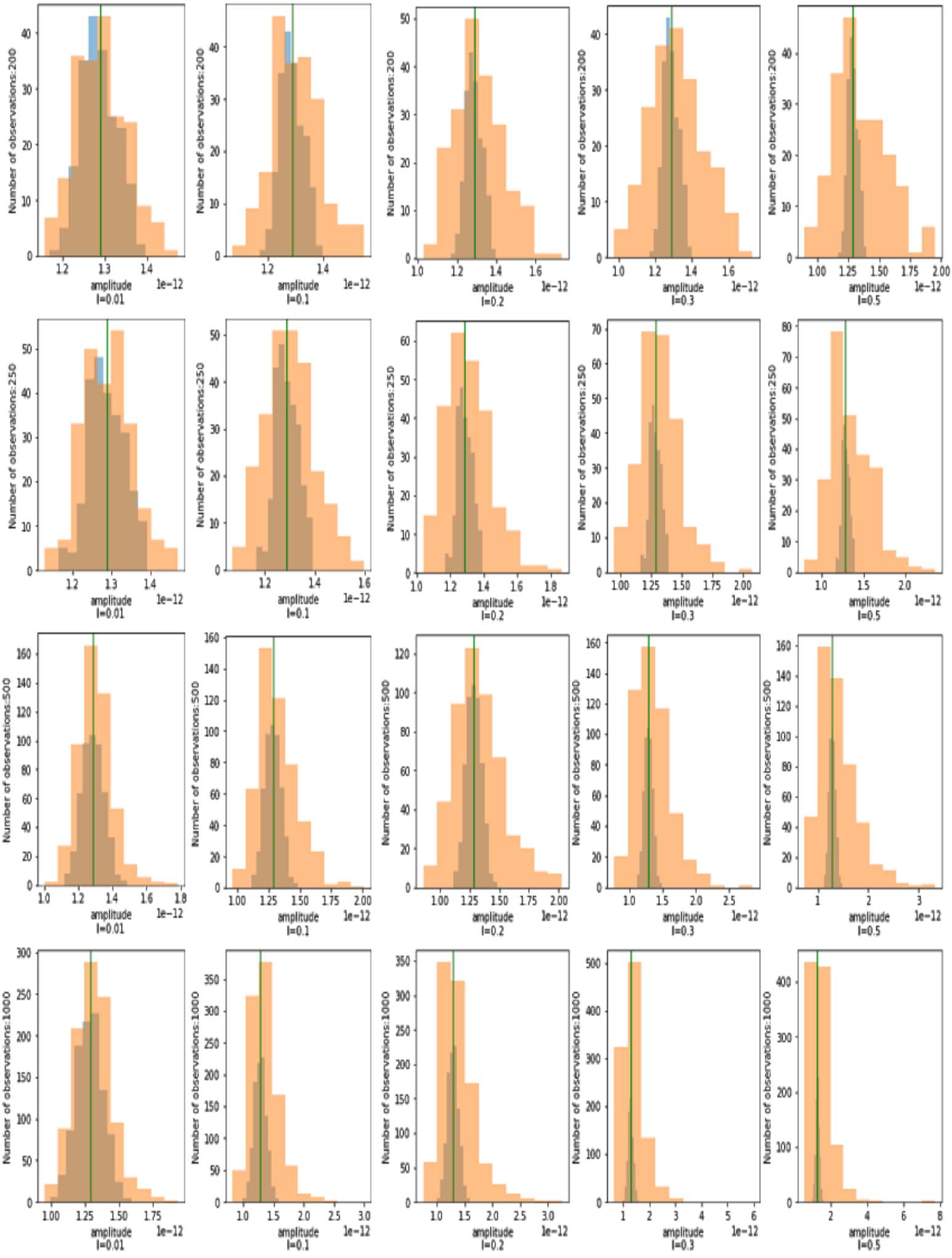
Index: 2.22
Amplitude: 1.289e-12
Livetime: [25,20,10,8,5,4,2,1] hrs
Number of observations: [40,50,100,125,200,250,500,1000]
Total Runtime: 1000 hrs
Energy Range: 30GeV - 100TeV
Model : [PowerLaw, l=0.01, l=0.1, l=0.2, l=0.3, l=0.5]

Comparing PowerLaw with PowerlawExponentialcutoff with different Lambda values for different number of observations:

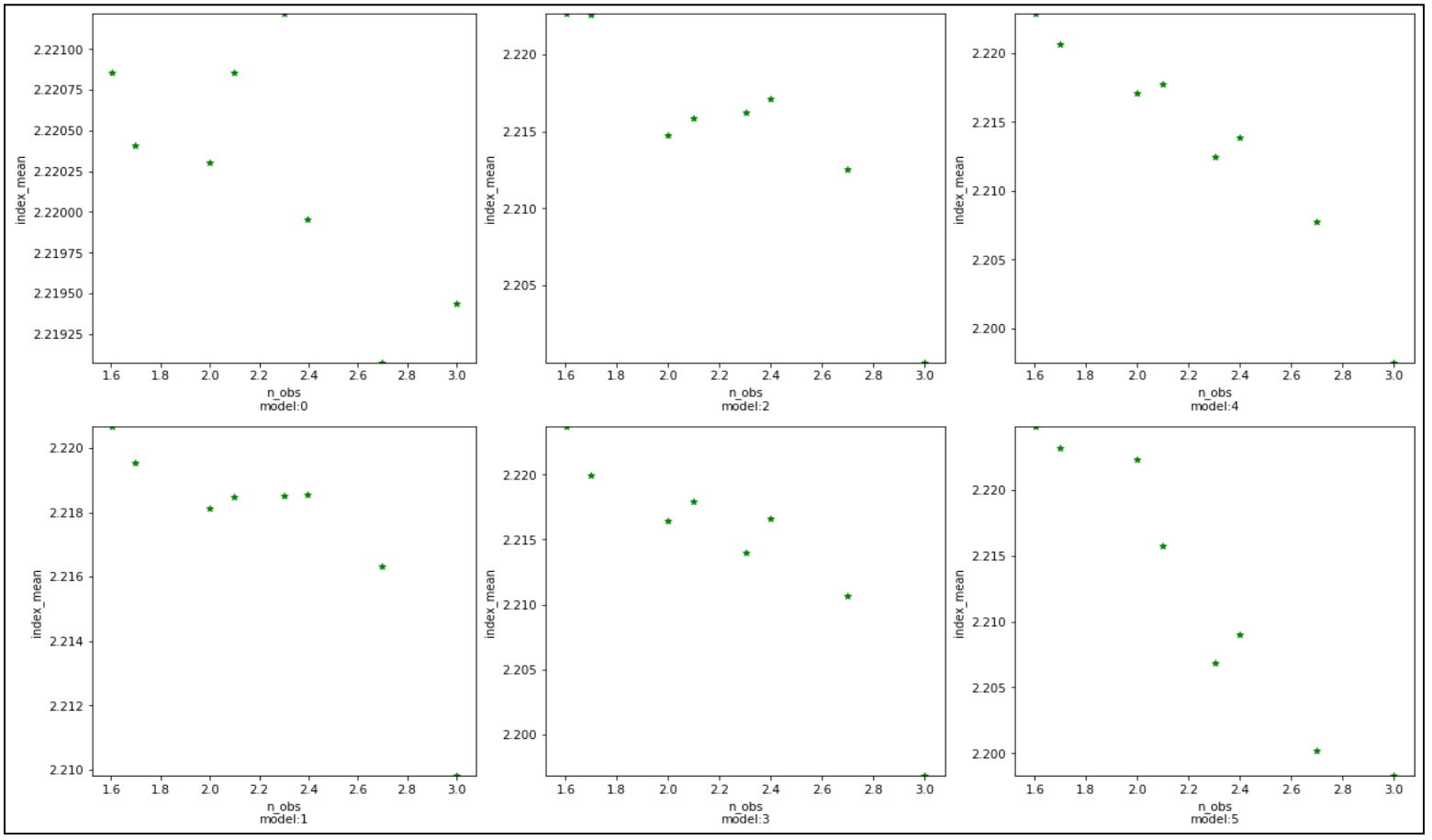


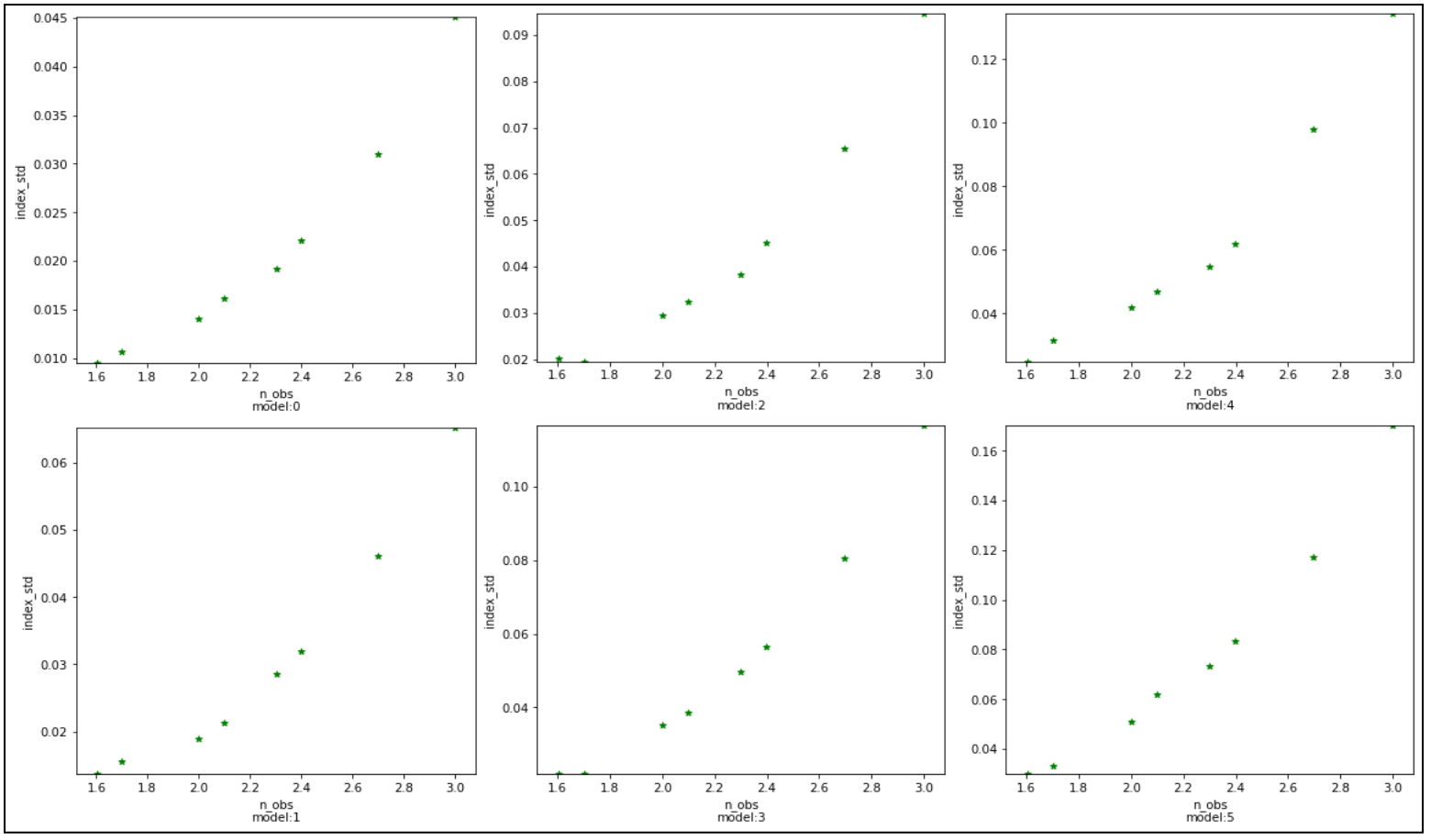

Number of observations:125
Index
I=0.01
Number of observations:125
Index
I=0.1
Number of observations:125
Index
I=0.2
Number of observations:125
Index
I=0.3
Number of observations:125
Index
I=0.5
Number of observations:200
Index
I=0.01
Number of observations:200
Index
I=0.1
Number of observations:200
Index
I=0.2
Number of observations:200
Index
I=0.3
Number of observations:200
Index
I=0.5
Number of observations:250
Index
I=0.01
Number of observations:250
Index
I=0.1
Number of observations:250
Index
I=0.2
Number of observations:250
Index
I=0.3
Number of observations:250
Index
I=0.5
Number of observations:500
Index
I=0.01
Number of observations:500
Index
I=0.1
Number of observations:500
Index
I=0.2
Number of observations:500
Index
I=0.3
Number of observations:500
Index
I=0.5
Number of observations:1000
Index
I=0.01
Number of observations:1000
Index
I=0.1
Number of observations:1000
Index
I=0.2
Number of observations:1000
Index
I=0.3
Number of observations:1000
Index
I=0.5

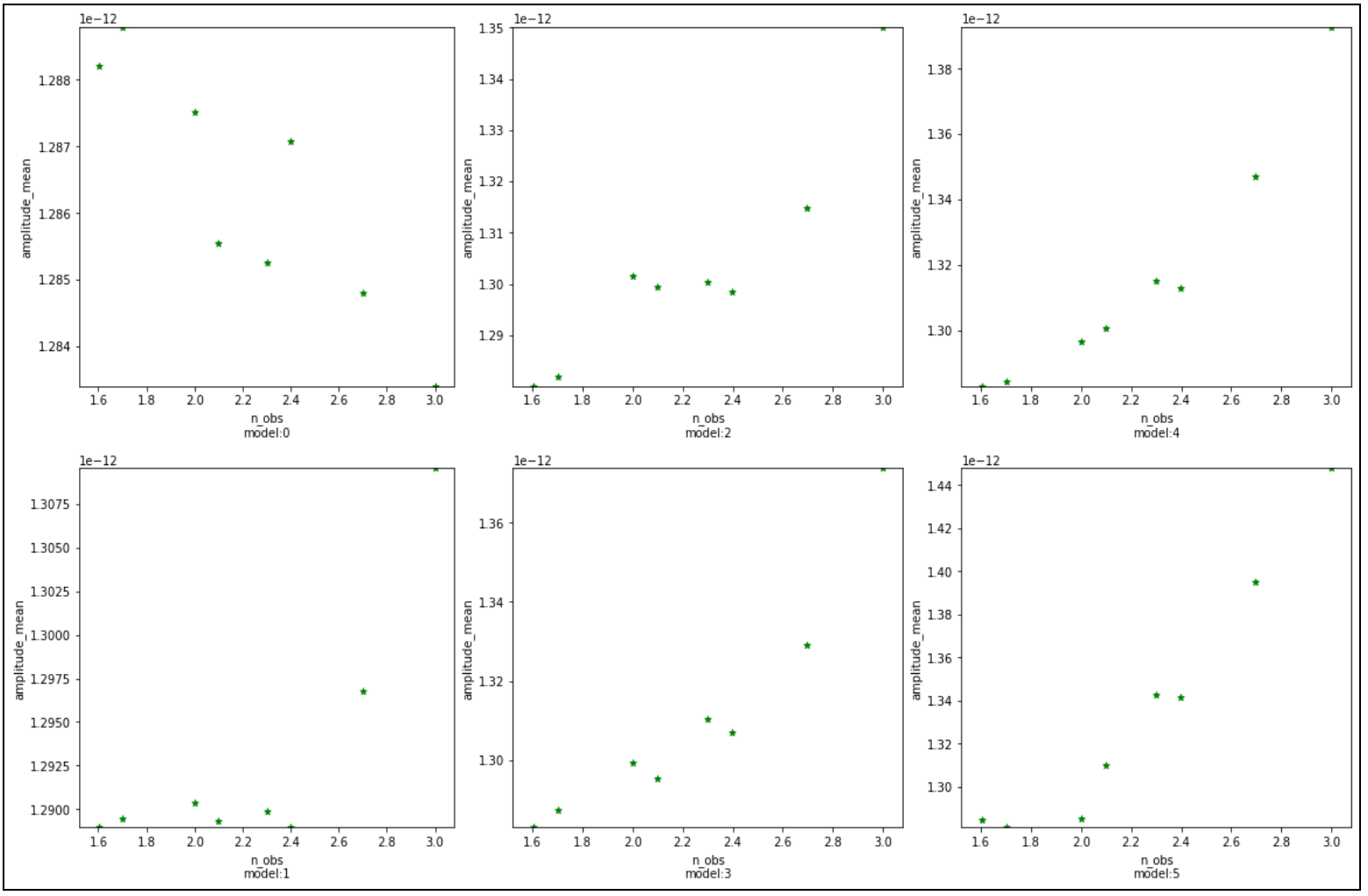

Number of observations:40
Number of observations:50
Number of observations:100
Number of observations:125
amplitude
1e−12
I=0.01
I=0.1
I=0.2
I=0.3
I=0.5

