Single Neutron Samples New Steering File Resolution, Response, and Efficiency Comparisons

New results

- **Summary**
  - Looked at reconstruction resolution/response for 0-1000 GeV neutron samples
    - I remade resolution, response, and efficiency plots using the new, fixed steering macro neutron samples
      - The improvement is, unsurprisingly, *dramatic,* and it addresses multiple previous open questions
    - I switched to using an R = 0.4 jet even though we are probably going to stick to using anti-kt
- **Next Steps**
  - I haven't applied any of the new cuts yet (eg: removing nozzle events) because I wanted to directly compare the pre and post steering macro fixes
    - I will be looking at this in the upcoming week

2D error histograms for energy bins

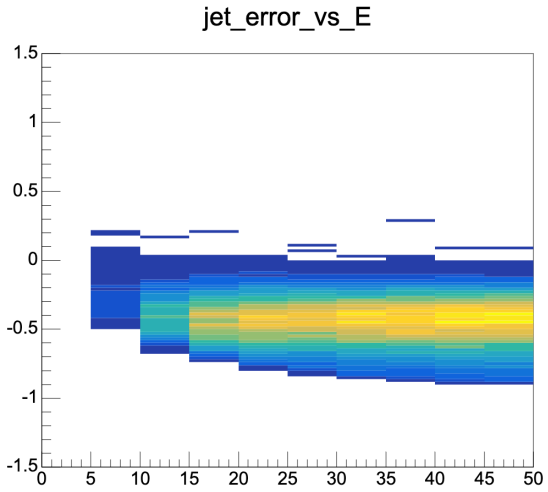
0-50 GeV

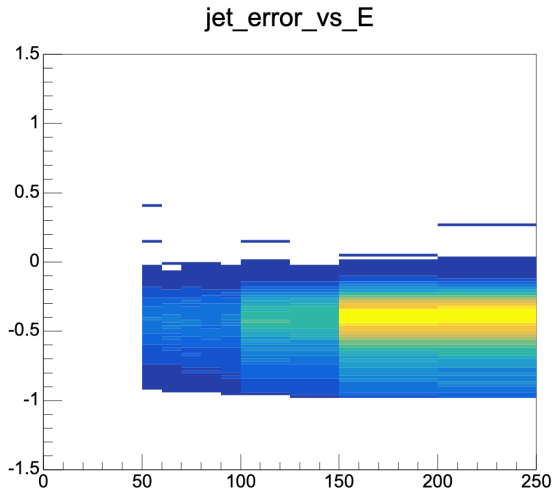
50-250 GeV

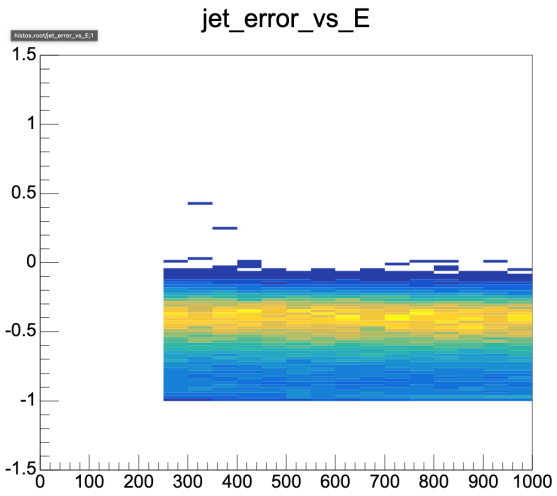
250-1000 GeV

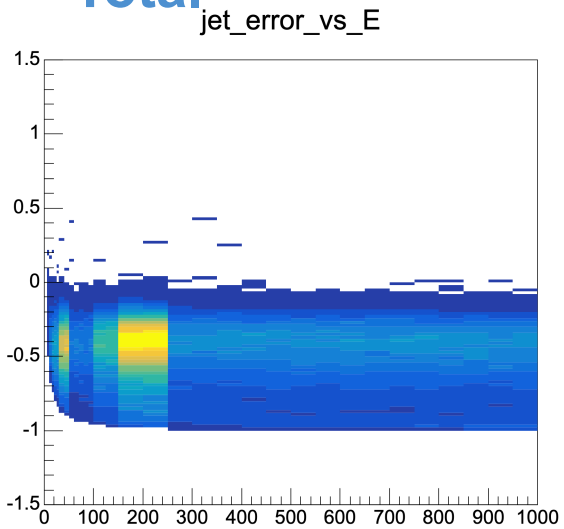
Total

Pre-fix









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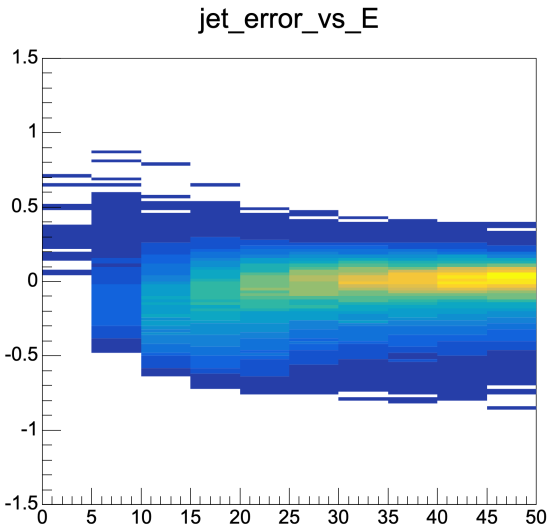
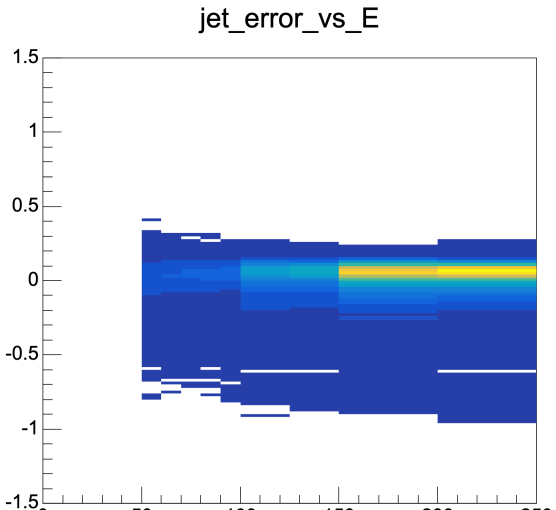
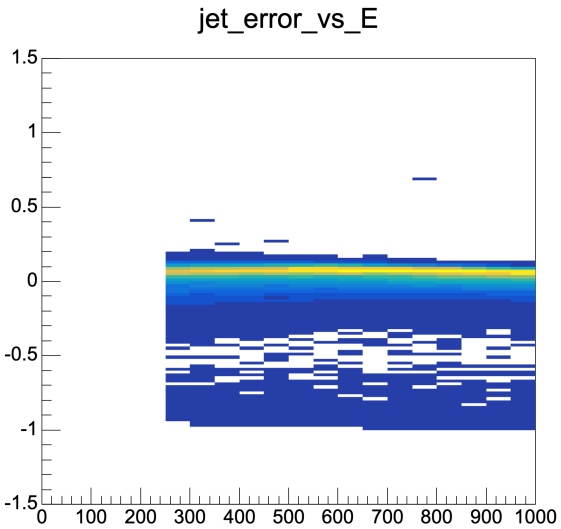
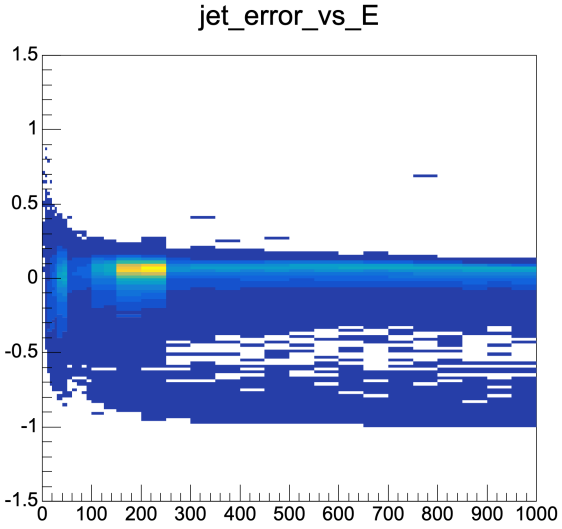