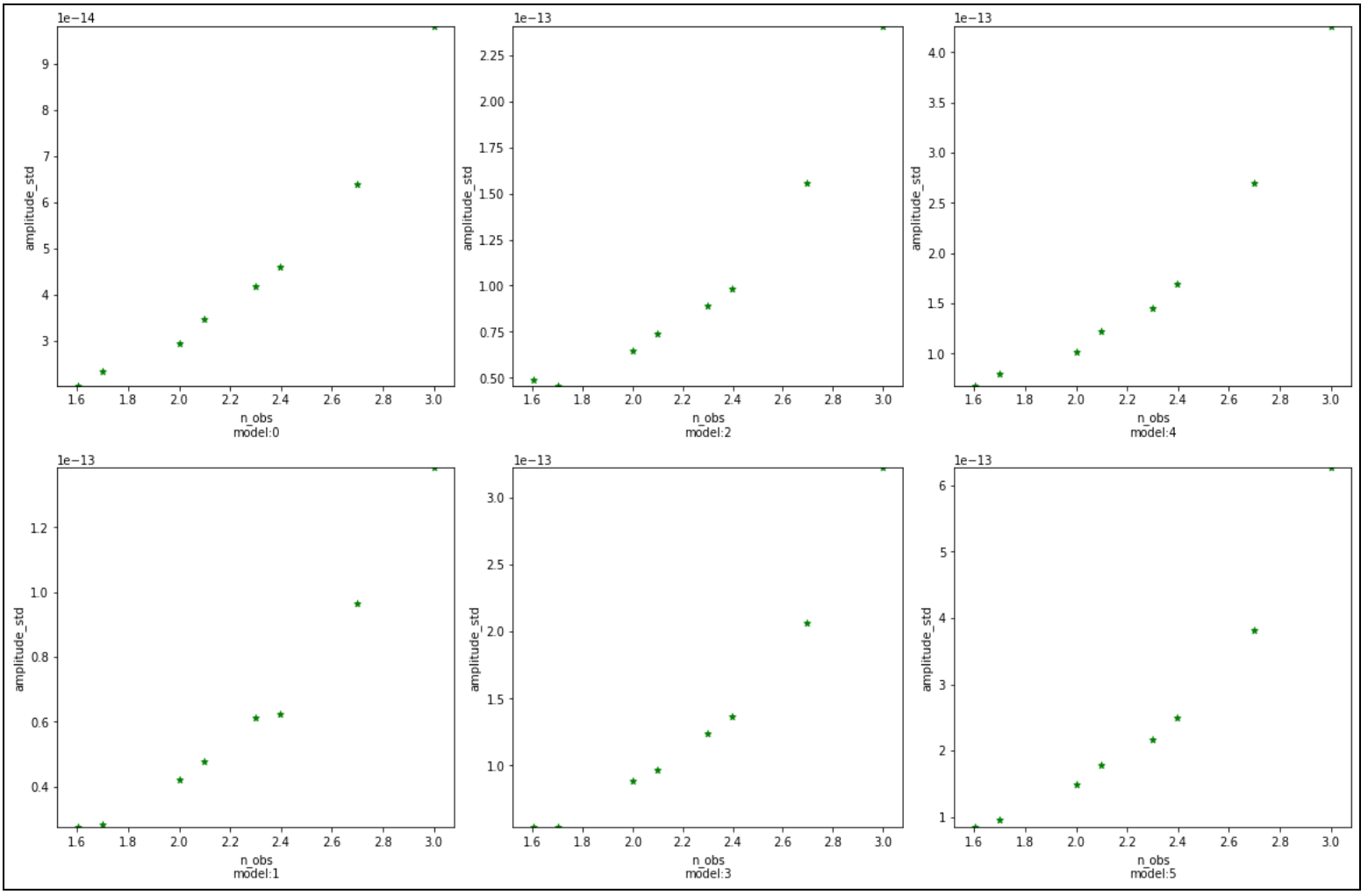

Number of observations:200
amplitude
1e−12
I=0.01
I=0.1
I=0.2
I=0.3
I=0.5
Number of observations:250
Number of observations:500
Number of observations:1000

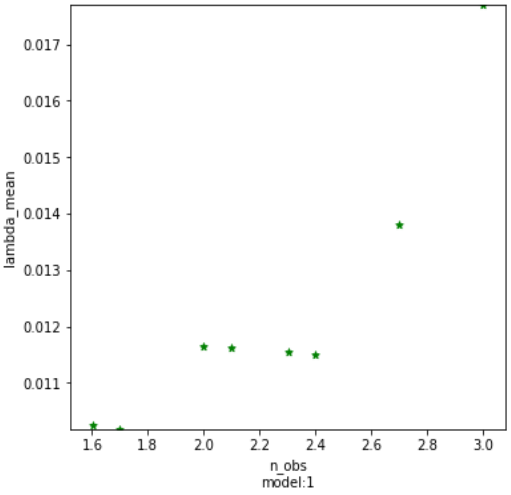
Comparing Index, Amplitude, Lambda values for different models for different number of observations:

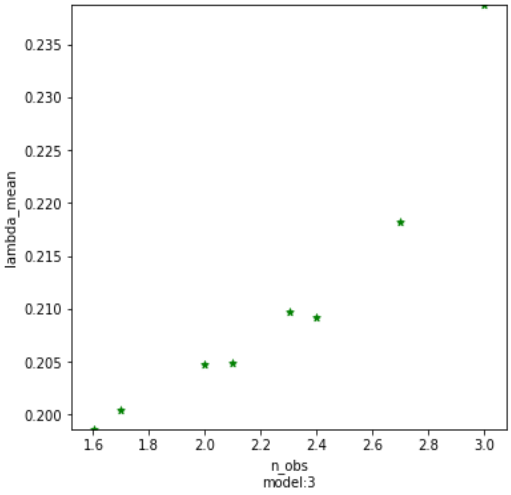


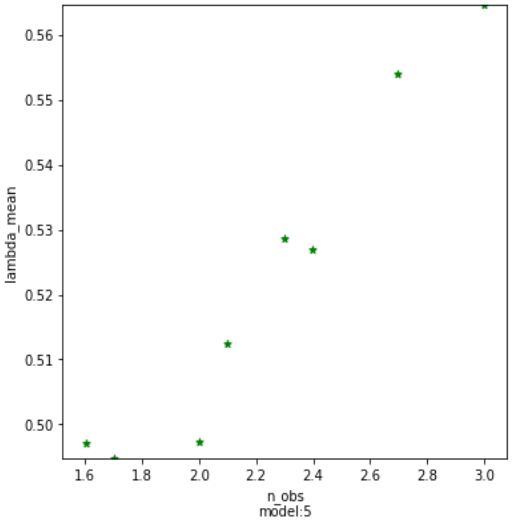


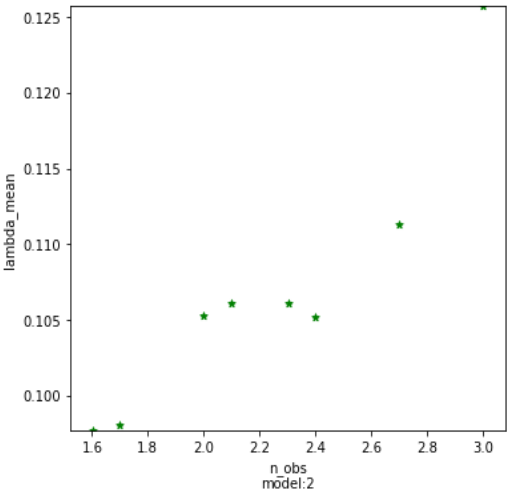

1e−12
amplitude_mean
n_obs
model:0
model:2
model:4
model:1
model:3
model:5

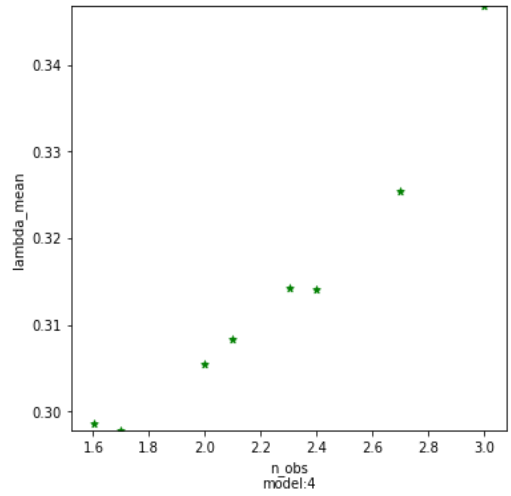

1e−14
1e−13
amplitude_std
n_obs
model:0
model:2
model:4
model:1
model:3
model:5

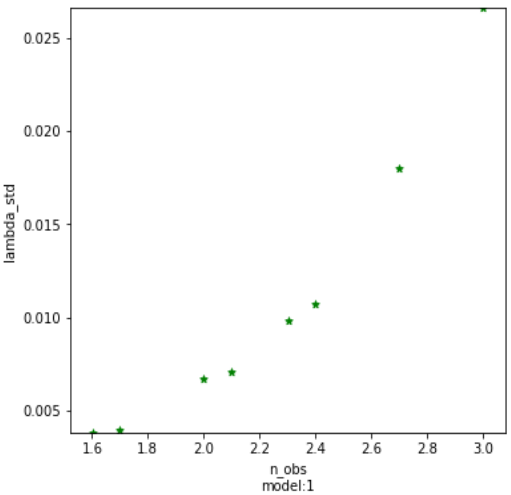

lambda_mean
n_obs
model:1

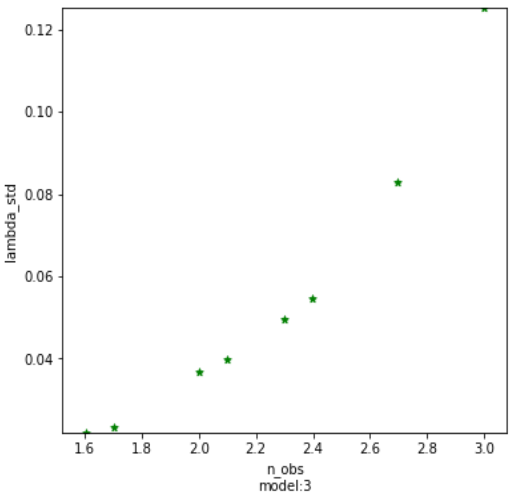

lambda_mean
n_obs
model:3

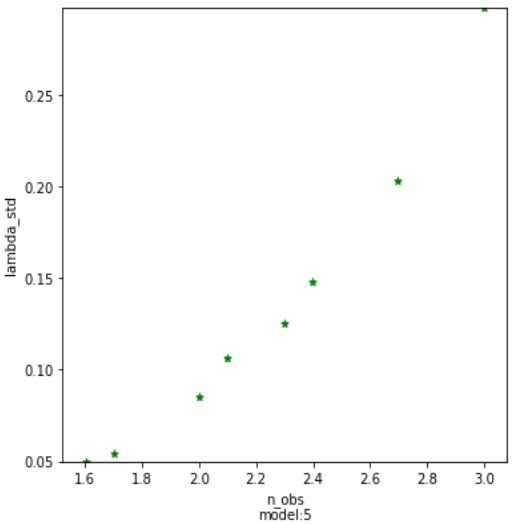

lambda_mean
n_obs
model:5

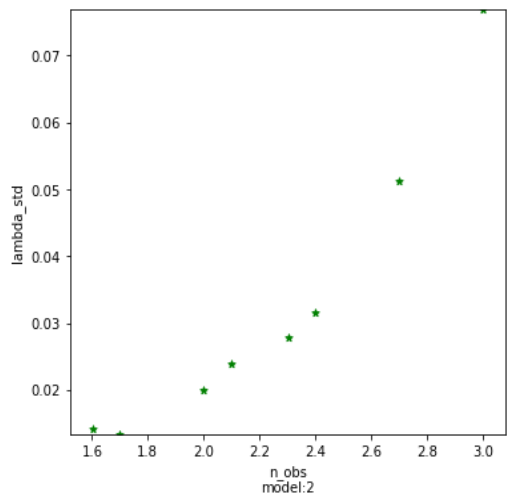

lambda_mean
n_obs
model:2

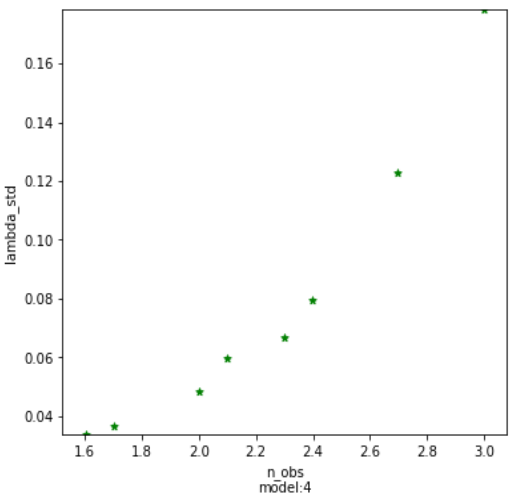

lambda_mean
n_obs
model:4


lambda_std
n_obs
model:1

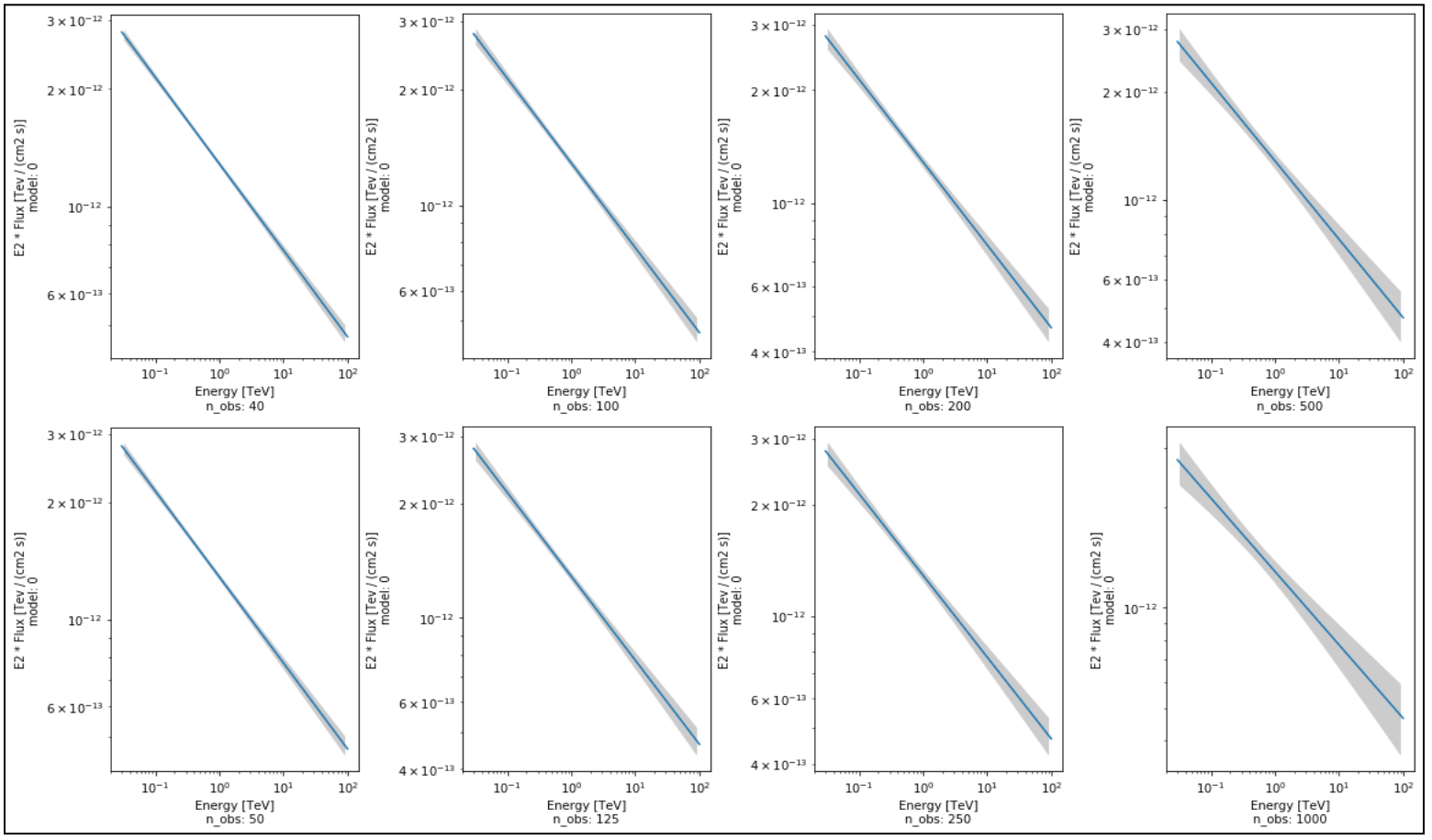

lambda_std
n_obs
model:3

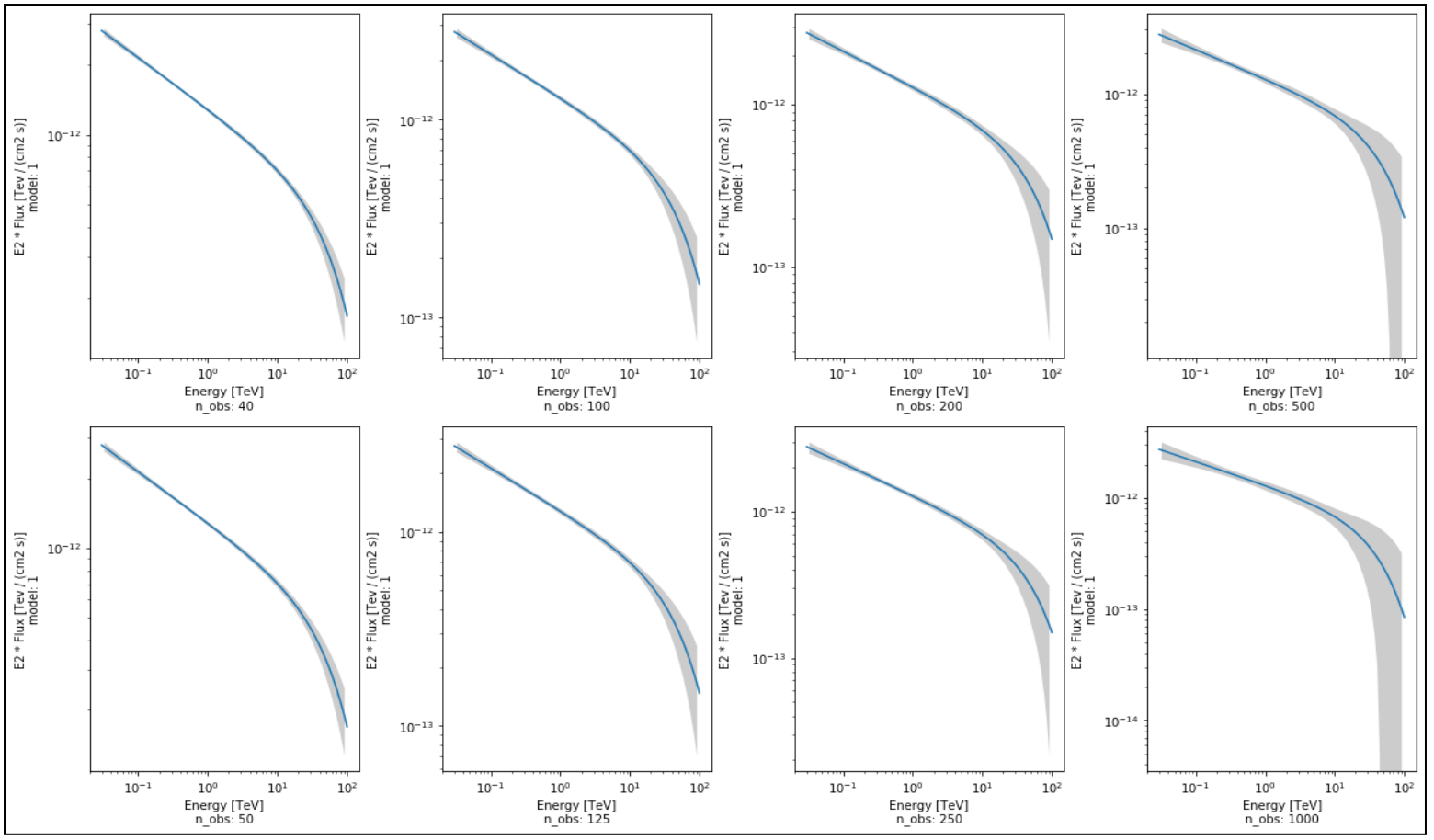

lambda_std
n_obs
model:5

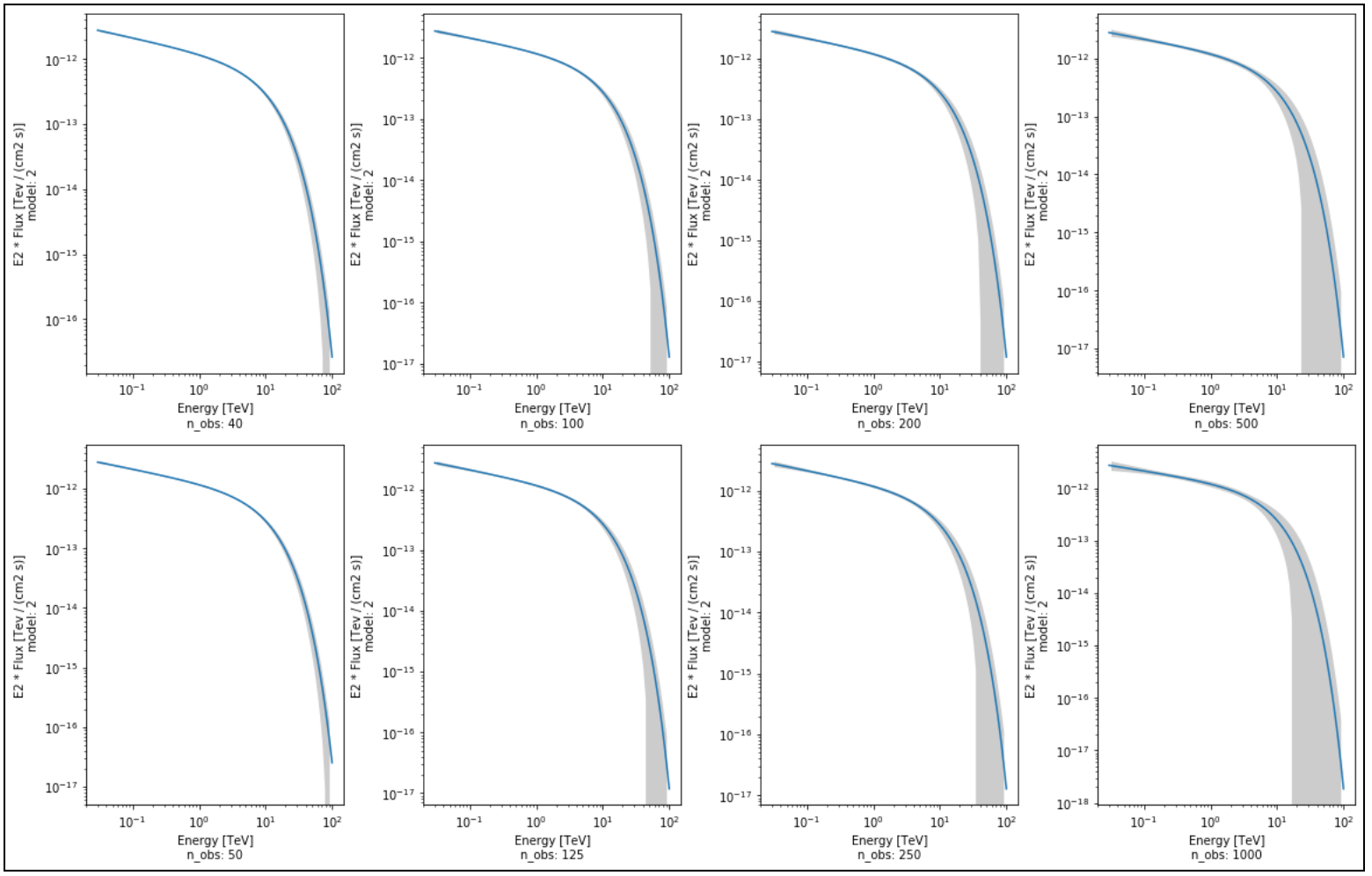

lambda_std
n_obs
model:2

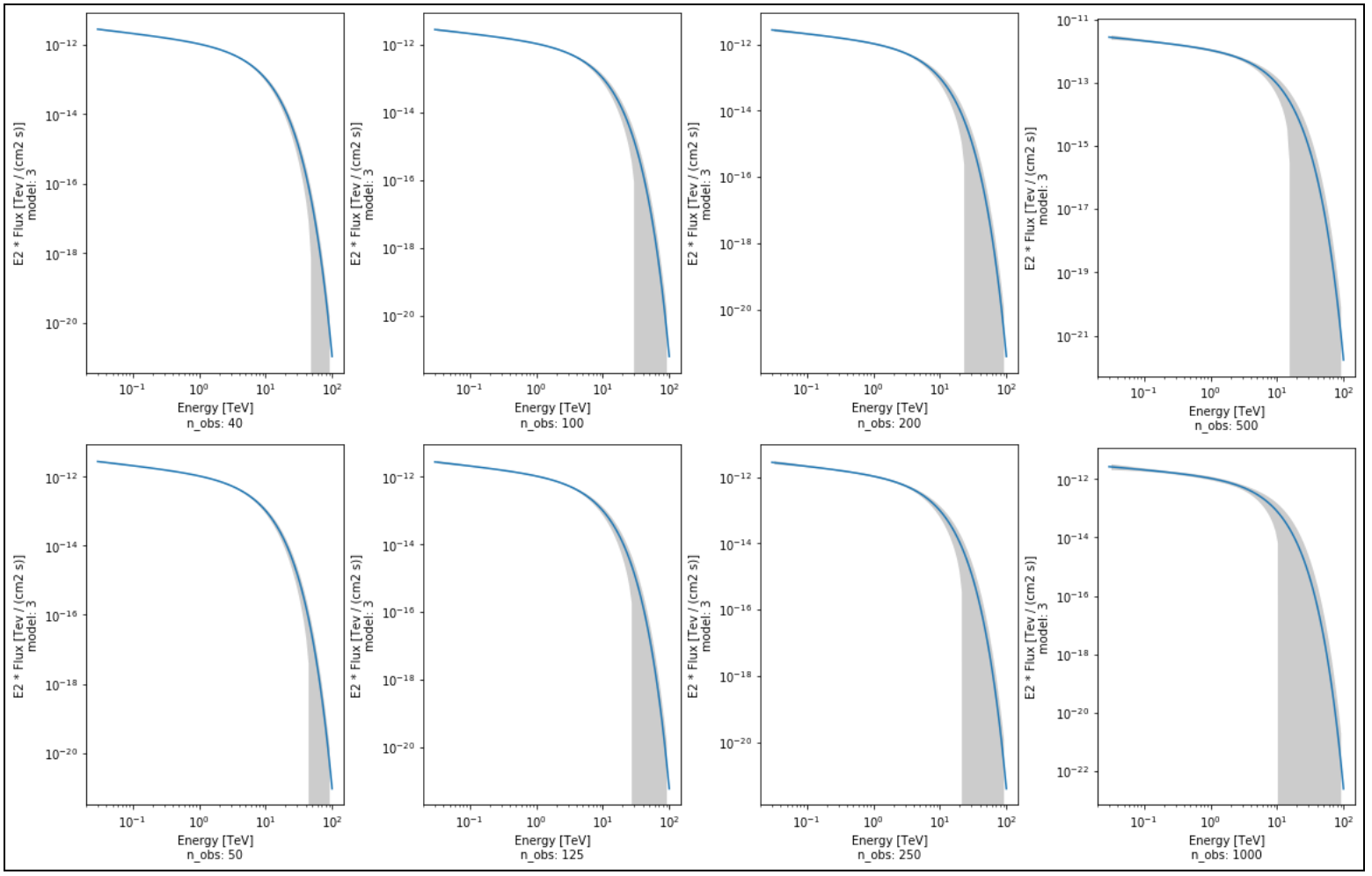

lambda_std
n_obs
model:4

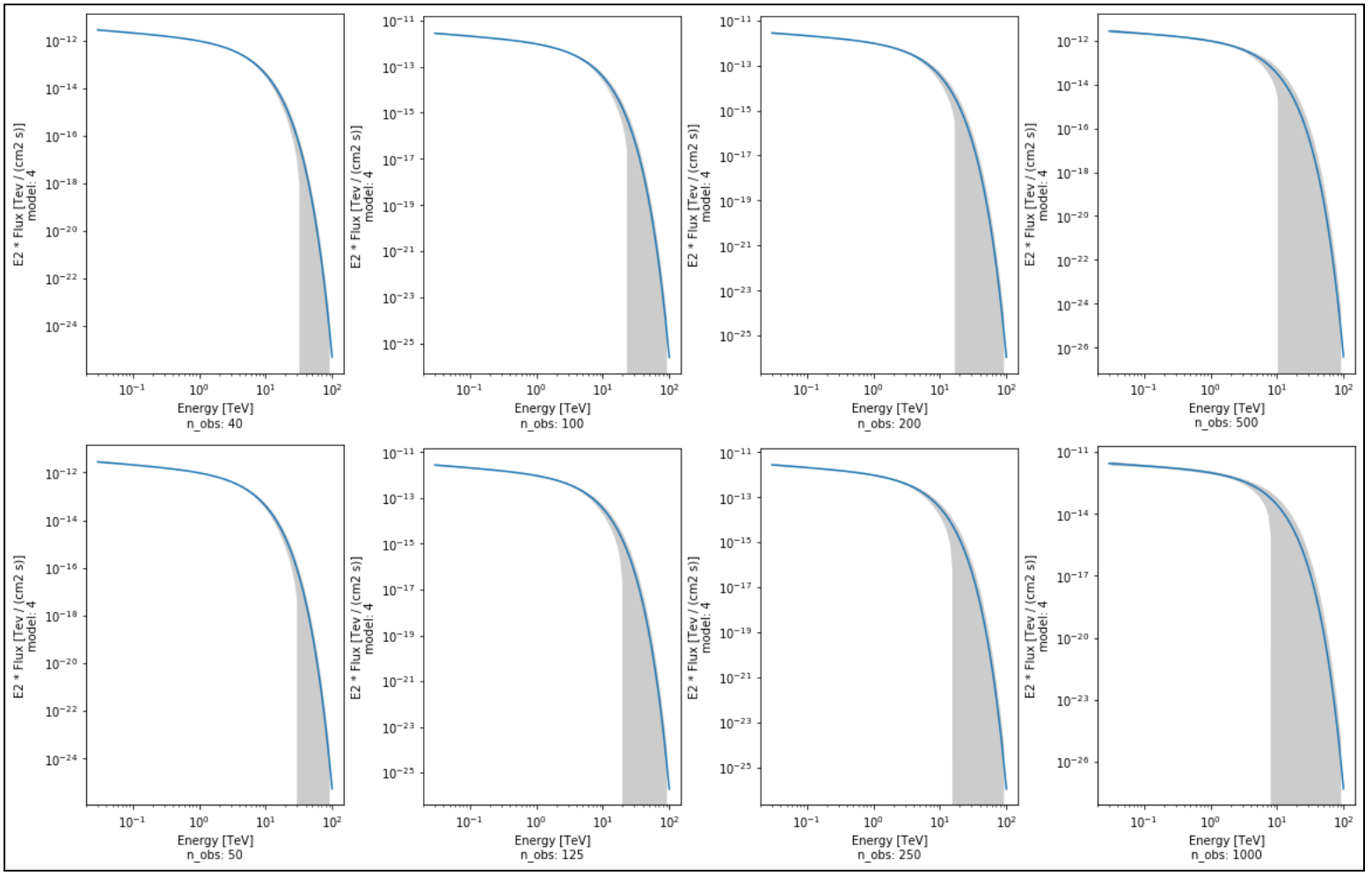