2D error histograms for theta bins

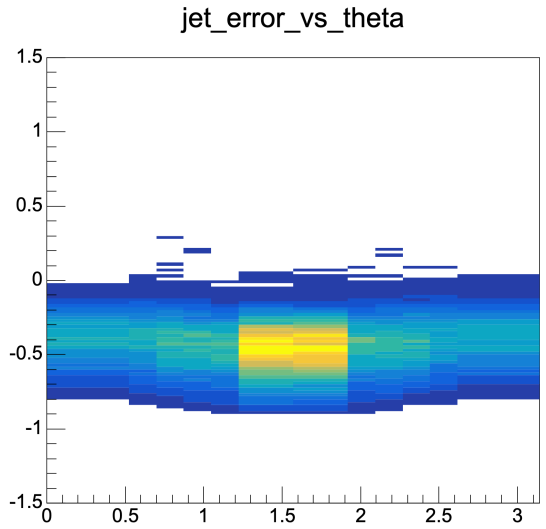
0-50 GeV

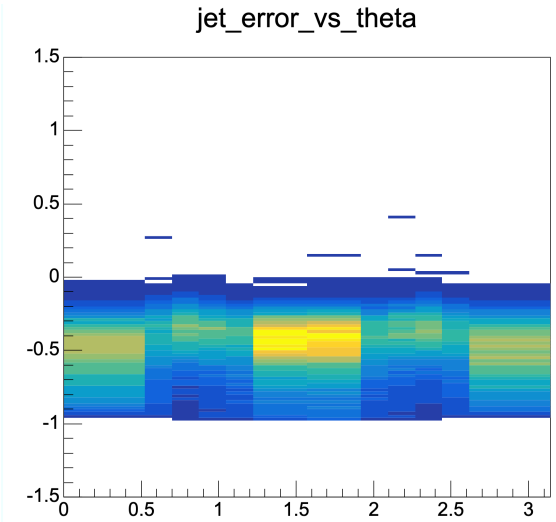
50-250 GeV

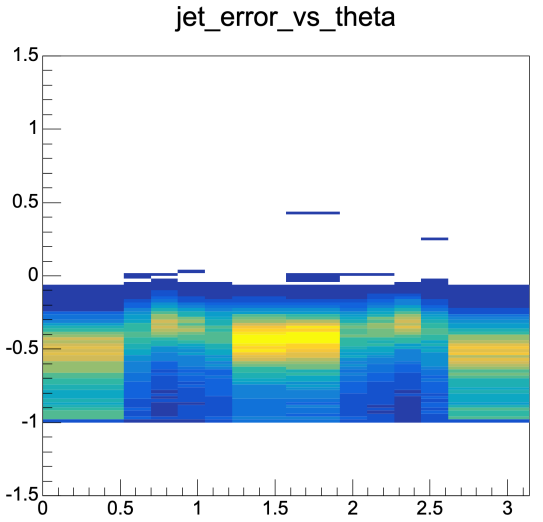
250-1000 GeV

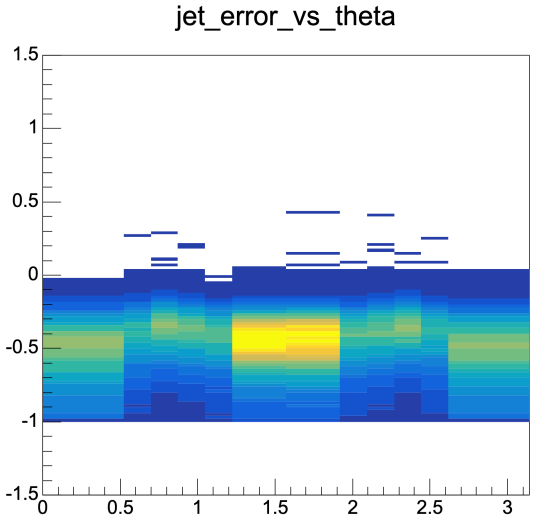
Total

Pre-fix









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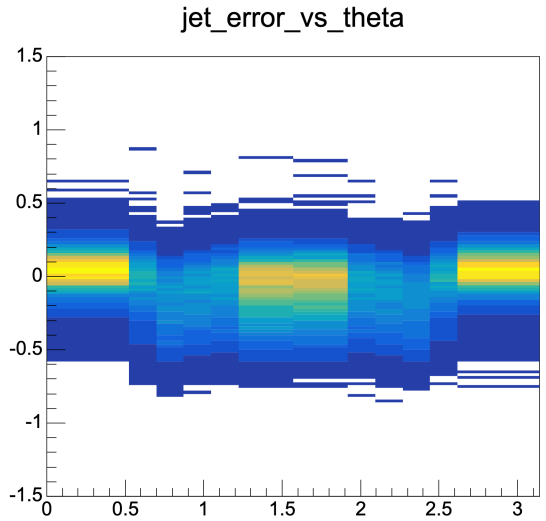
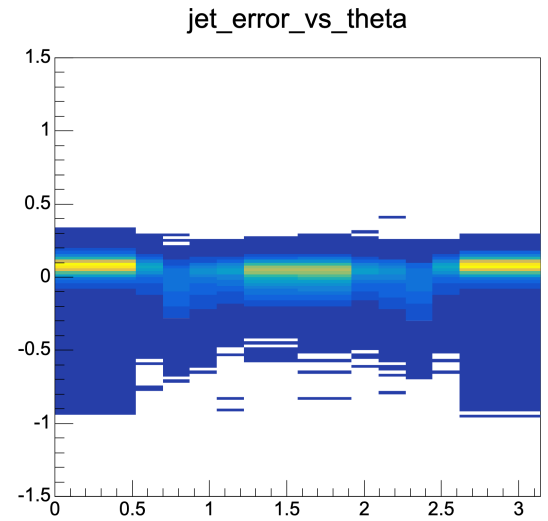
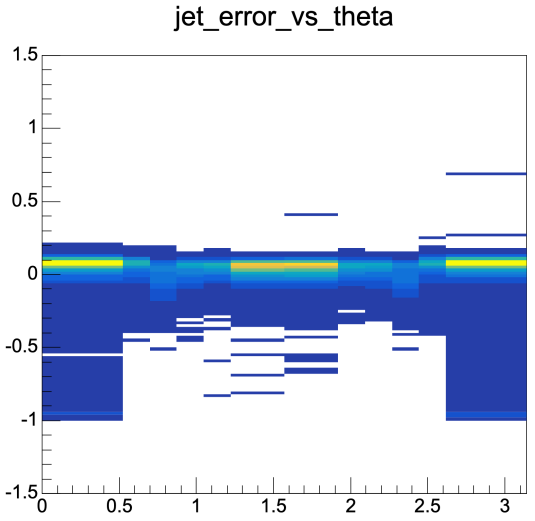
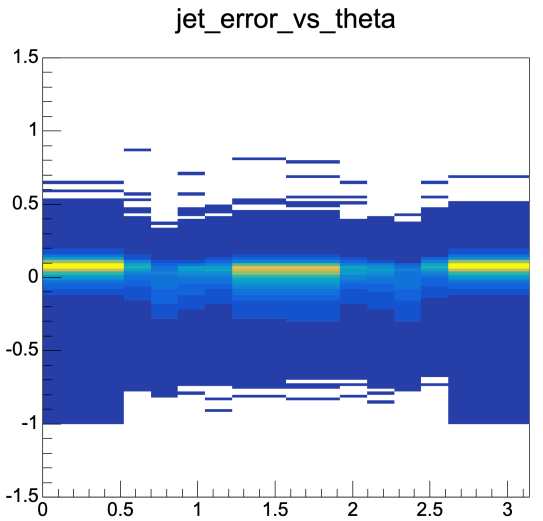




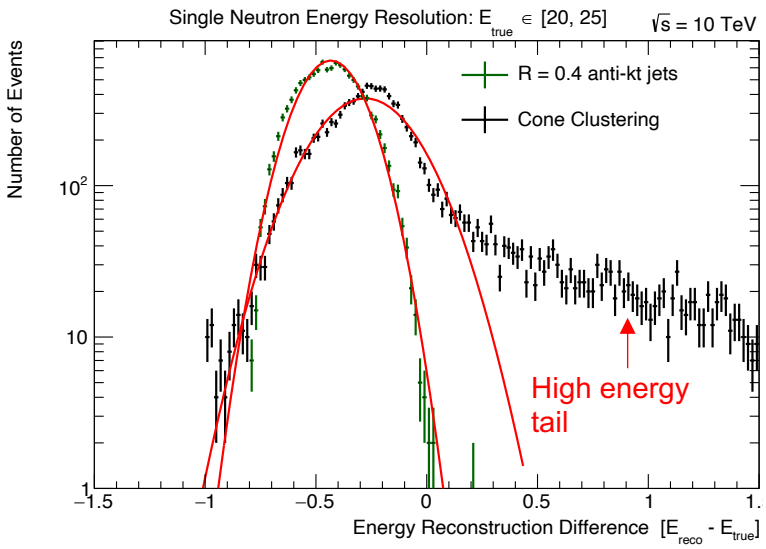


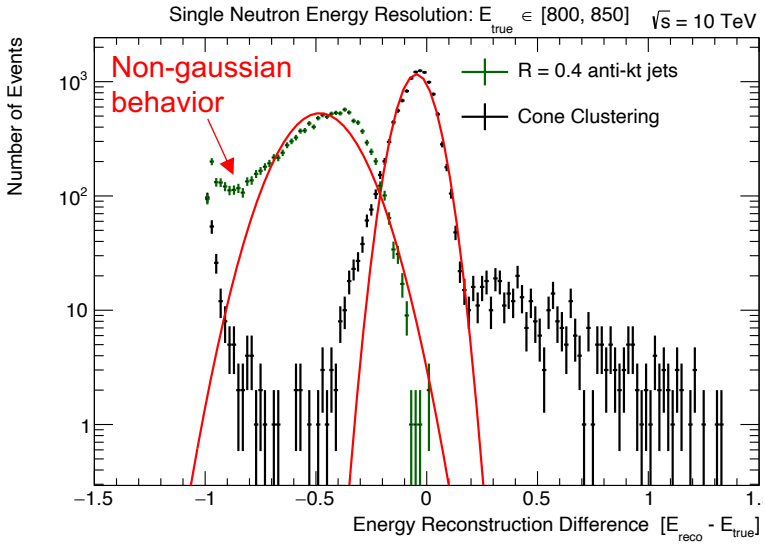


Quick fitting note

- **Notes**
  - These fits come from projections of the 2D error histograms
  - The high energy tail in the cone clustering is still present
    - Although the larger R = 0.4 seems to be helping
  - The high energy non-gaussian behavior of anti-kt jets reconstructed with very low energy is still present
    - It is, however, greatly improved with significantly fewer number of total events
      - And, it only arises in the theta bin closest to the beam

Pre-fix





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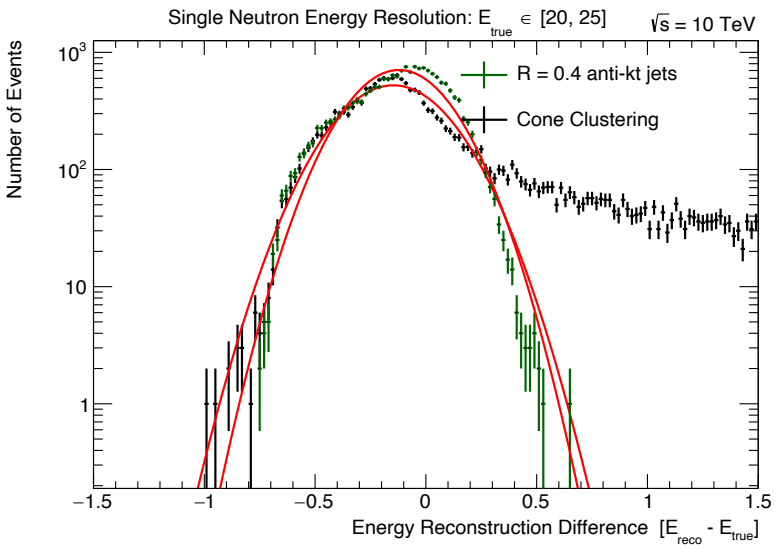
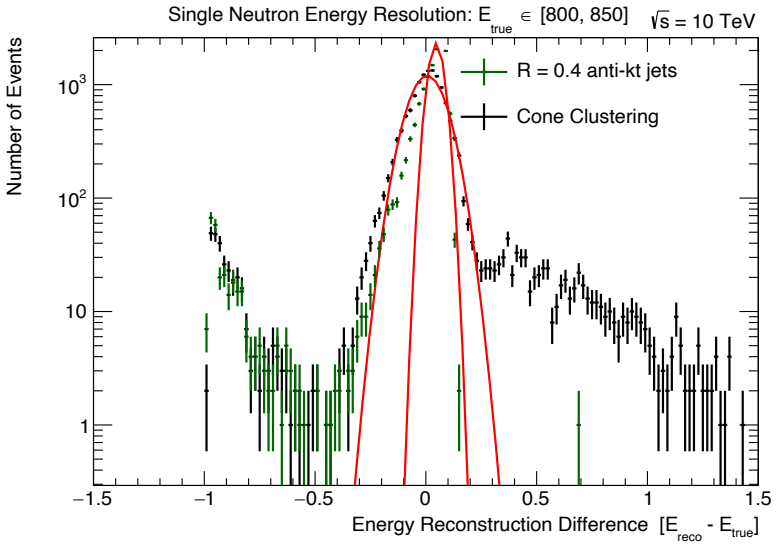
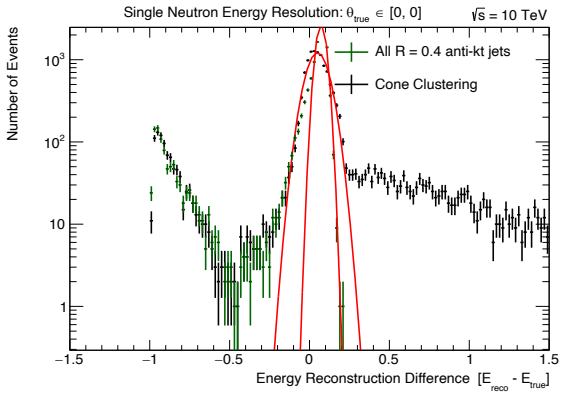




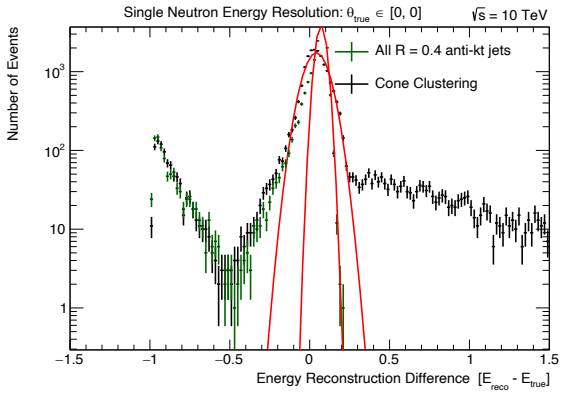
Example Fits

- **Notes**
  - These fits come from the 250-1000 GeV samples
  - Both the non-gaussian behavior in the anti-kt and the high energy tail from the cone only seem to arise near the beam/nozzle
    - When cutting out the nozzle, should I use reconstructed theta or truth theta?
  - The anti-kt gaussian does also look a bit wider than the fit

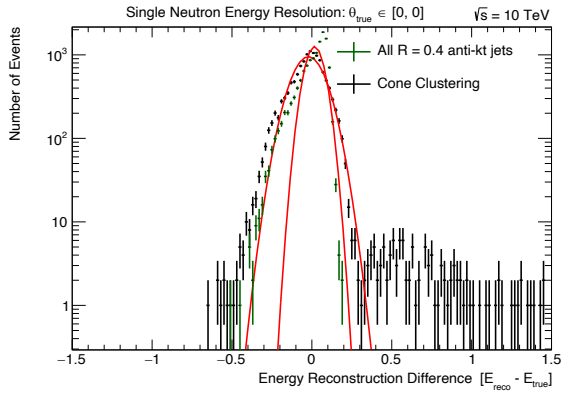
0 – 0.52 Rad



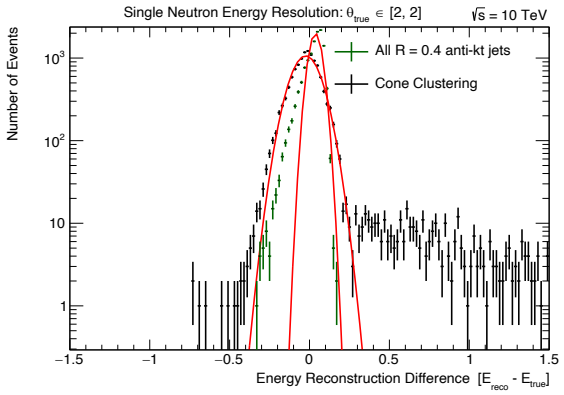
0.52 – 0.69 Rad



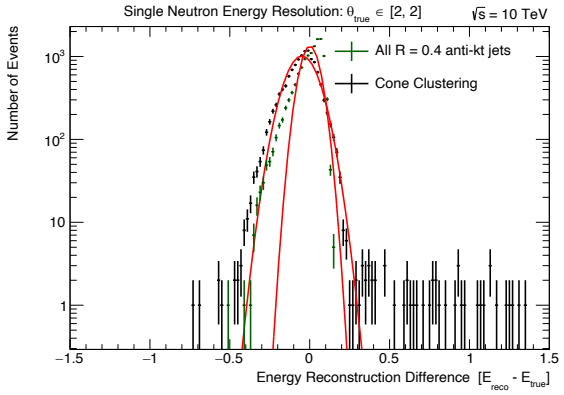
0.69– 0.87 Rad



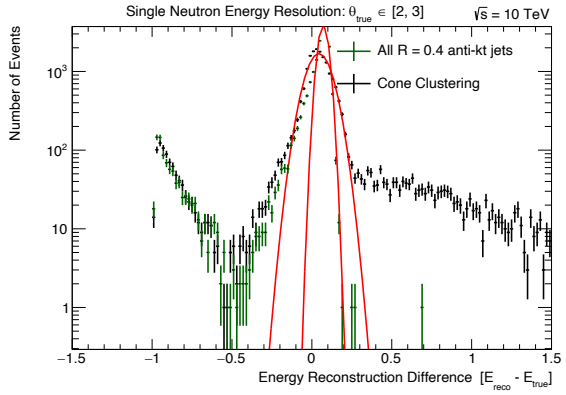
2.09 – 2.27 Rad



2.27 – 2.44 Rad



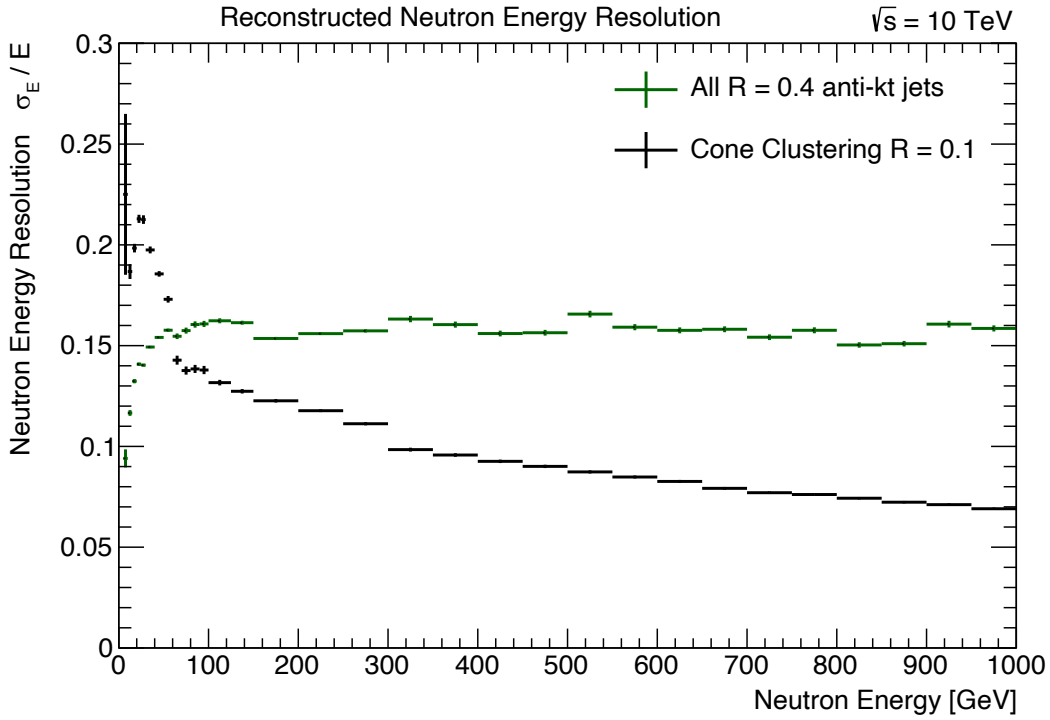
2.44 – 3.14 Rad



This bin is too large (0.7 rads) making the effect look asymmetric

Neutron energy resolution vs energy

Pre-fix



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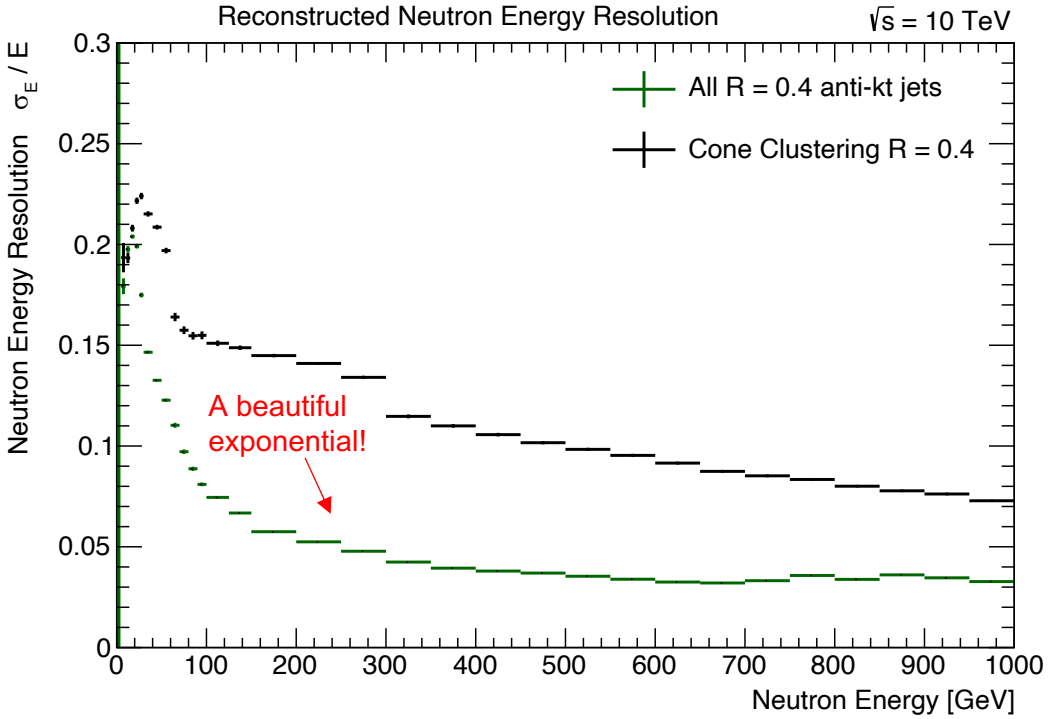
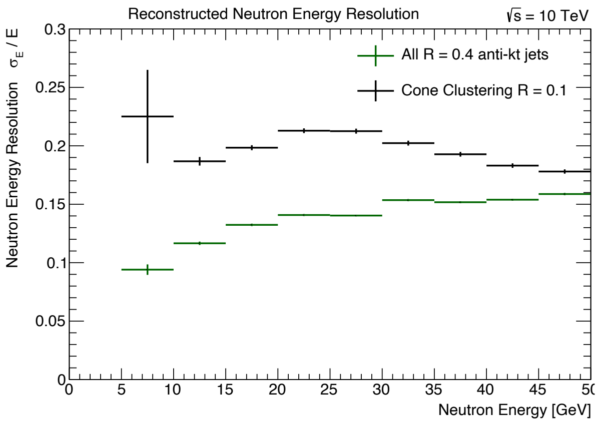


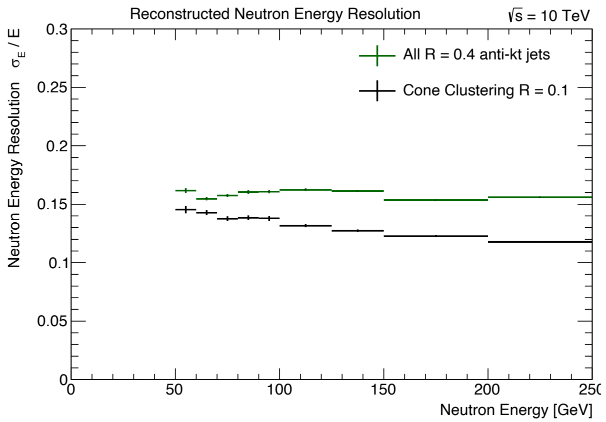
Total

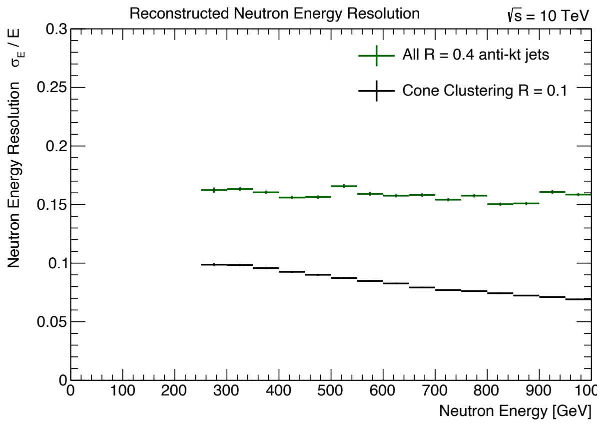
Neutron energy resolution vs energy (each bin)