Flux vs Energy Curve with error for different models and number of observations:

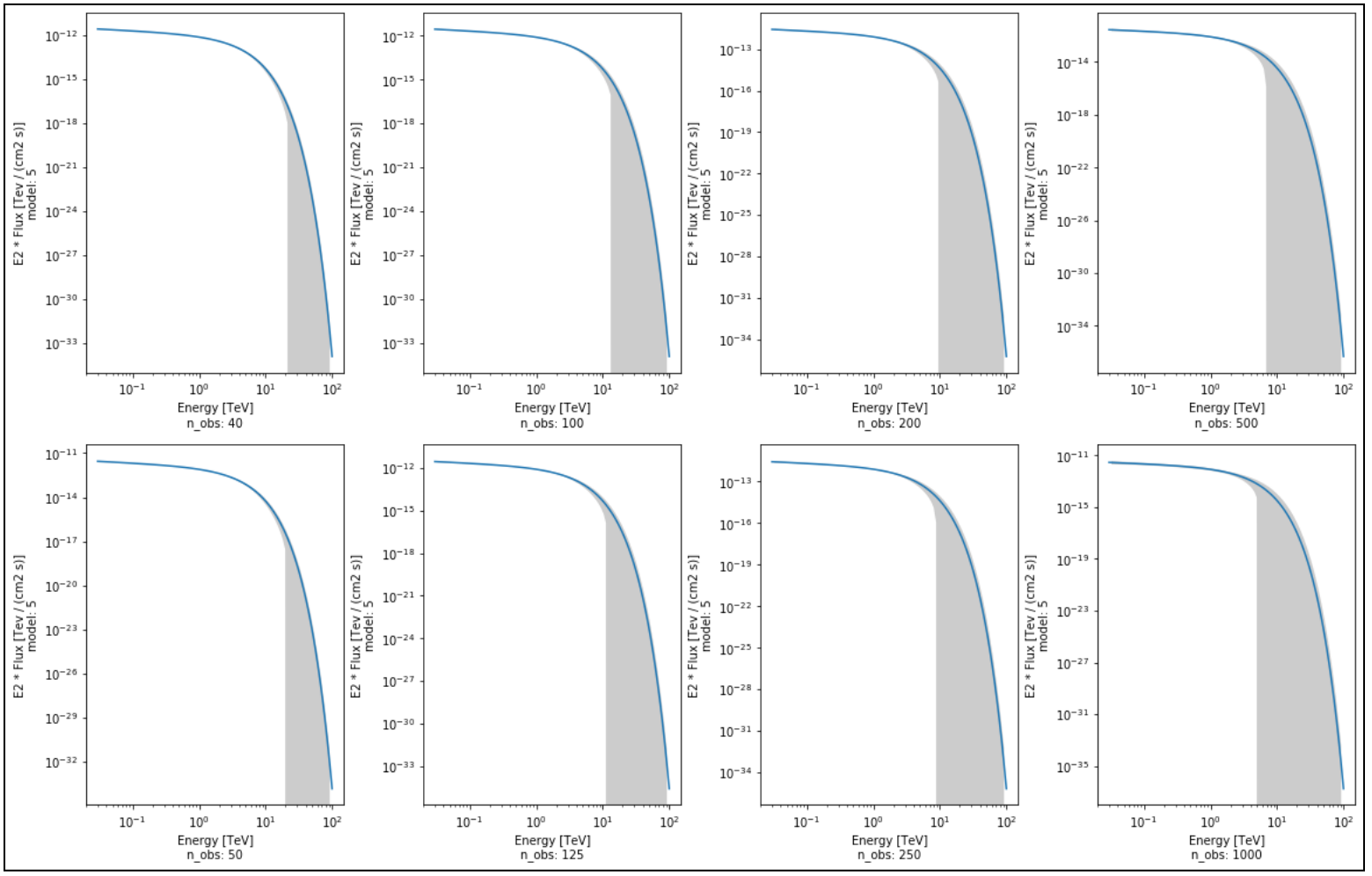




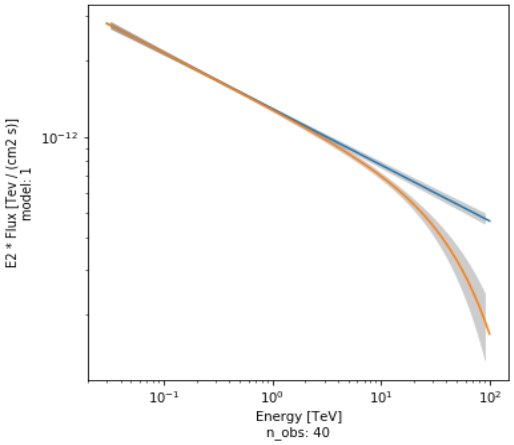

E2 * Flux [Tev / (cm2 s)]
model: 2
Energy [TeV]
n_obs: 40
n_obs: 100
n_obs: 200
n_obs: 500
n_obs: 50
n_obs: 125
n_obs: 250
n_obs: 1000

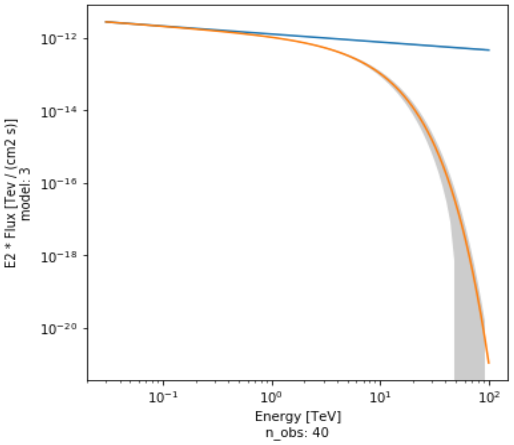

E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]
n_obs: 40
n_obs: 100
n_obs: 200
n_obs: 500
n_obs: 50
n_obs: 125
n_obs: 250
n_obs: 1000

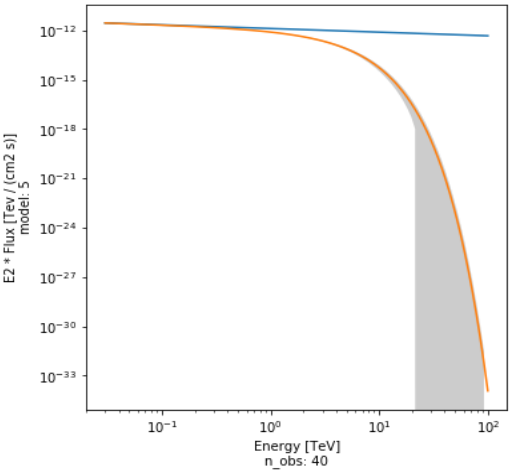

E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]
n_obs: 40
n_obs: 100
n_obs: 200
n_obs: 500
n_obs: 50
n_obs: 125
n_obs: 250
n_obs: 1000

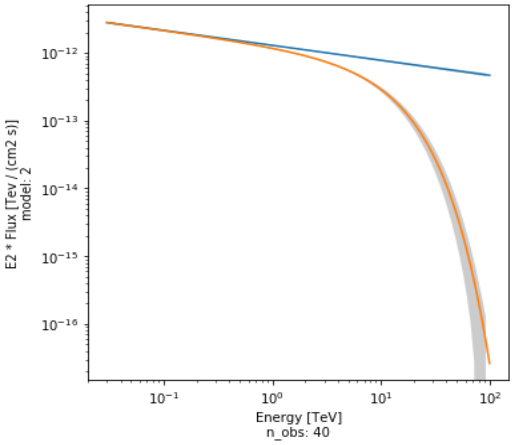

E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]
n_obs: 40
n_obs: 100
n_obs: 200
n_obs: 500
n_obs: 50
n_obs: 125
n_obs: 250
n_obs: 1000

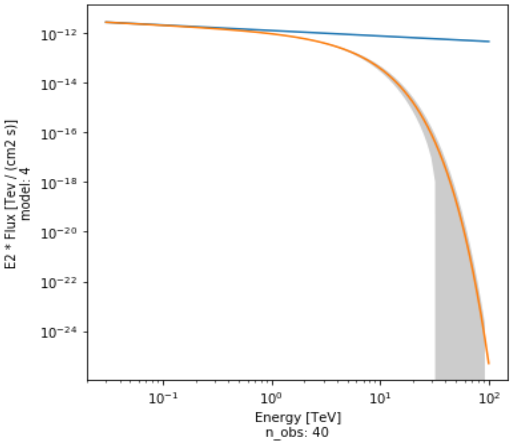
Comparing Flux vs Energy curve of PowerLaw with PowerLawExponentialcutoff for same no. of observations:

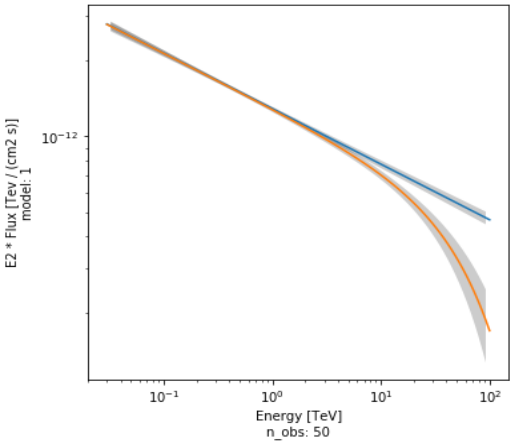


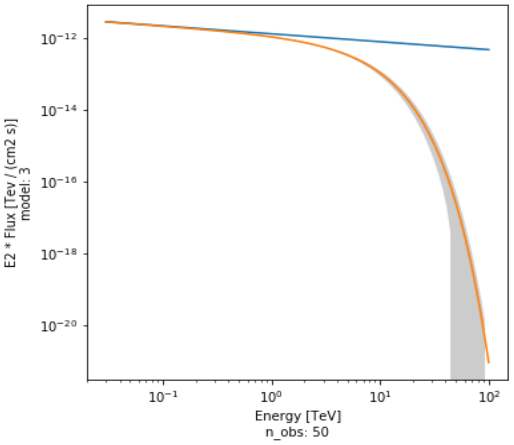


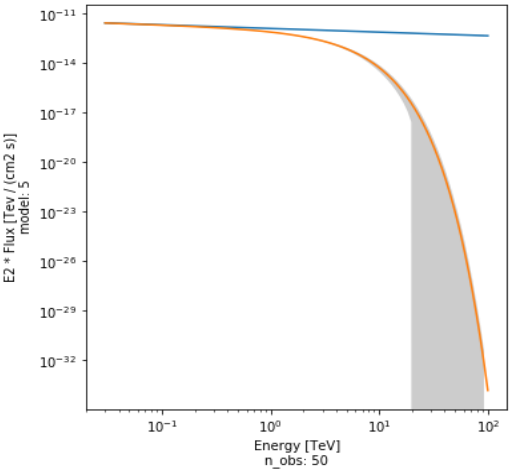


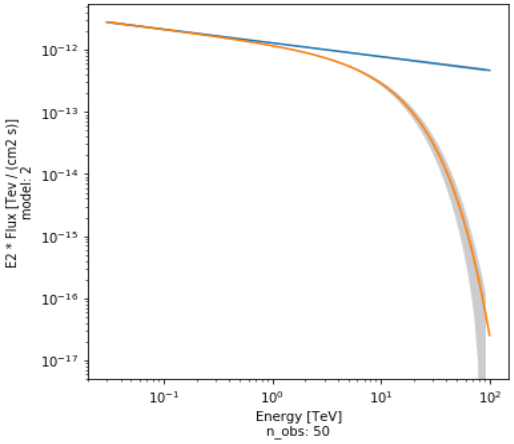


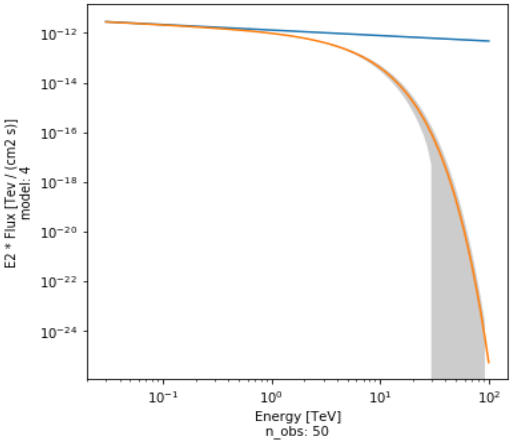


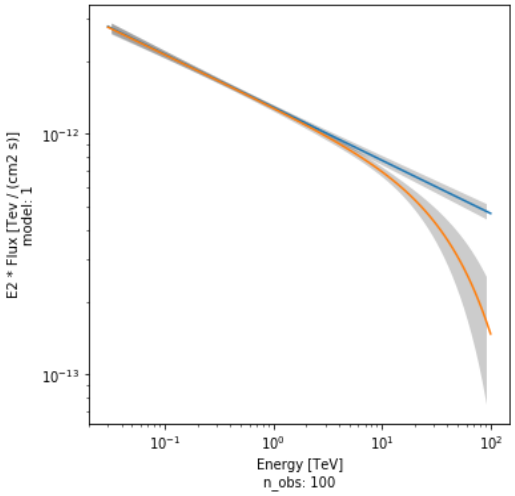


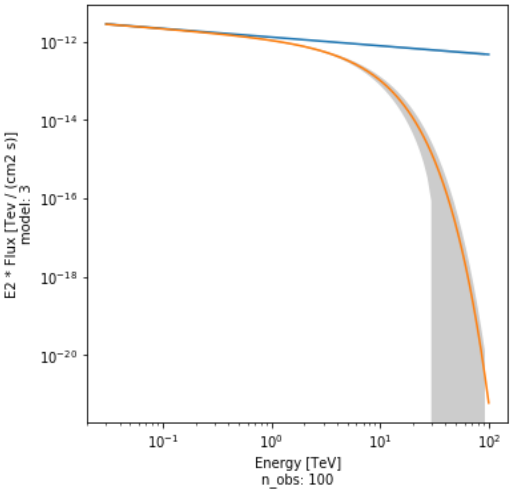


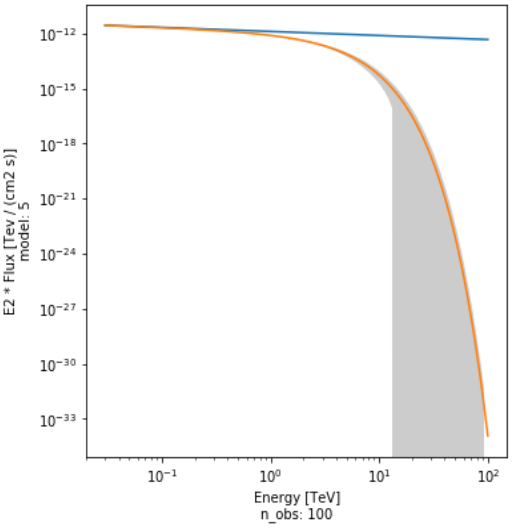


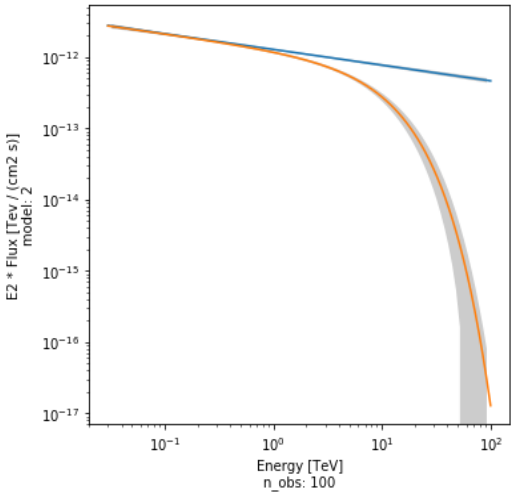


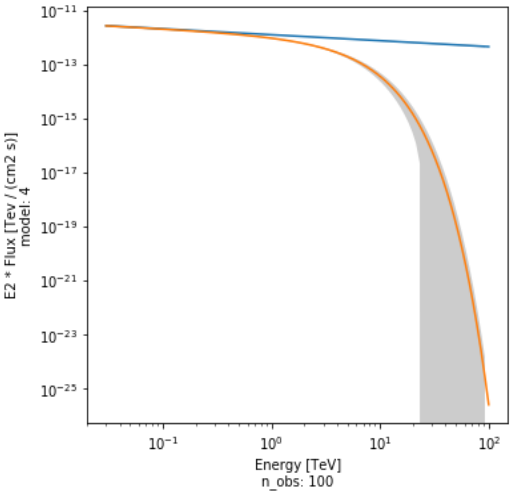


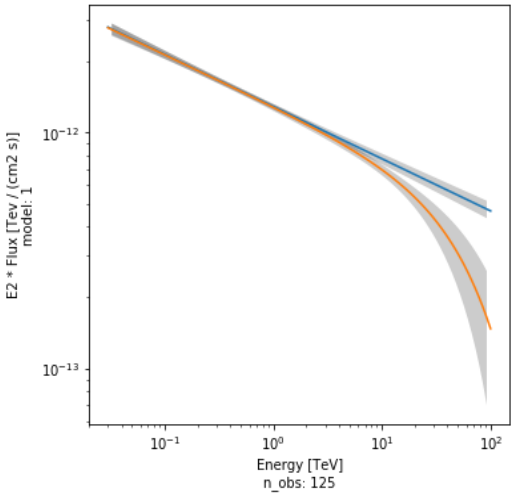

E2 * Flux [Tev / (cm2 s)]
model: 1
Energy [TeV]
n_obs: 100

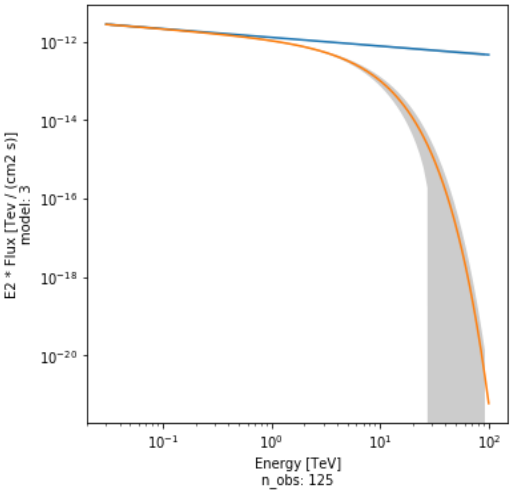

E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]
n_obs: 100

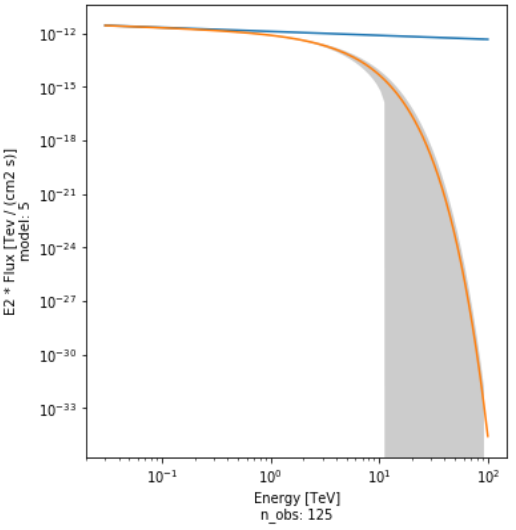

E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]
n_obs: 100

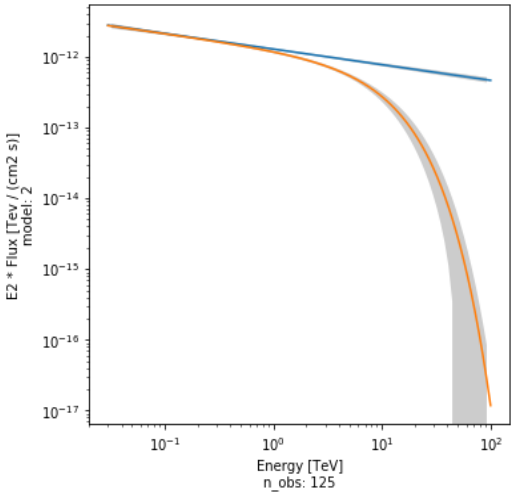

E2 * Flux [Tev / (cm2 s)]
model: 2
Energy [TeV]
n_obs: 100

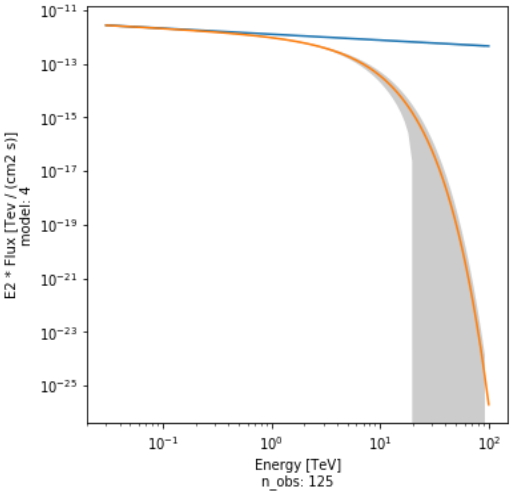

E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]
n_obs: 100

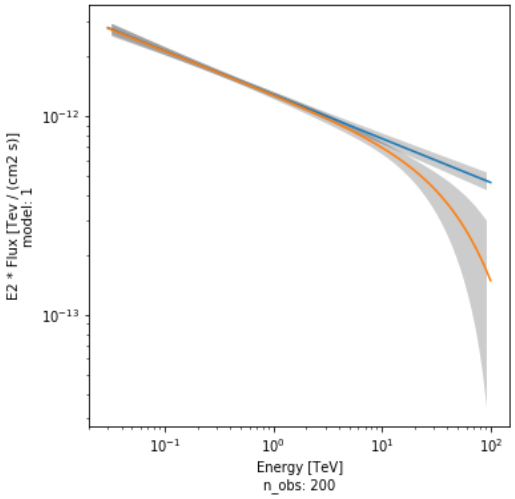

E2 * Flux [Tev / (cm2 s)]
model: 1
Energy [TeV]
n_obs: 125

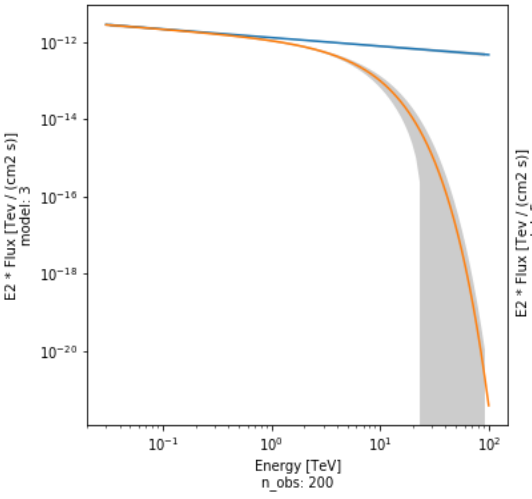

E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]
n_obs: 125

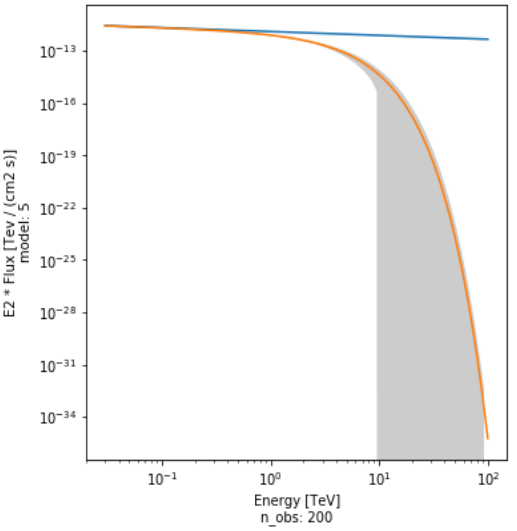