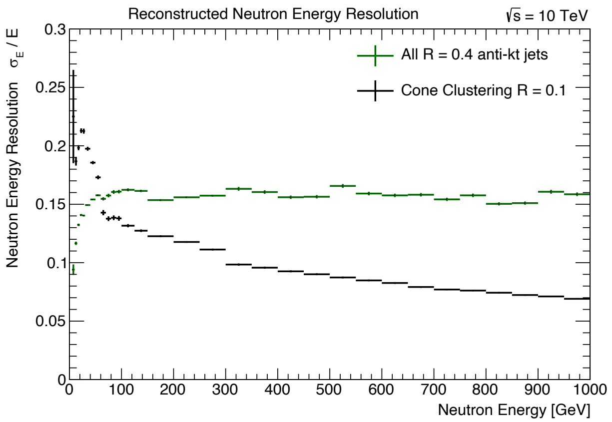
	0-50 GeV	50-250 GeV	250-1000 GeV	Total

Pre-fix









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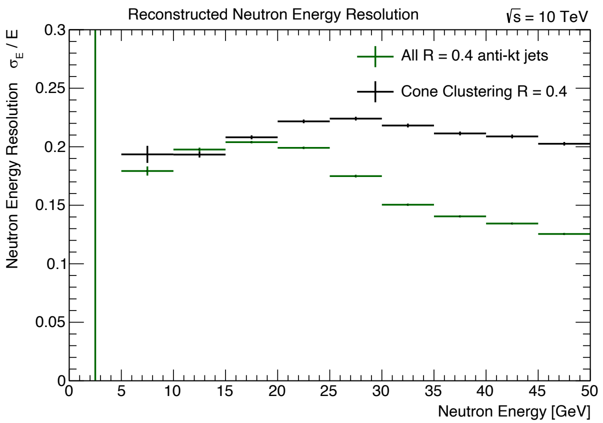
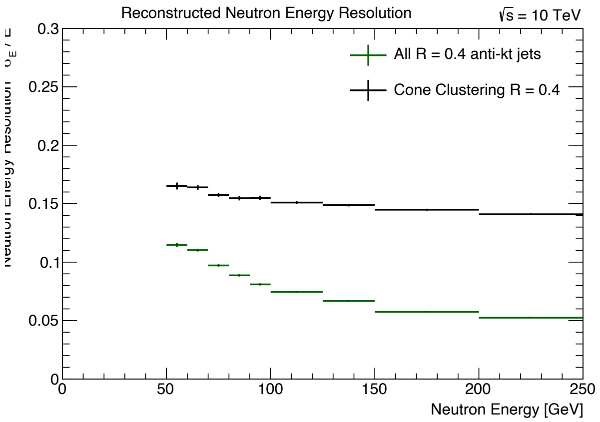
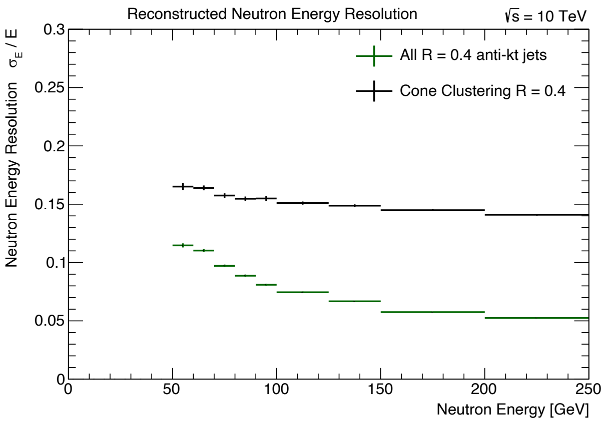
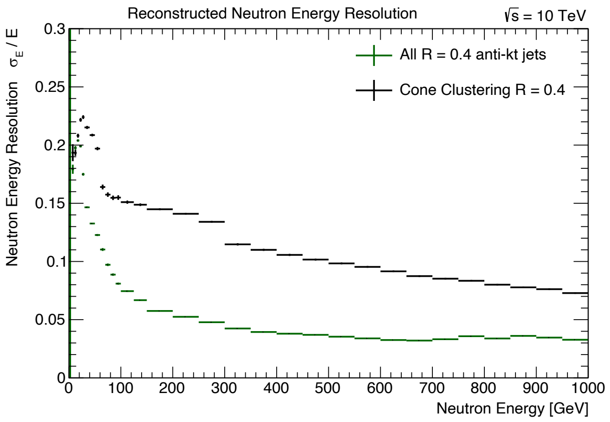


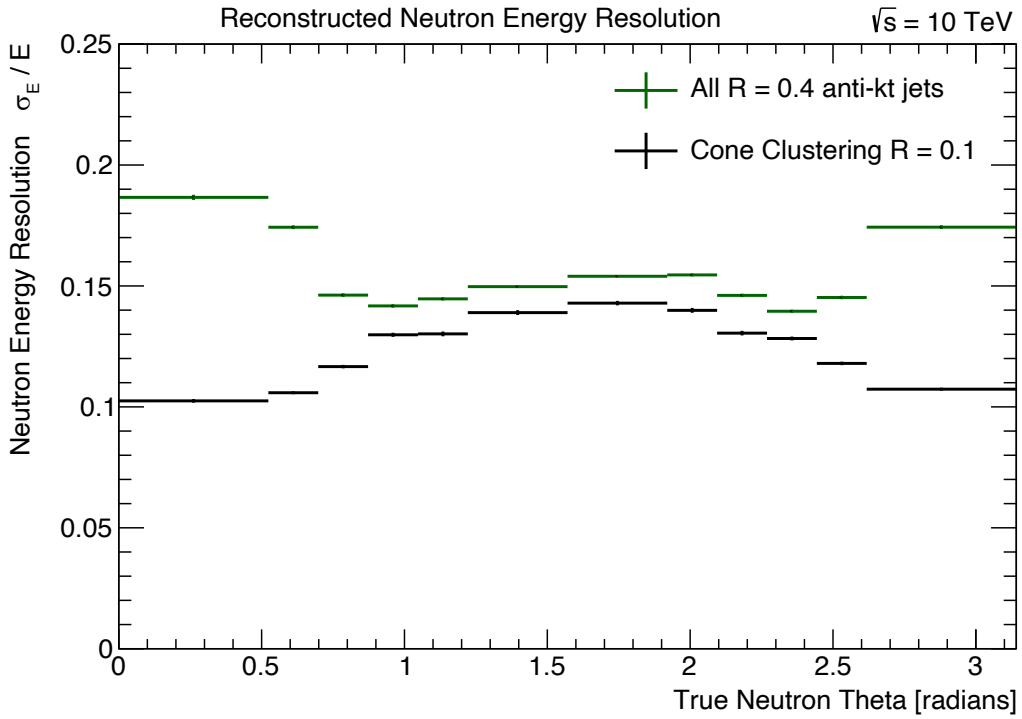






Neutron energy resolution vs theta

Pre-fix



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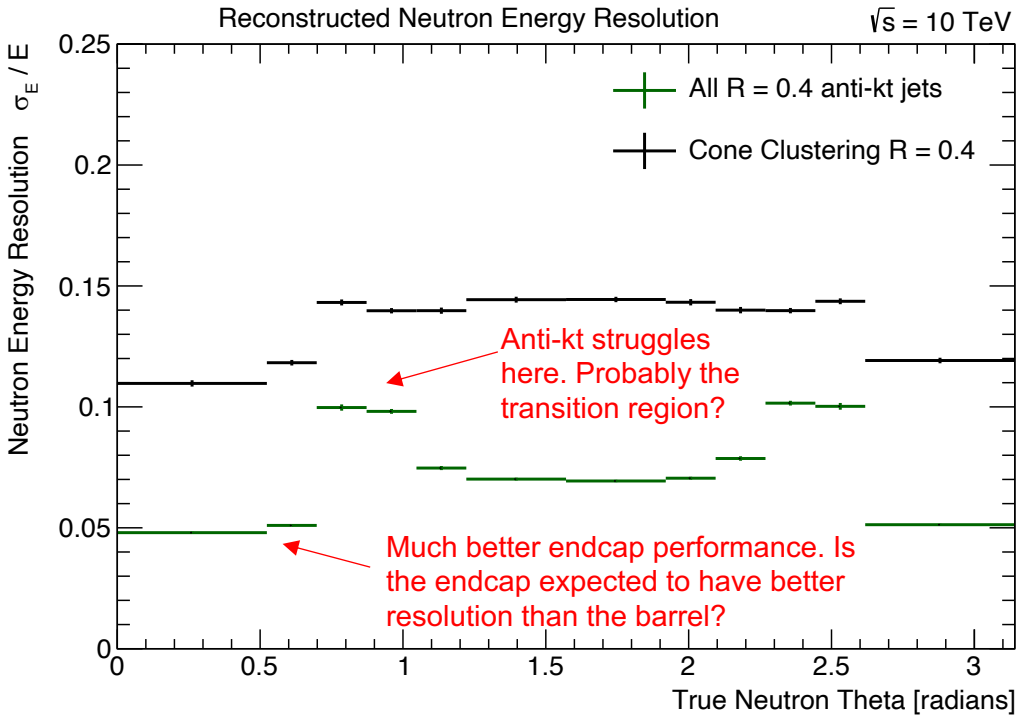
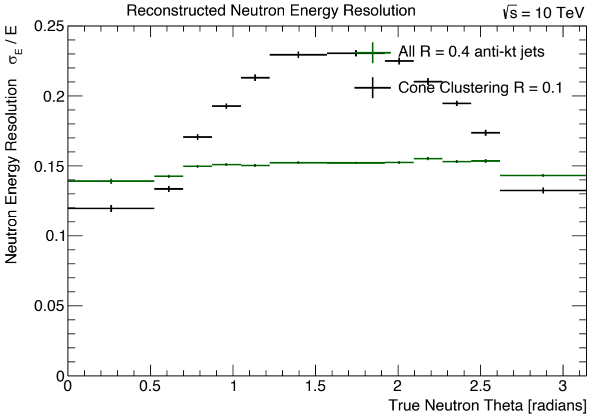


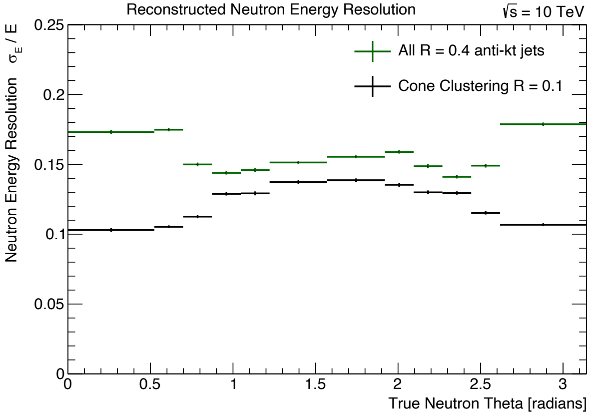
Total

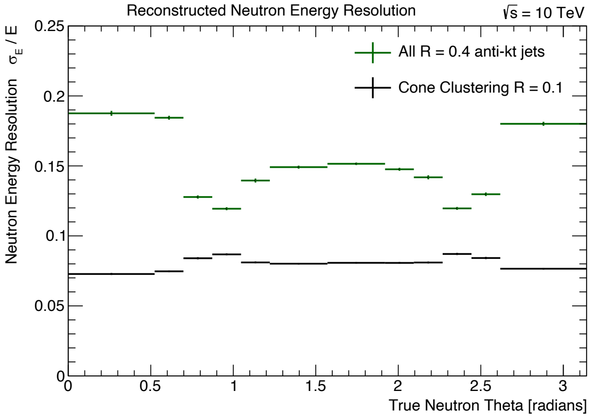
Neutron energy resolution vs theta (each bin)

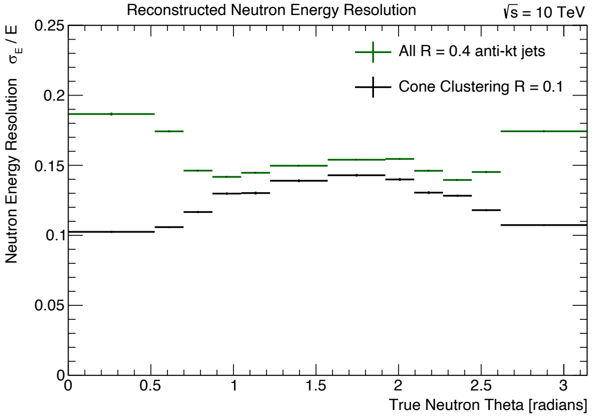
0-50 GeV | **50-250 GeV** | **250-1000 GeV** | **Total**

Pre-fix









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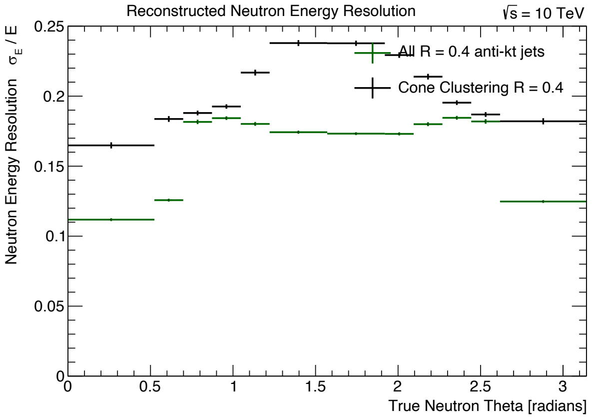
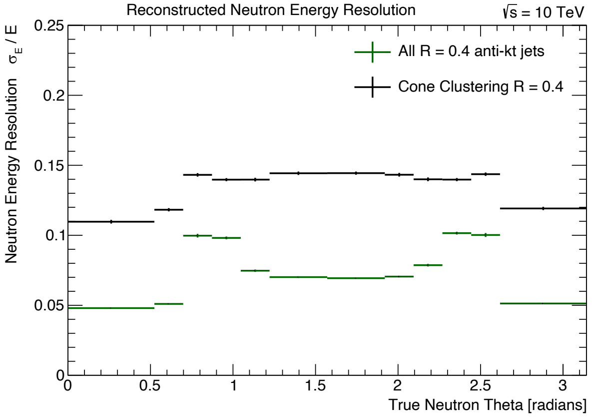
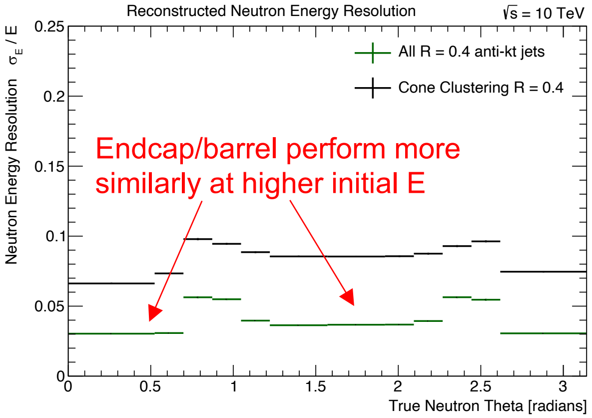
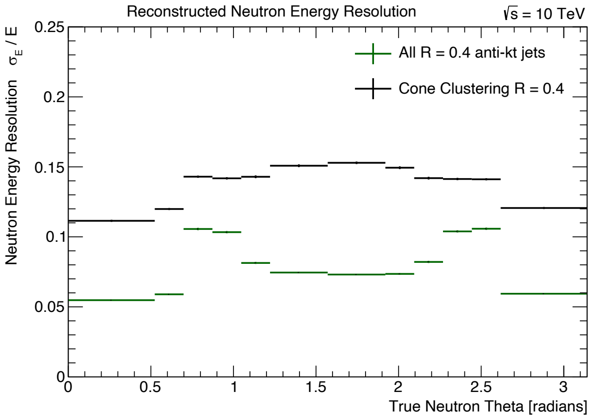


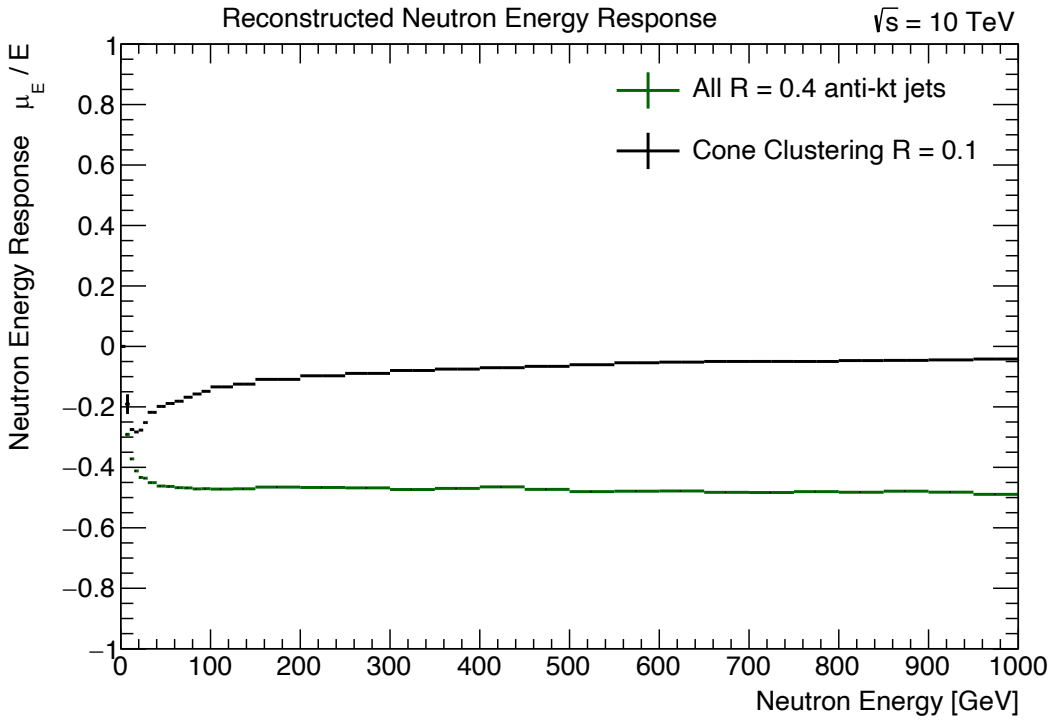






Neutron energy response vs energy

Pre-fix



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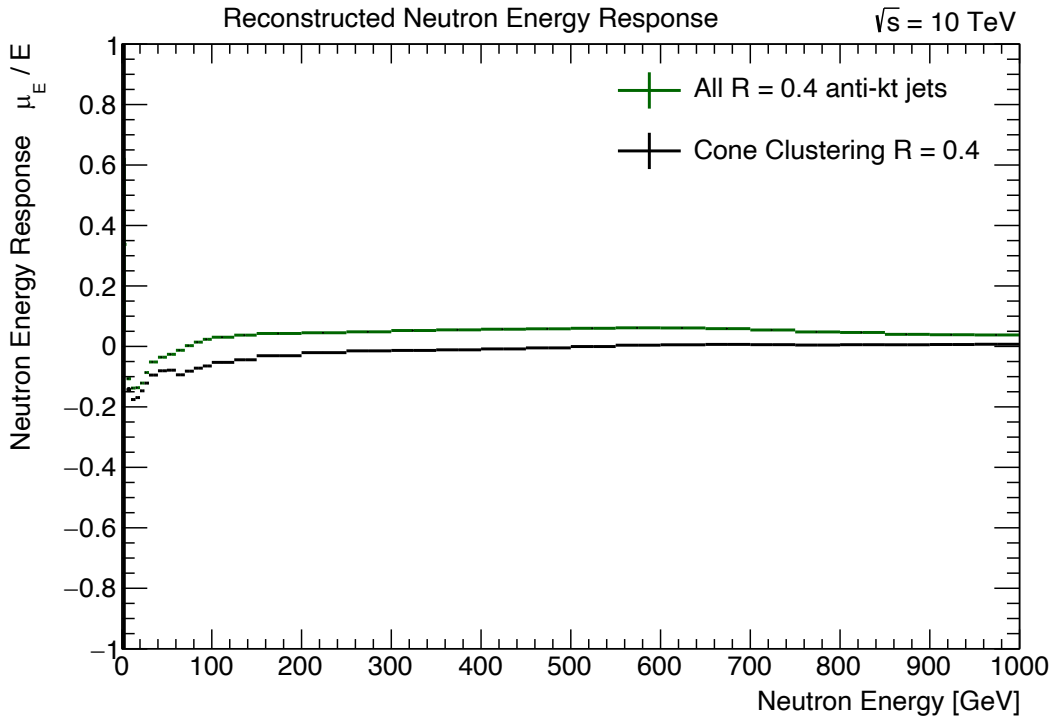


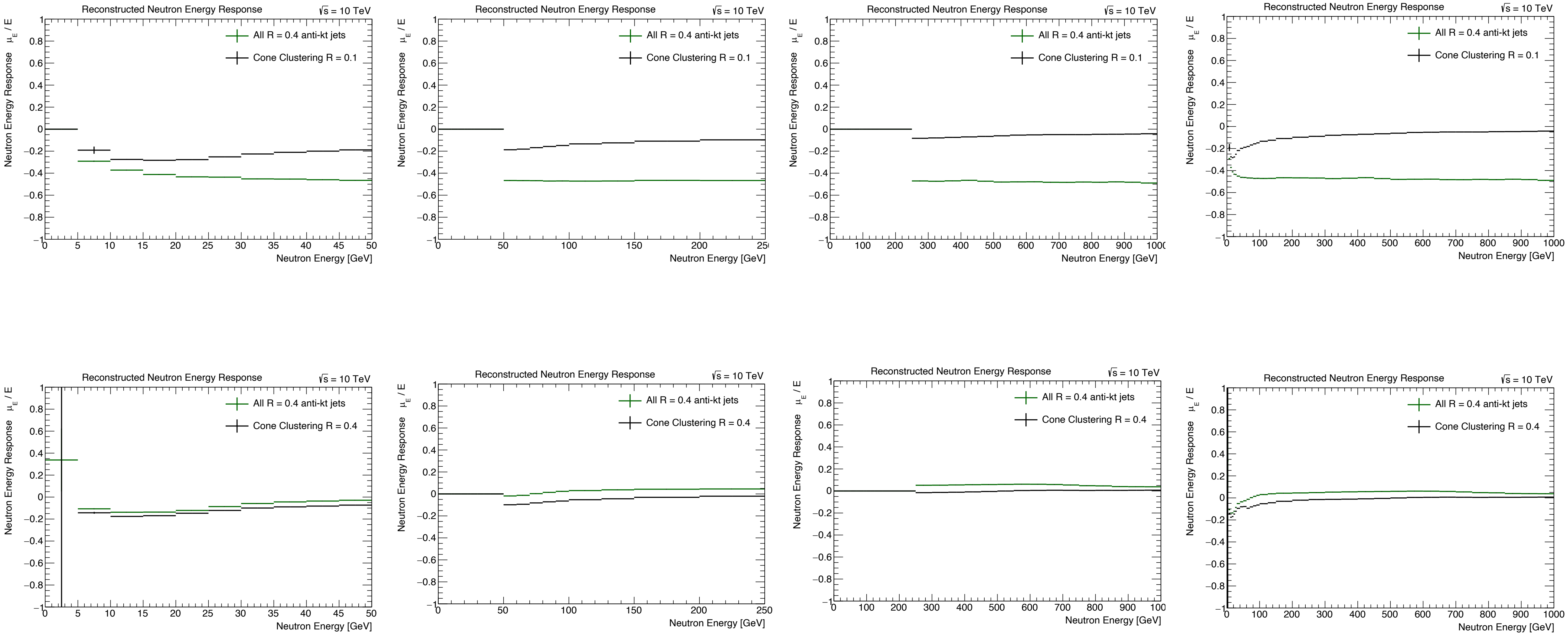
Total

Neutron energy response vs energy (each bin)