E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]
n_obs: 125

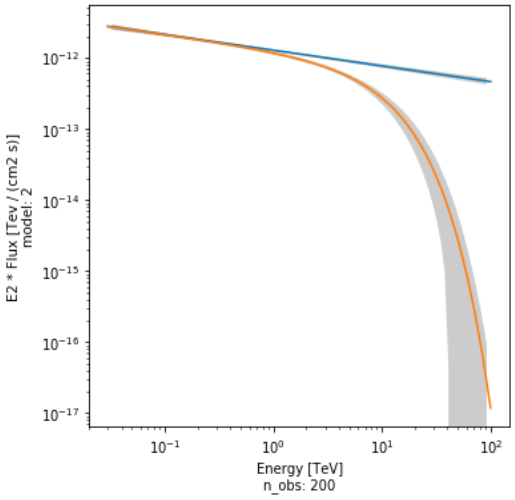

E2 * Flux [Tev / (cm2 s)]
model: 2
Energy [TeV]
n_obs: 125

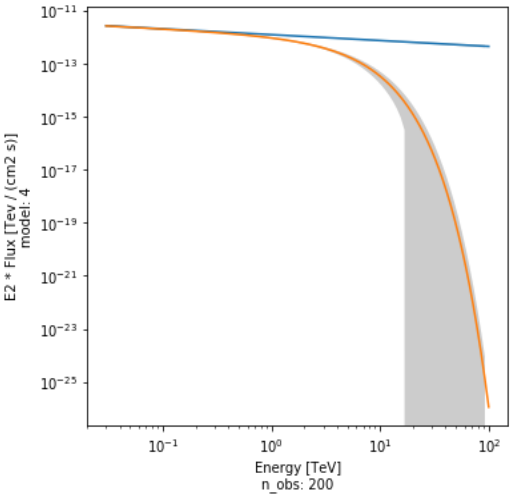

E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]
n_obs: 125

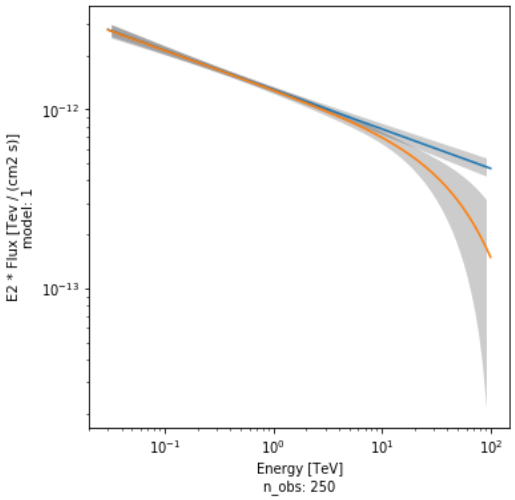

E2 * Flux [Tev / (cm2 s)]
model: 1
Energy [TeV]
n_obs: 200

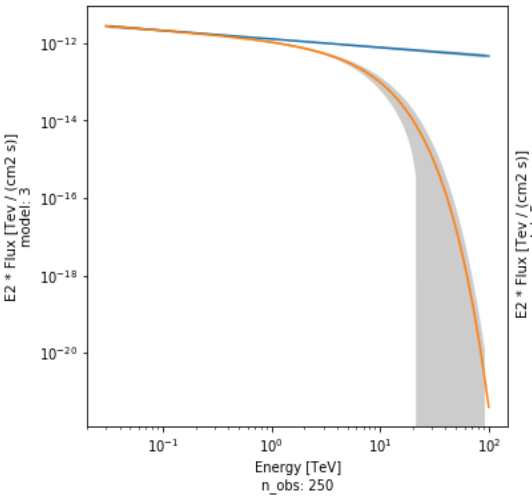

E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]
n_obs: 200

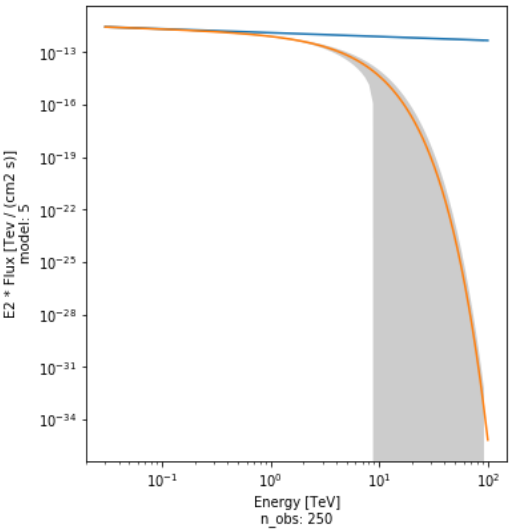

E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]
n_obs: 200

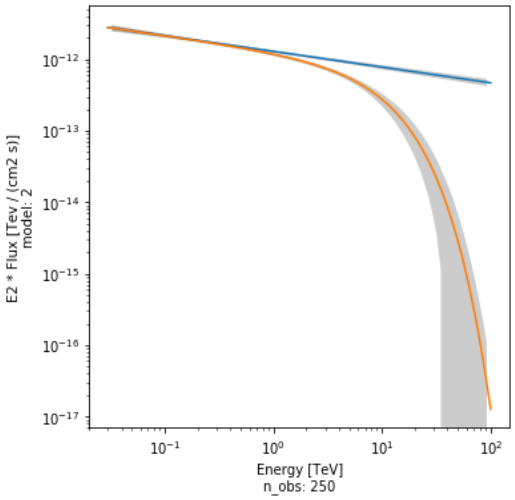

E2 * Flux [Tev / (cm2 s)]
model: 2
Energy [TeV]
n_obs: 200

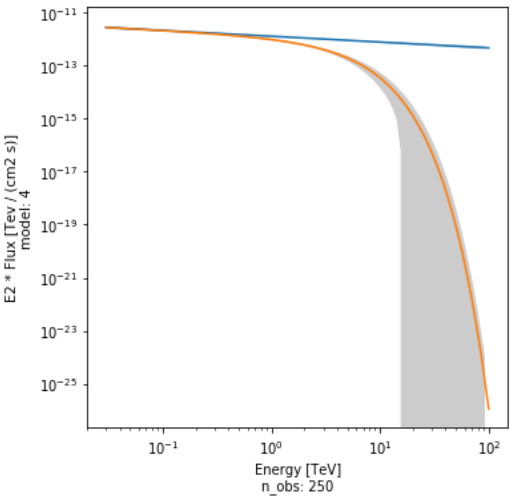

E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]
n_obs: 200

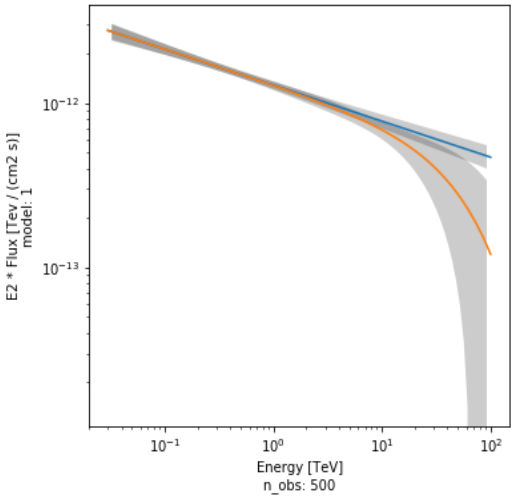

E2 * Flux [Tev / (cm2 s)]
model: 1
Energy [TeV]
n_obs: 250

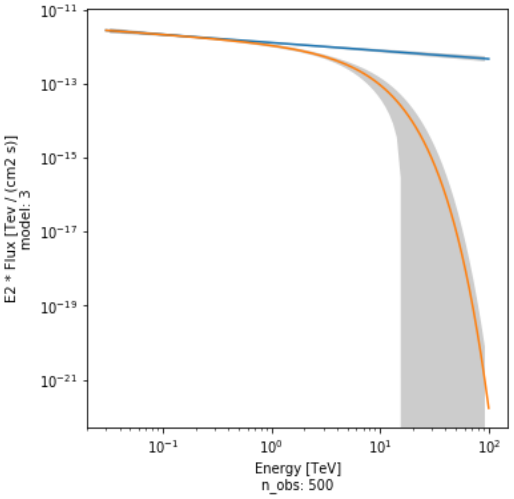

E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]
n_obs: 250

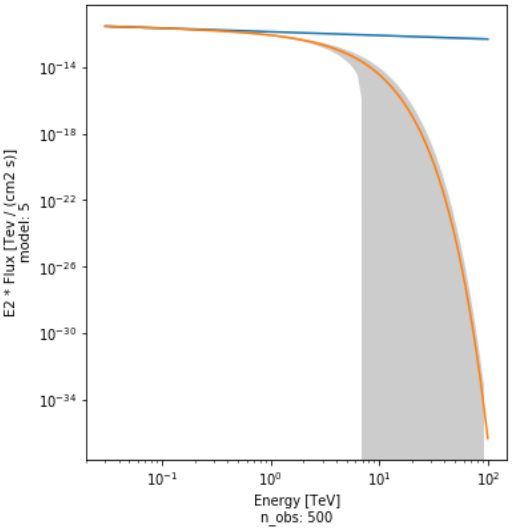

E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]
n_obs: 250

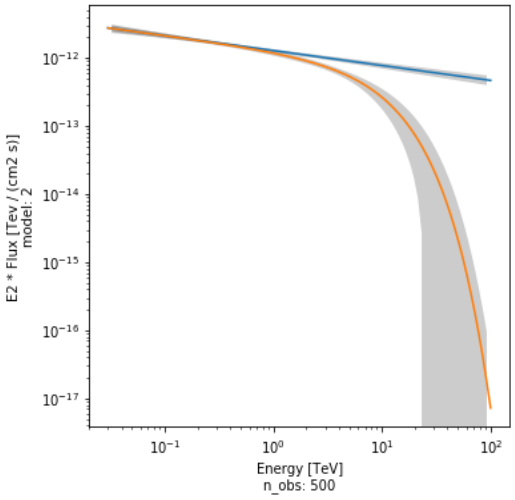

E2 * Flux [Tev / (cm2 s)]
model: 2
Energy [TeV]
n_obs: 250

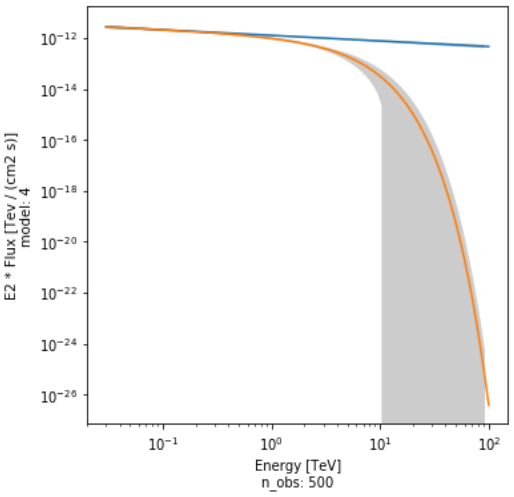