0-50 GeV | 50-250 GeV | 250-1000 GeV | Total

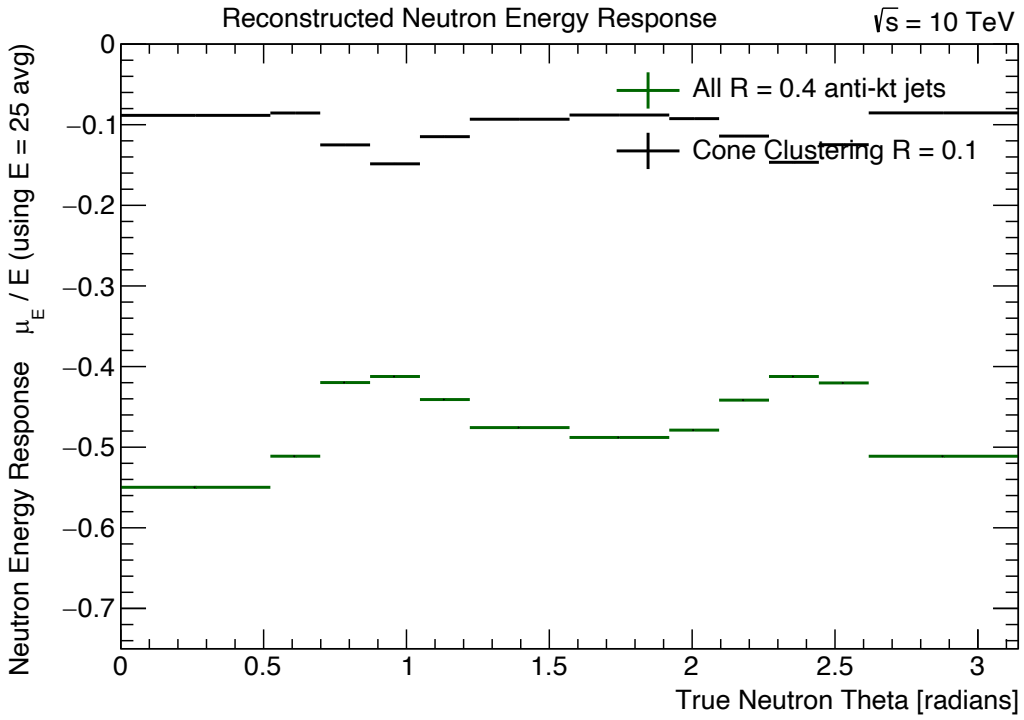
Pre-fix

Post-fix



Neutron energy response vs theta

Pre-fix



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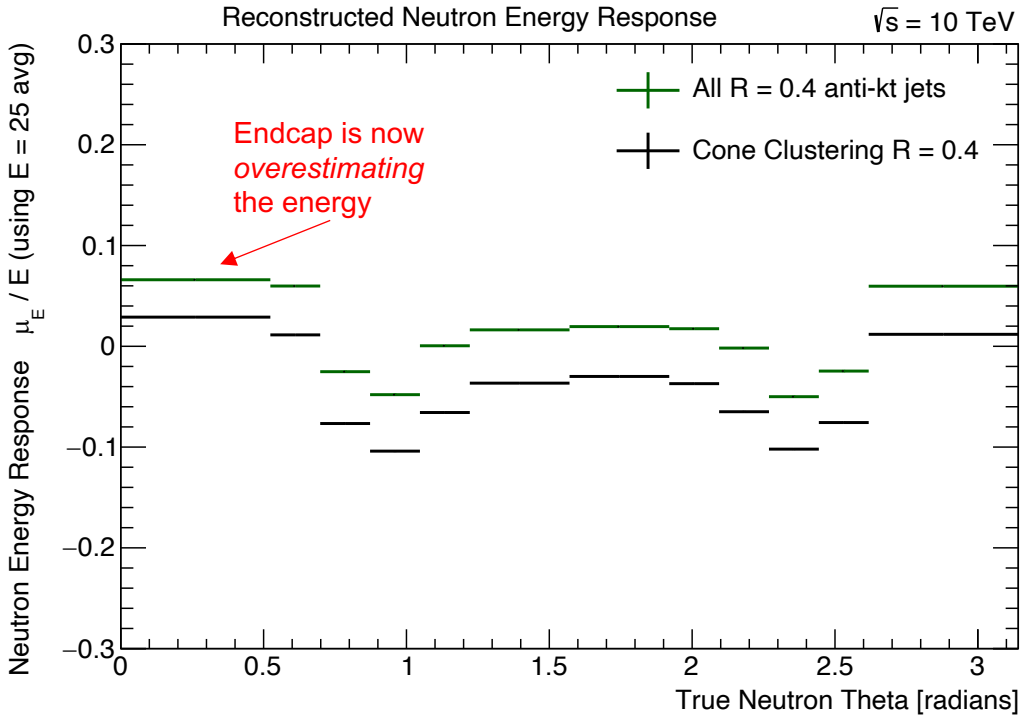
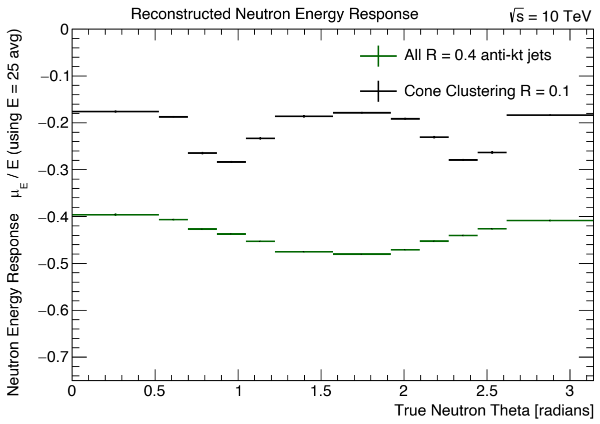


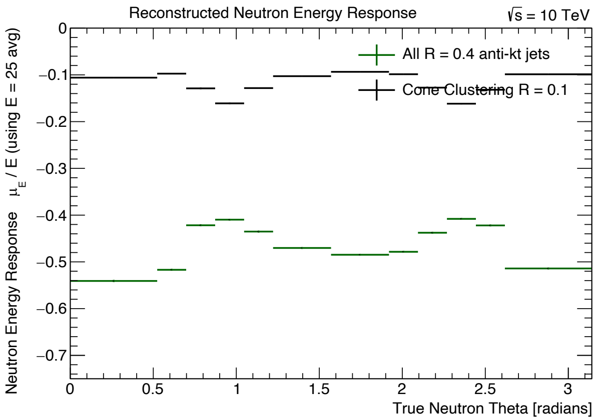
Total

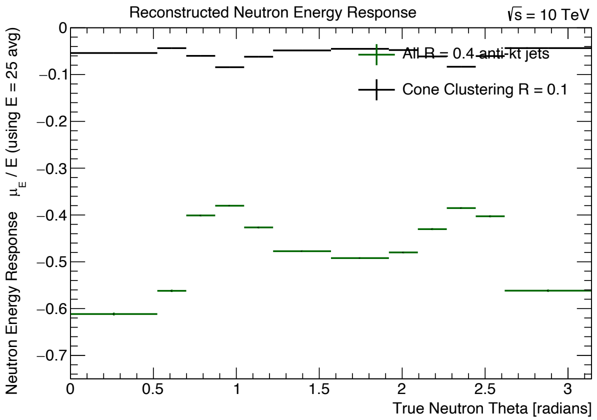
Neutron energy response vs theta (each bin)

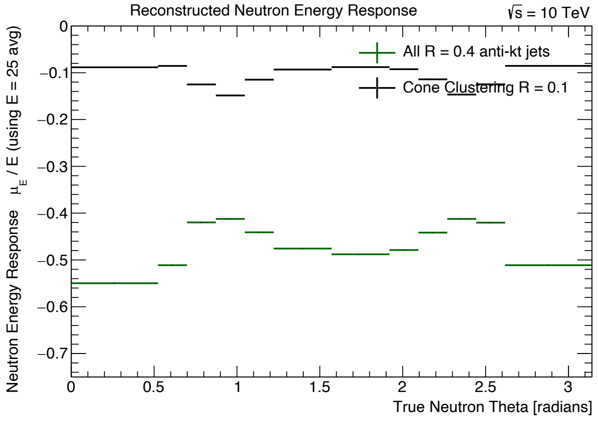
0-50 GeV | **50-250 GeV** | **250-1000 GeV** | **Total**

Pre-fix









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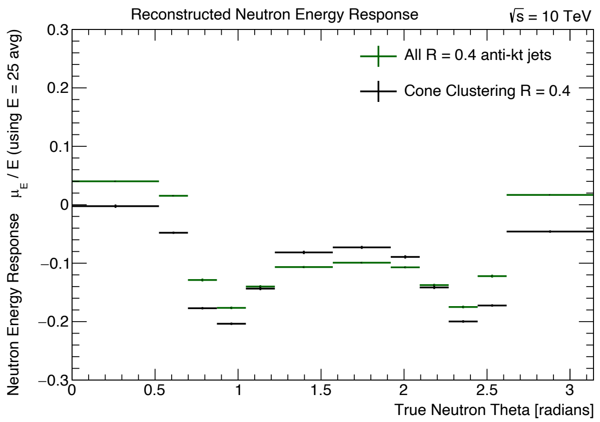
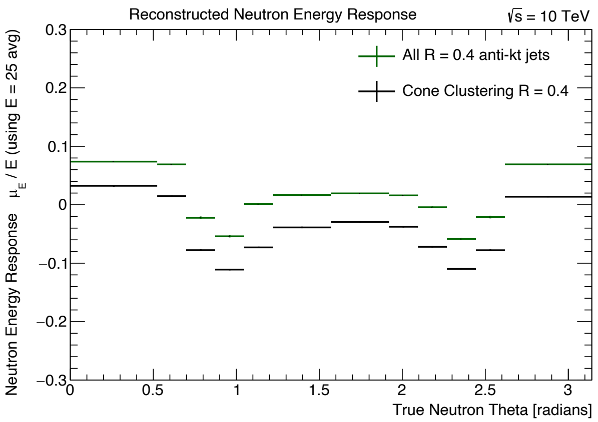
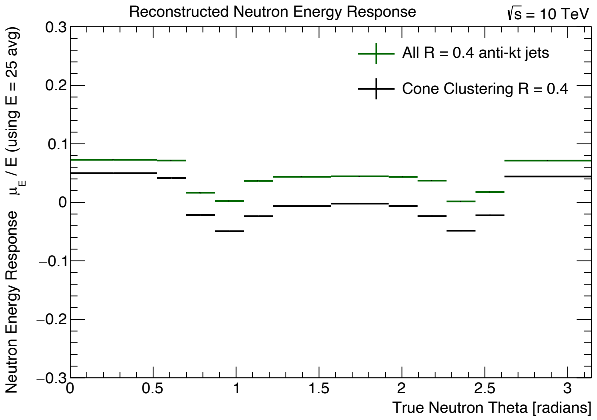
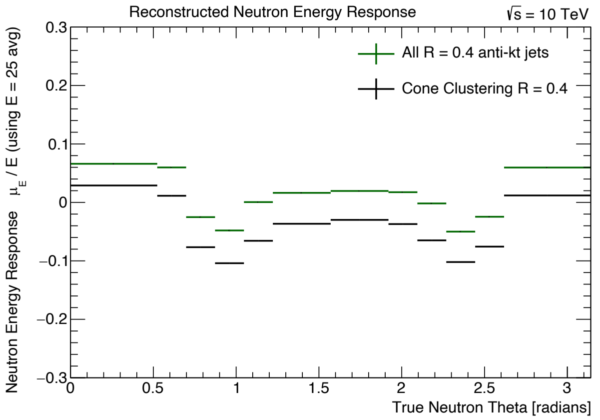


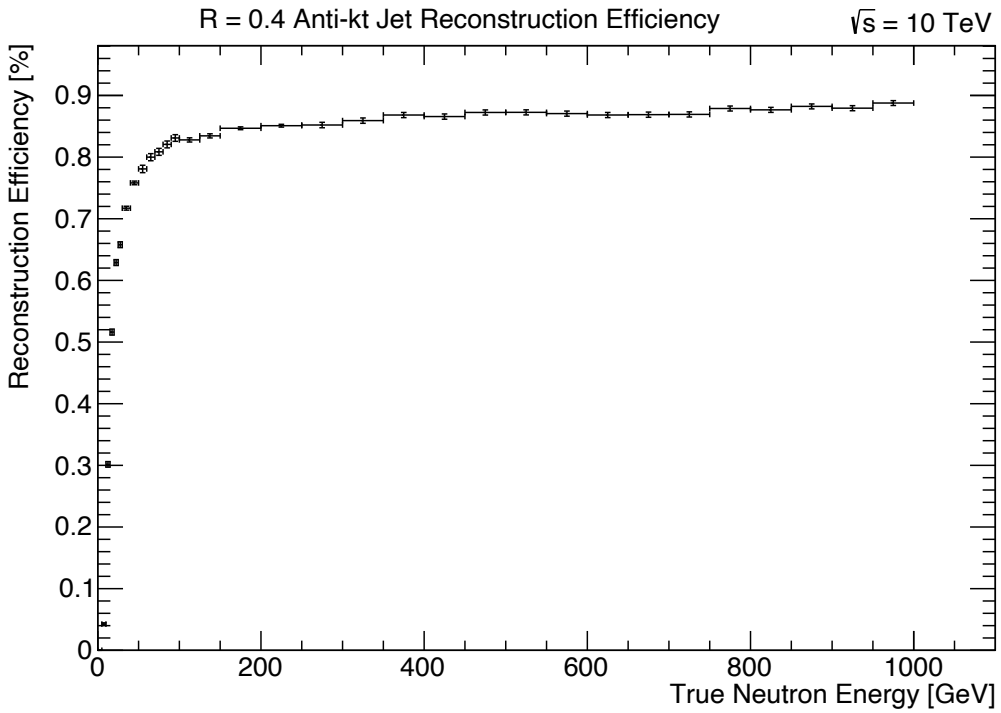






Neutron reconstruction efficiency vs energy

Pre-fix



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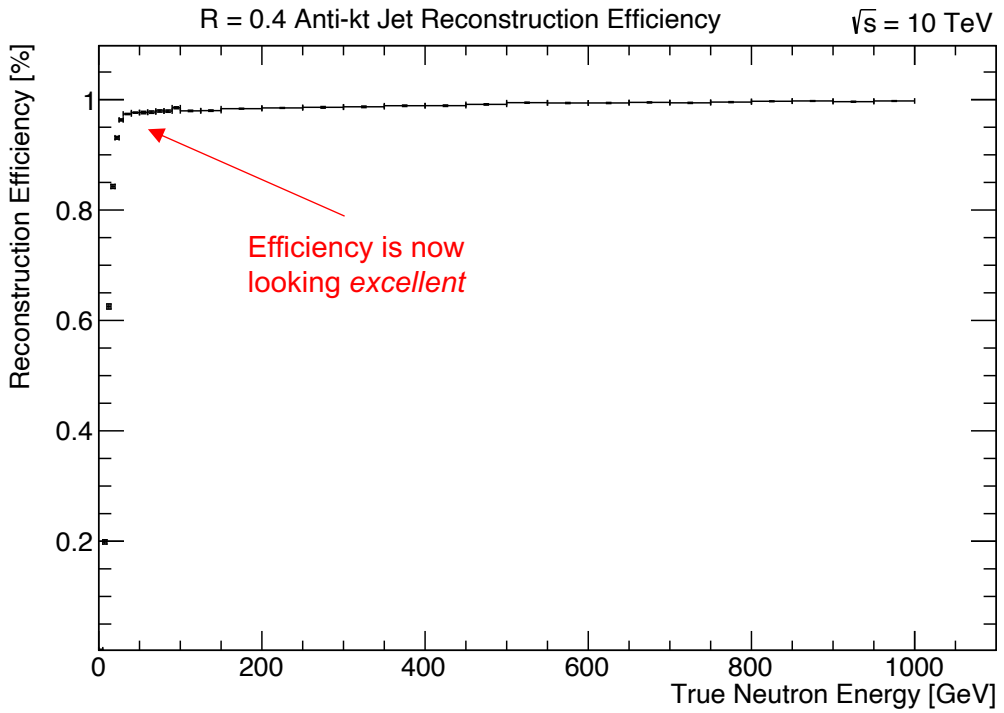
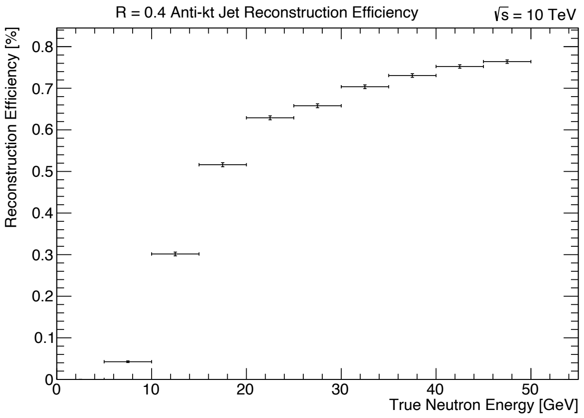


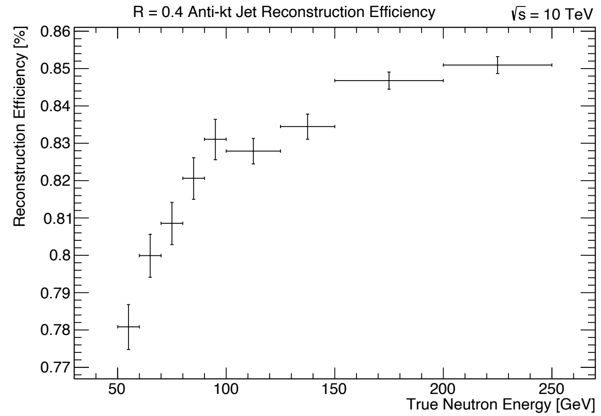
Total

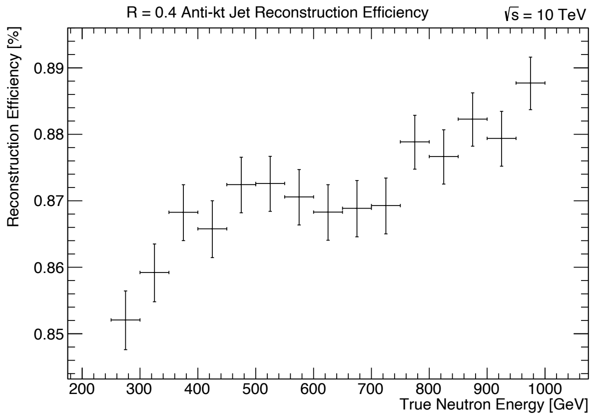
Neutron reconstruction efficiency vs energy (bins)