E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]
n_obs: 250

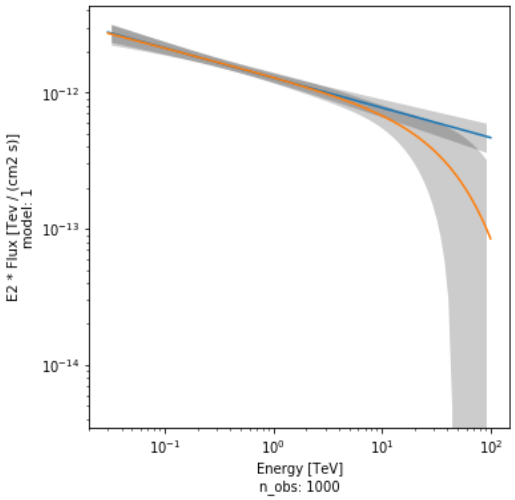

E2 * Flux [Tev / (cm2 s)]
model: 1
Energy [TeV]
n_obs: 500

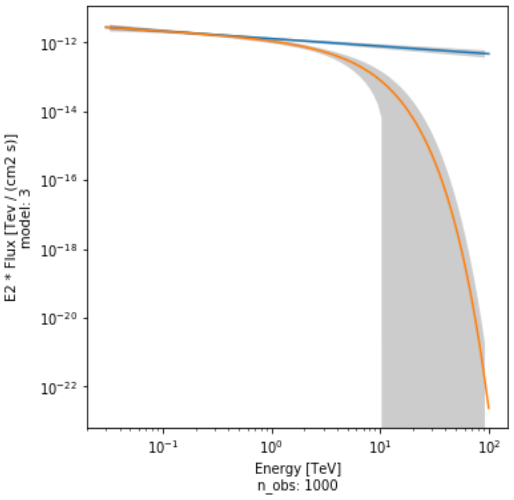

E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]
n_obs: 500

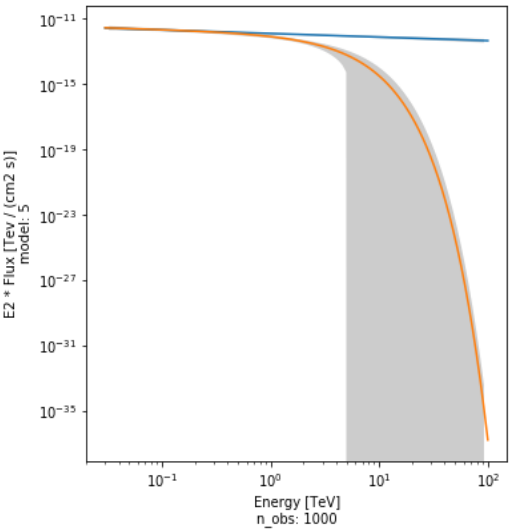

E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]
n_obs: 500

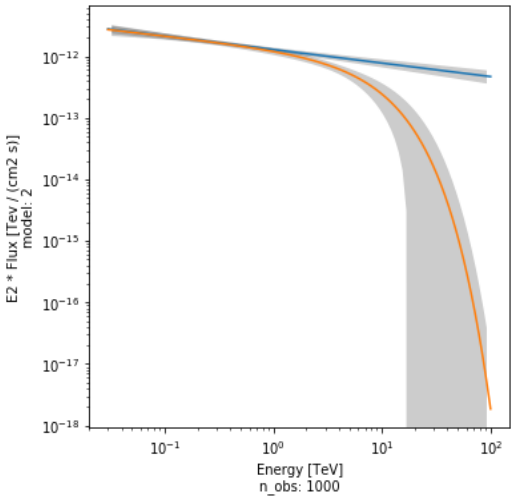

E2 * Flux [Tev / (cm2 s)]
model: 2
Energy [TeV]
n_obs: 500

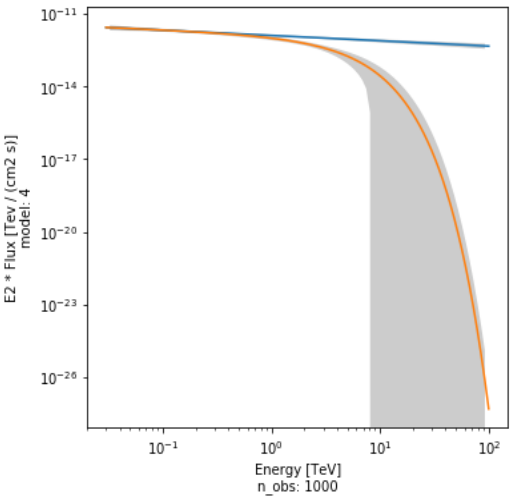

E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]
n_obs: 500


E2 * Flux [Tev / (cm2 s)]
model: 1
Energy [TeV]
n_obs: 1000

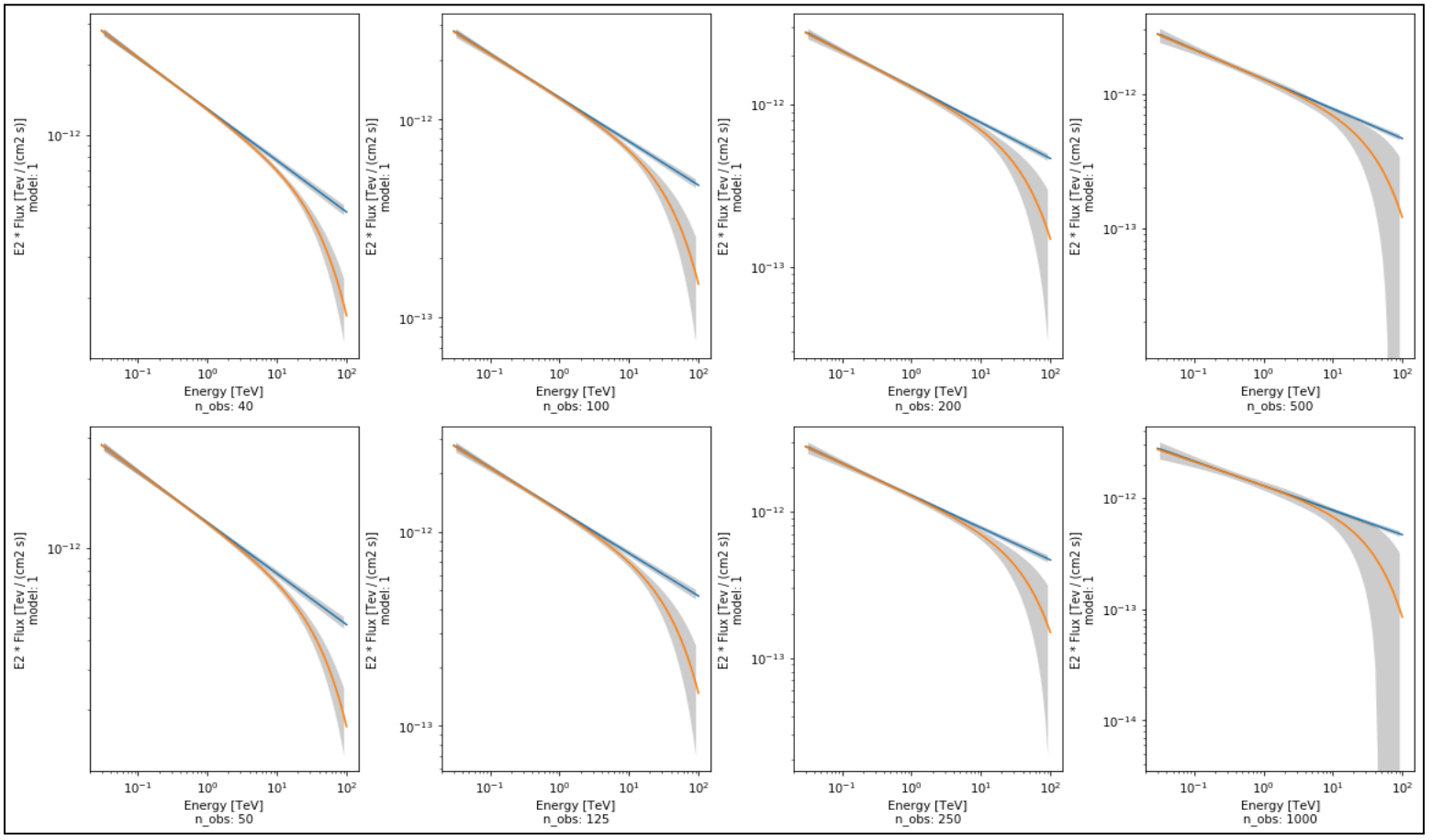

E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]
n_obs: 1000

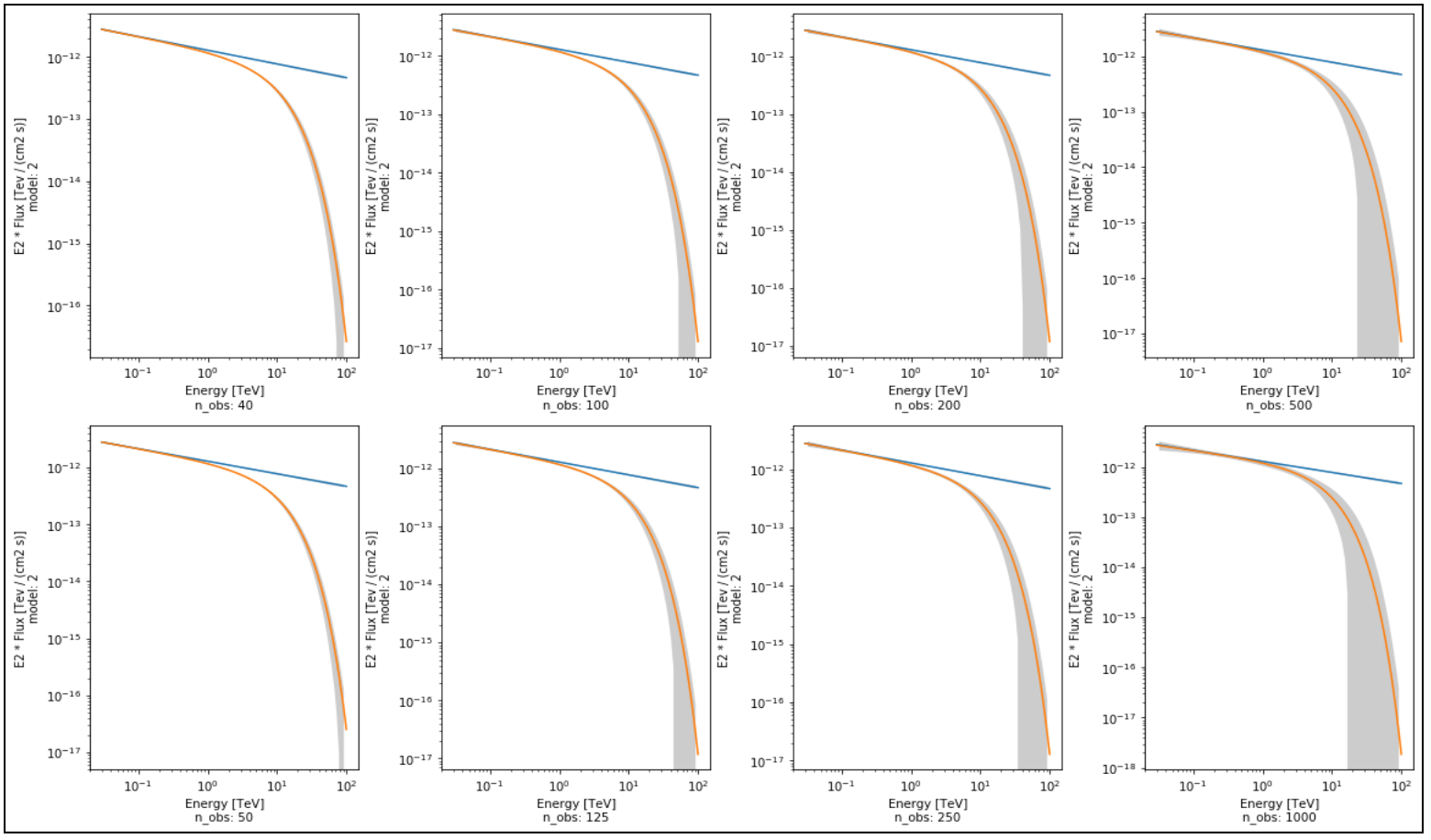

E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]
n_obs: 1000

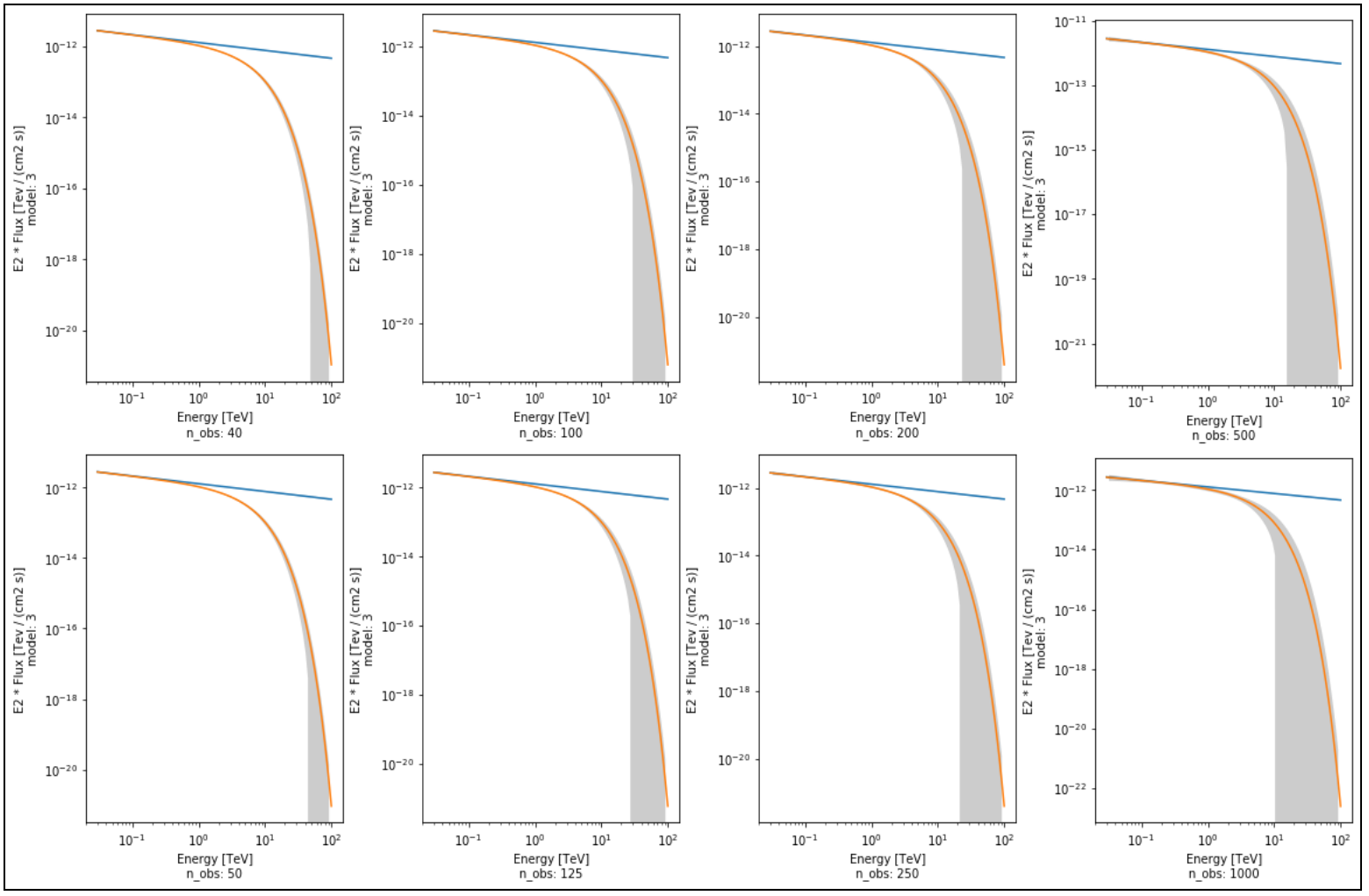

E2 * Flux [Tev / (cm2 s)]
model: 2
Energy [TeV]
n_obs: 1000

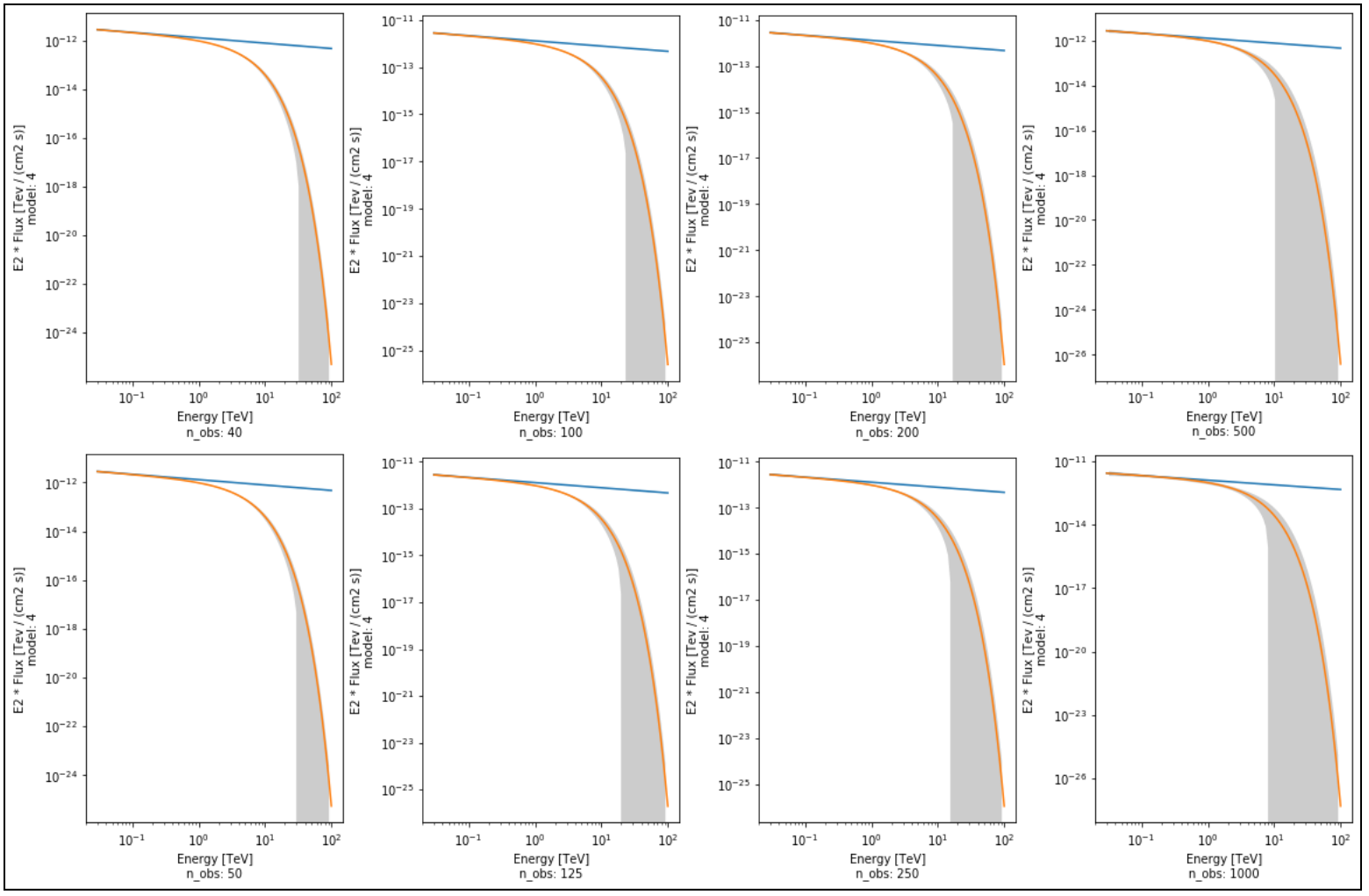

E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]
n_obs: 1000

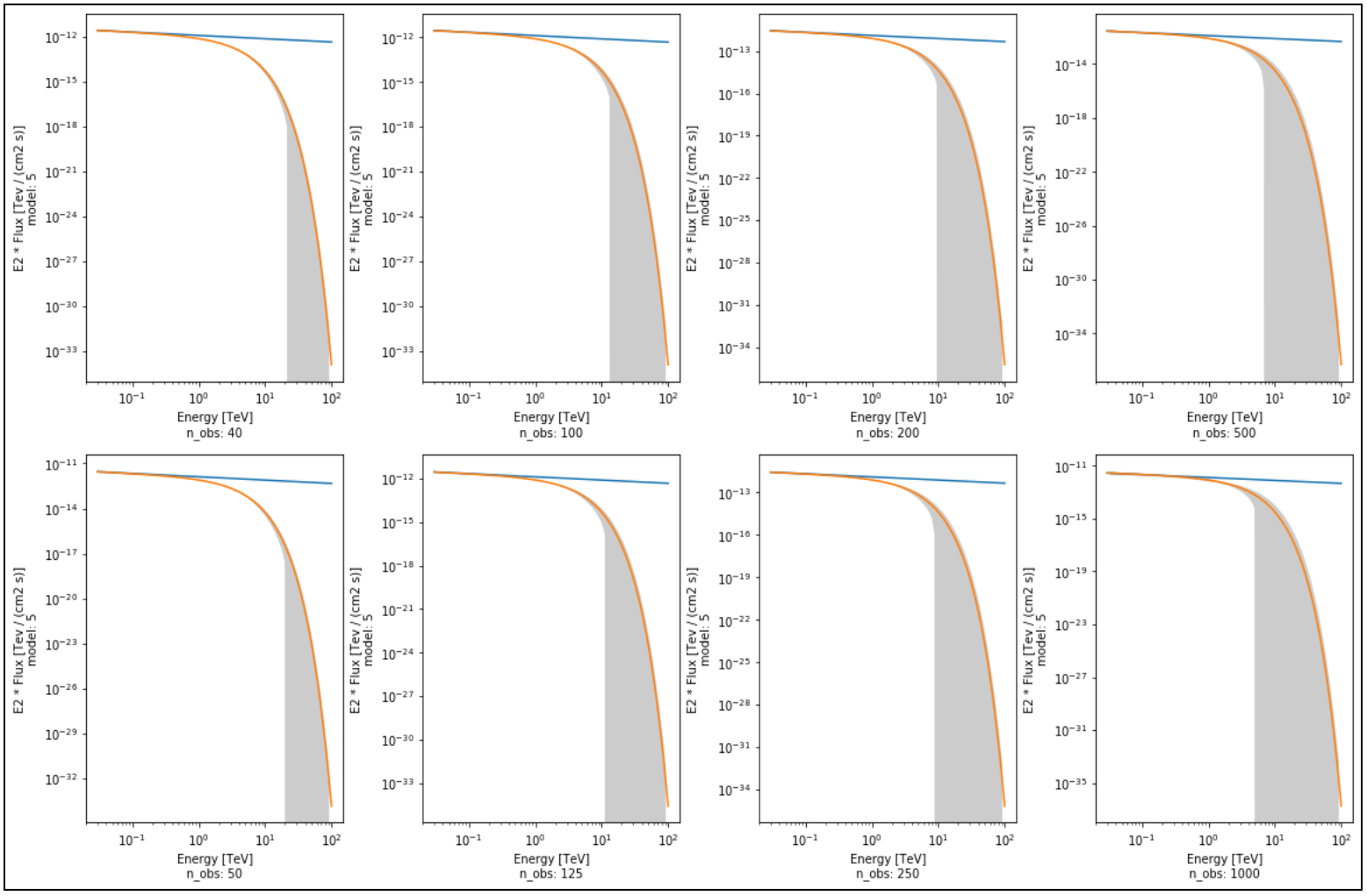
Comparing Flux vs Energy curve of PowerLaw with PowerLawExponentialcutoff for the same model:



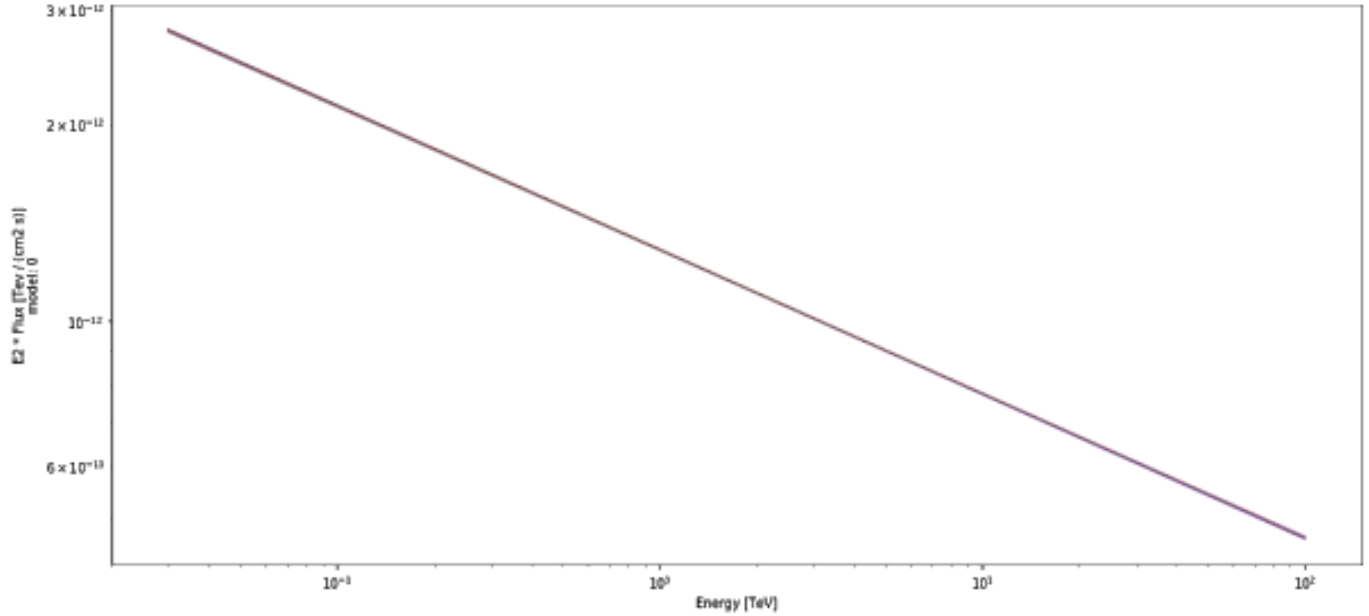


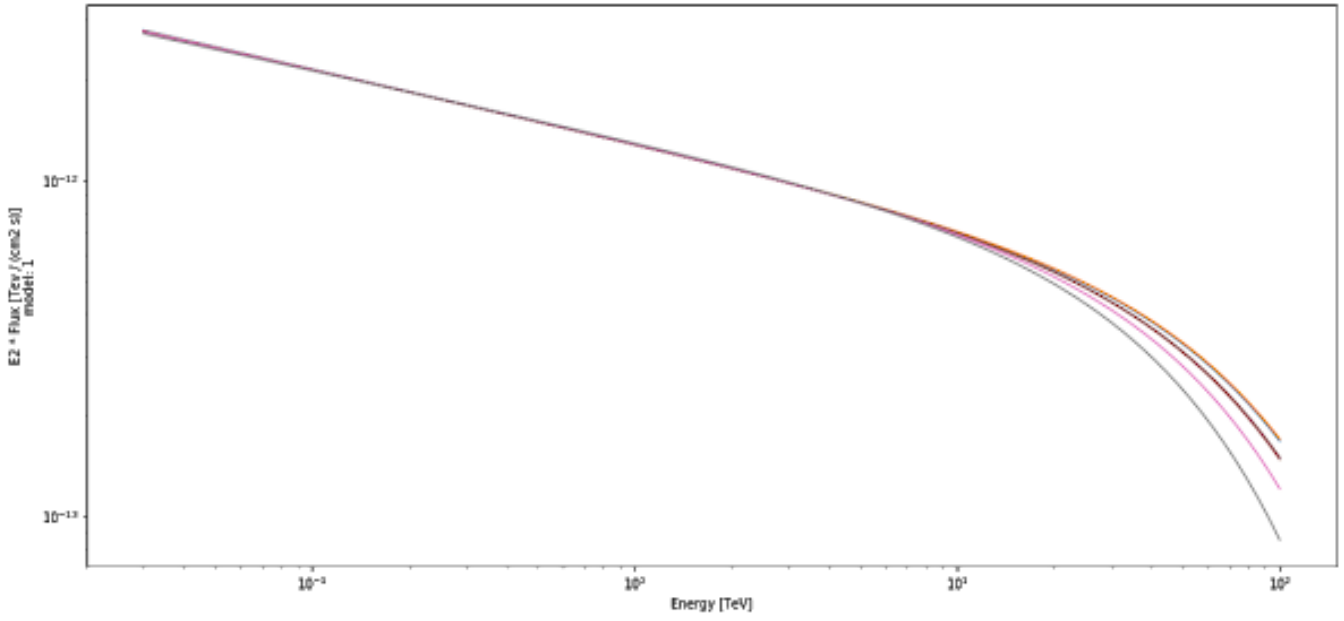

E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]
n_obs: 40
n_obs: 100
n_obs: 200
n_obs: 500
n_obs: 50
n_obs: 125
n_obs: 250
n_obs: 1000

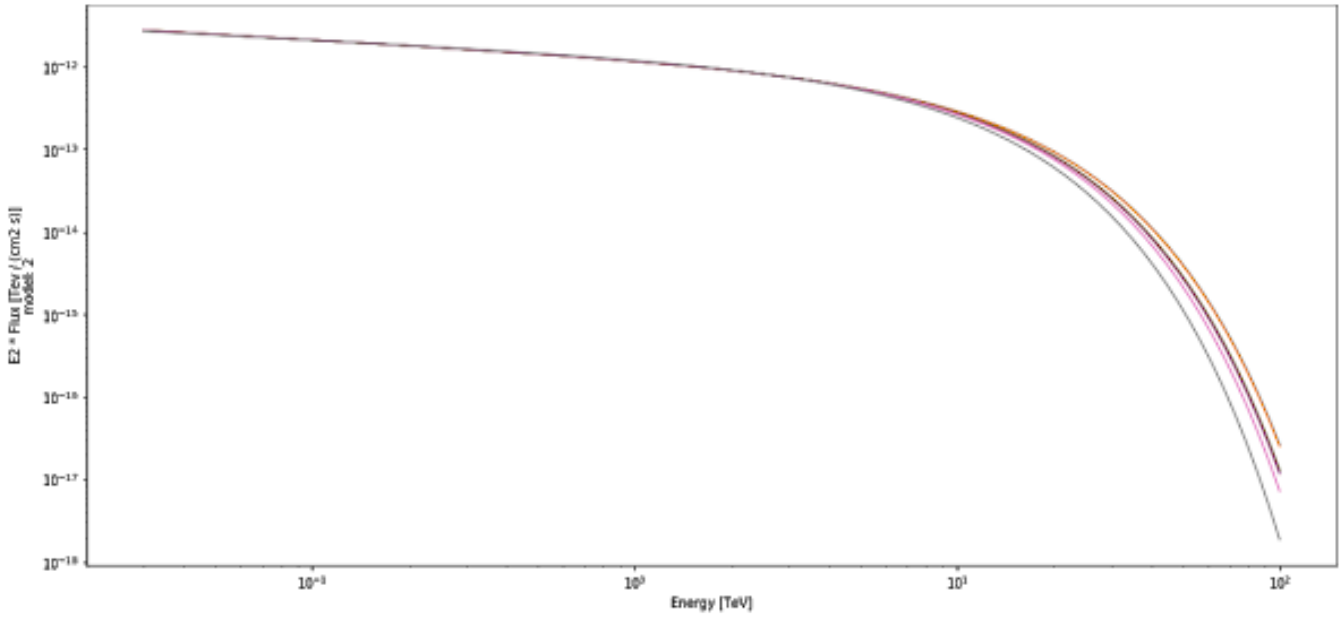

E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]
n_obs: 40
n_obs: 100
n_obs: 200
n_obs: 500
n_obs: 50
n_obs: 125
n_obs: 250
n_obs: 1000

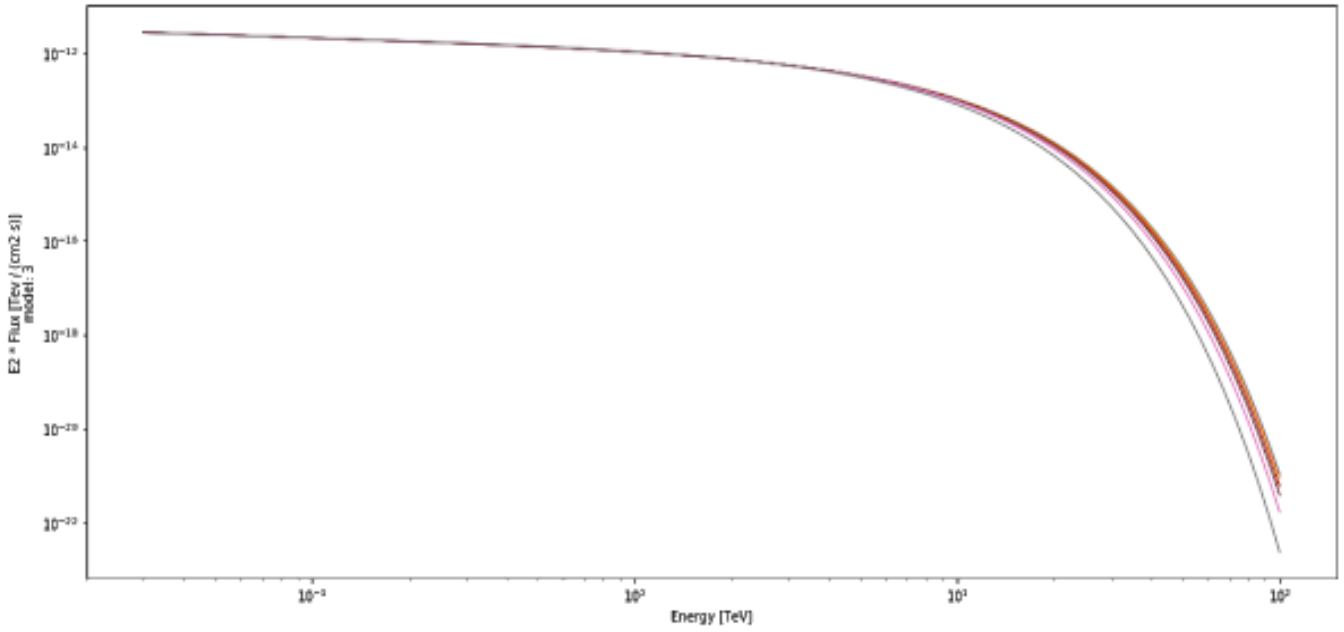

E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]
n_obs: 40
n_obs: 100
n_obs: 200
n_obs: 500
n_obs: 50
n_obs: 125
n_obs: 250
n_obs: 1000

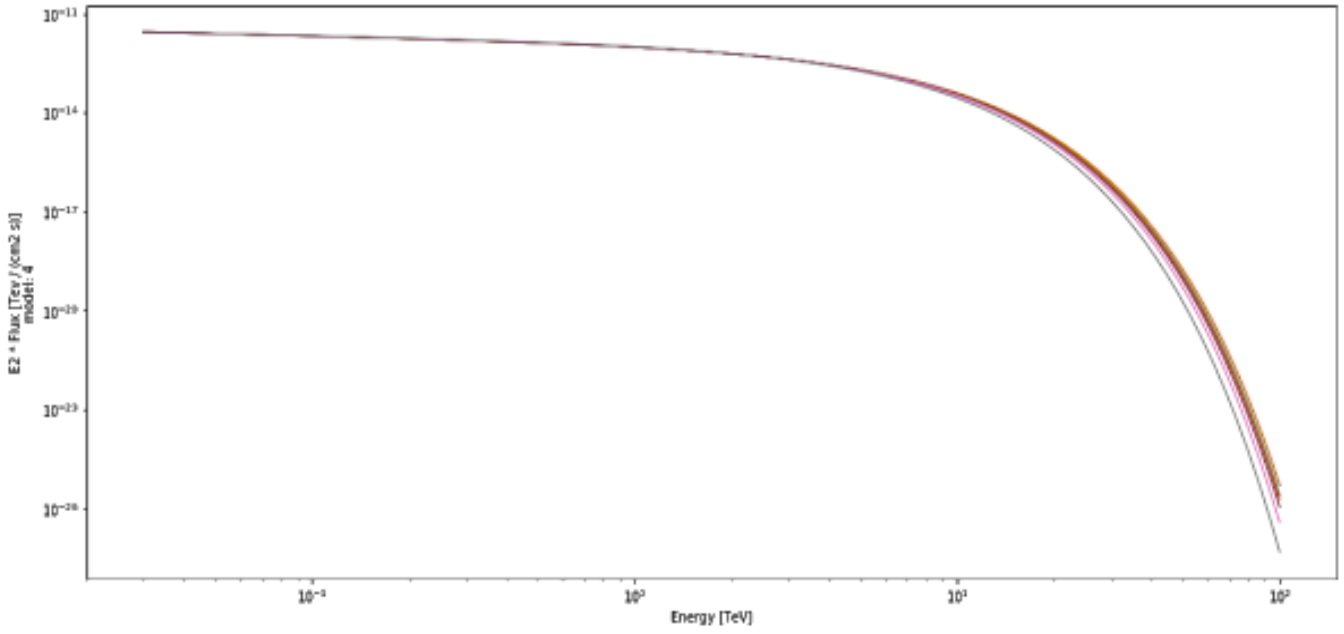
Flux vs Energy curve for different models:

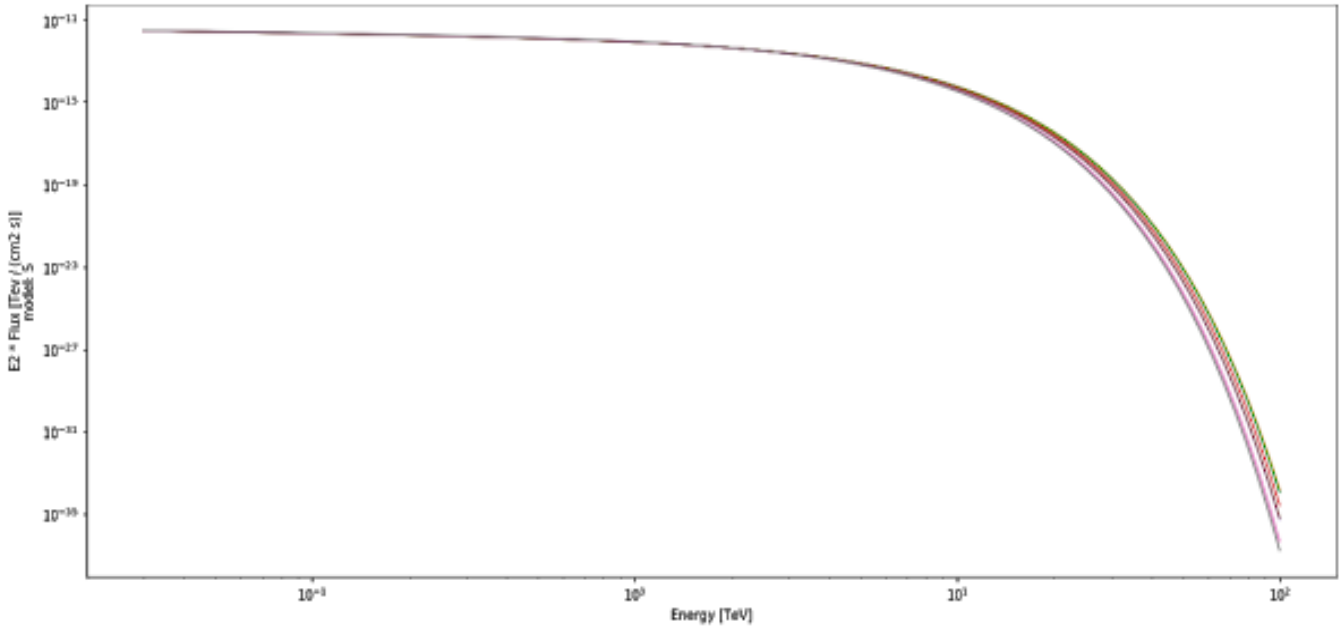







E2 * Flux [Tev / (cm2 s)]
model: 3
Energy [TeV]


E2 * Flux [Tev / (cm2 s)]
model: 4
Energy [TeV]


E2 * Flux [Tev / (cm2 s)]
model: 5
Energy [TeV]