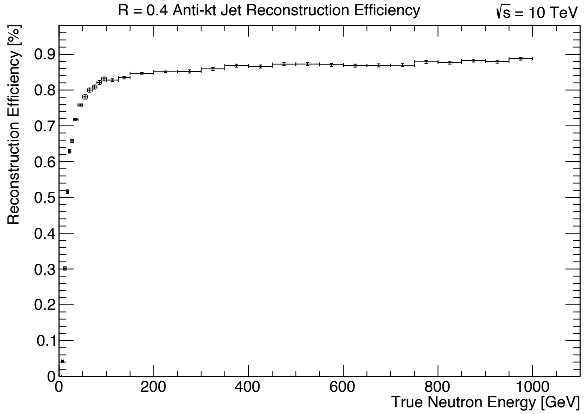
	0-50 GeV	50-250 GeV	250-1000 GeV	Total

Pre-fix

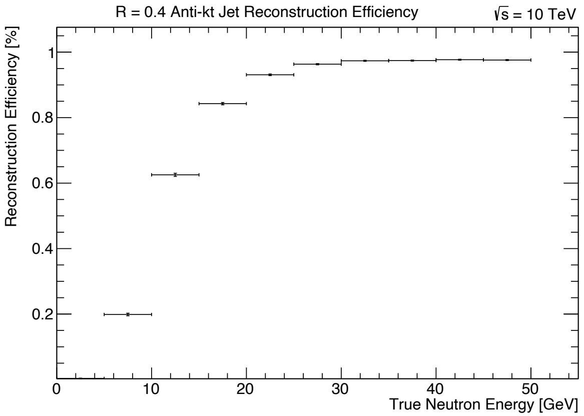


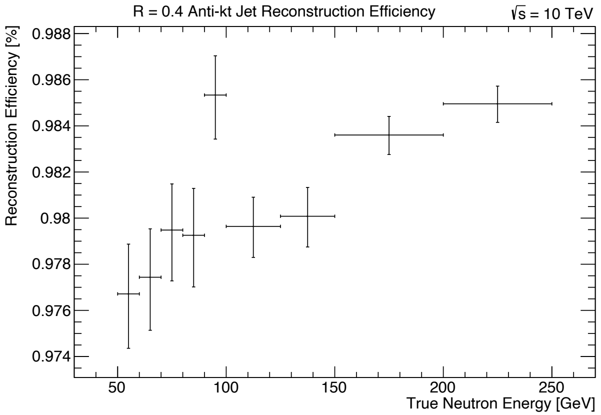


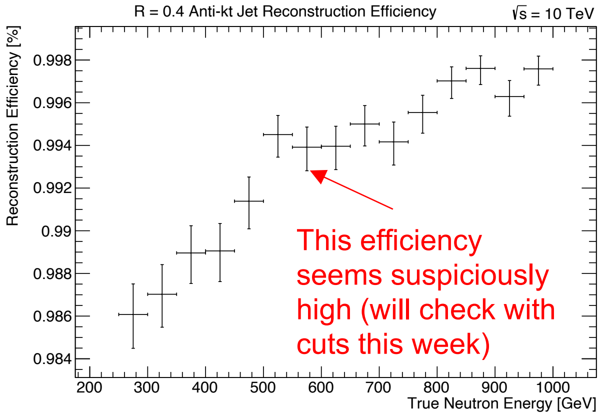


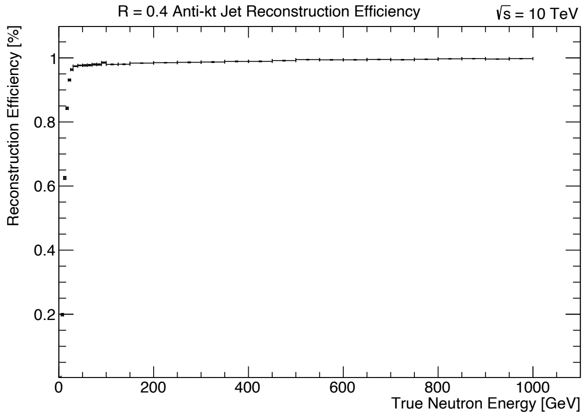


Post-fix



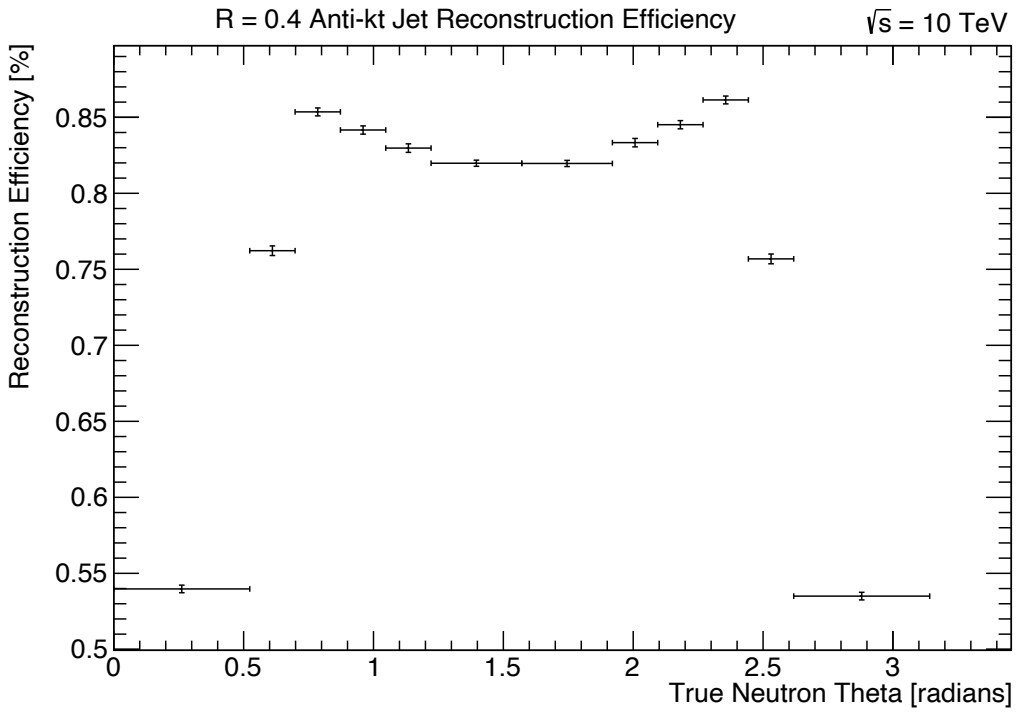




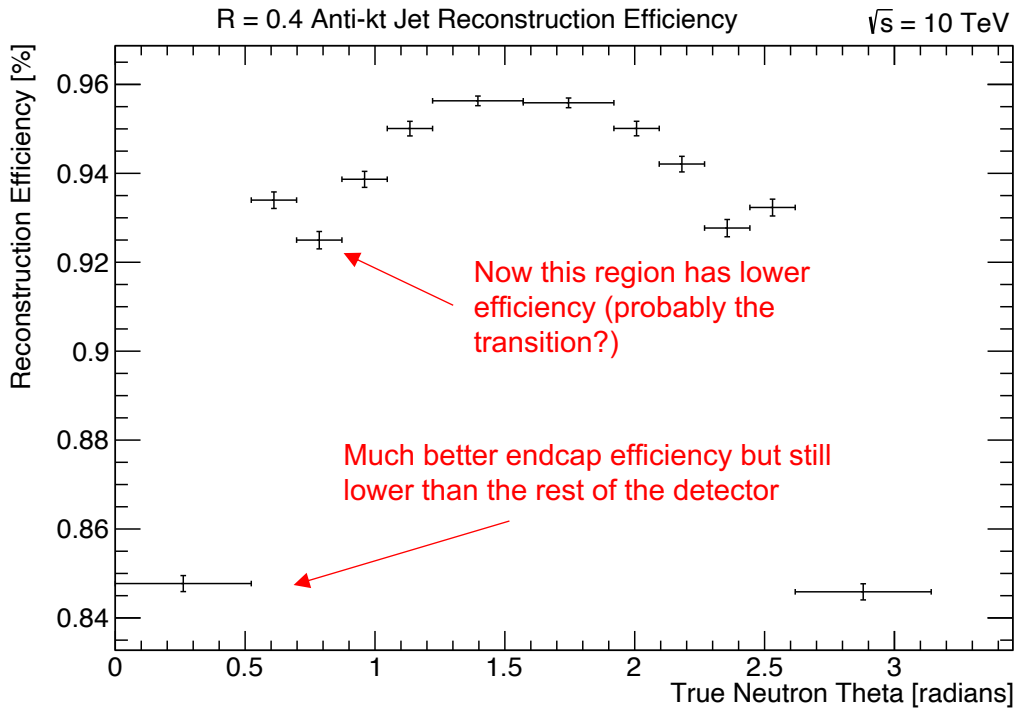


Neutron reconstruction efficiency vs theta

Pre-fix



Post-fix



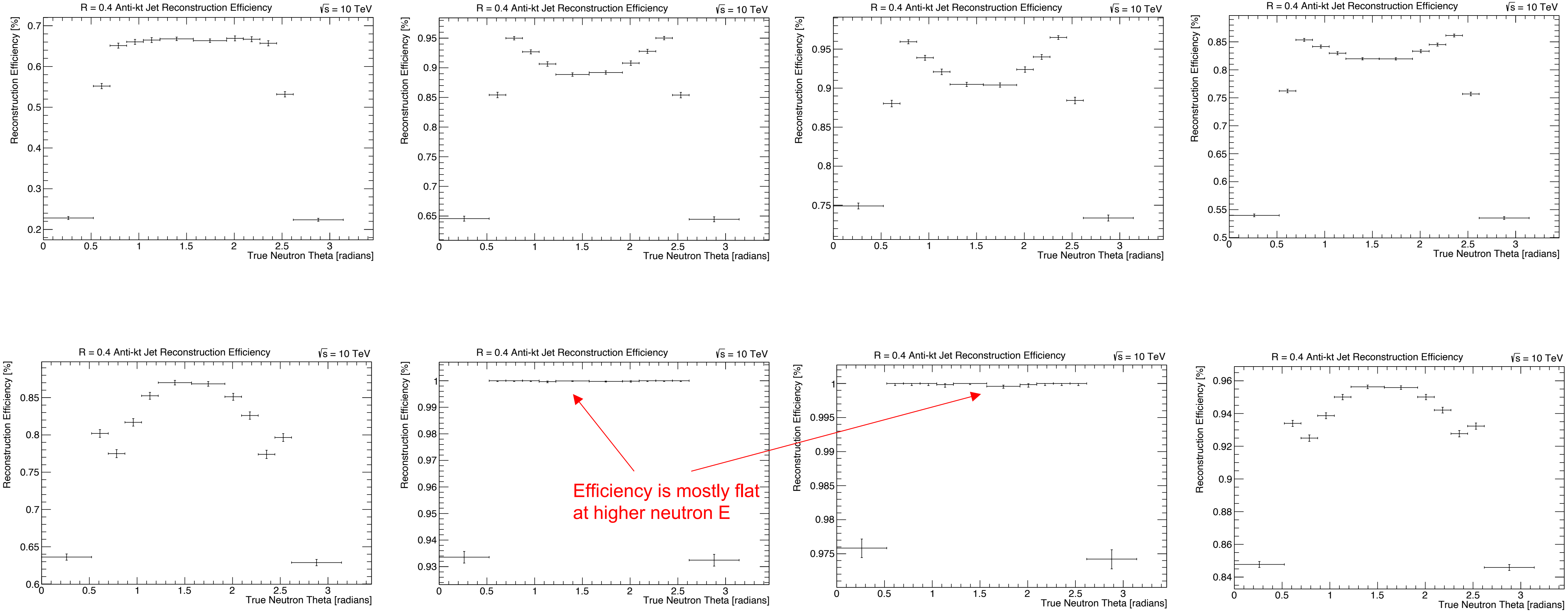
Total

Neutron reconstruction efficiency vs theta (bins)

0-50 GeV | **50-250 GeV** | **250-1000 GeV** | **Total**

Pre-fix

Post-fix



Summary and Next Steps

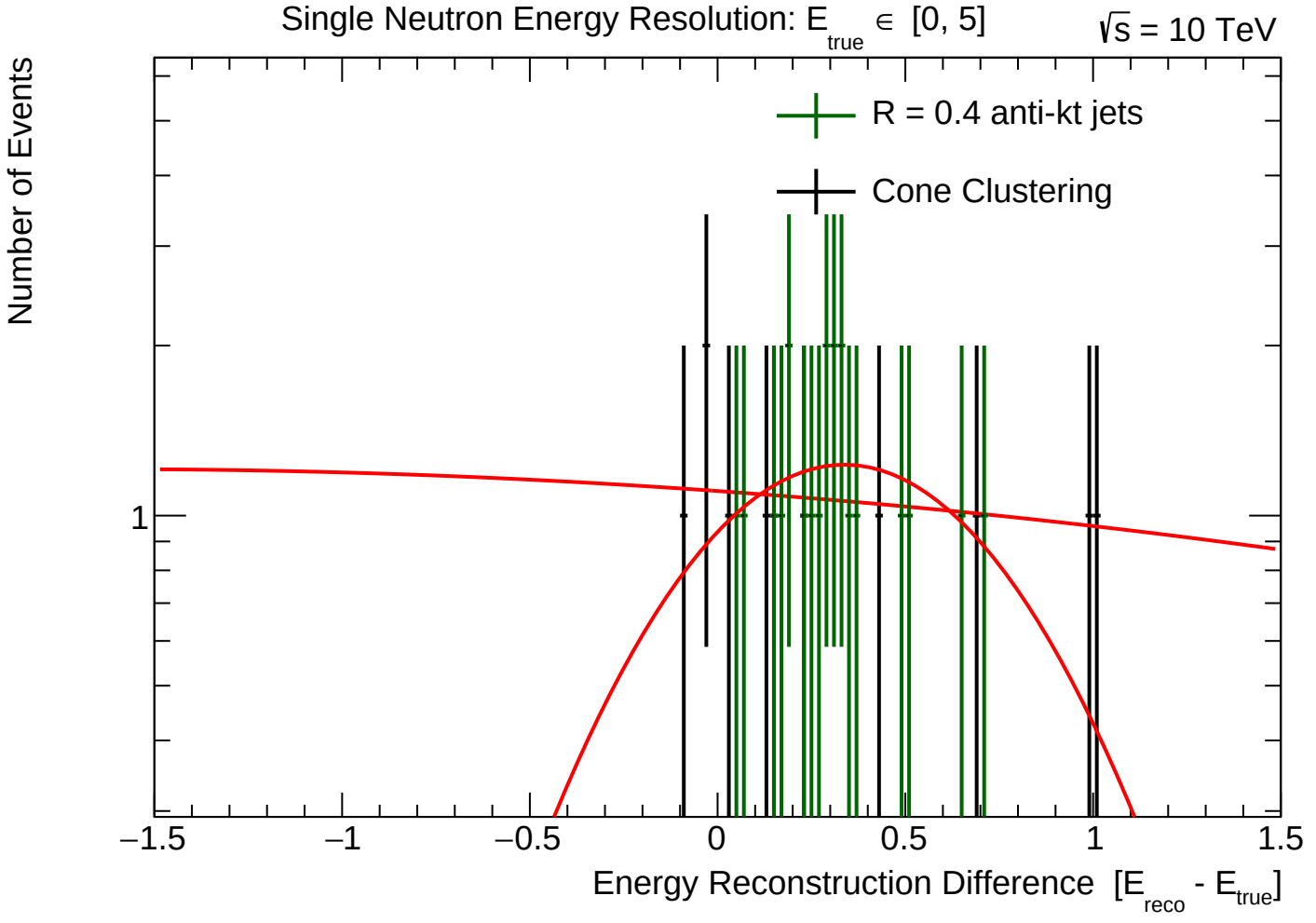
- **Summary**
  - The response, resolution, and efficiency plots have been extended to all 0-1000 GeV neutron samples with the new steering files
    - Now the resolution looks like an exponential
    - The efficiency increased from the fix

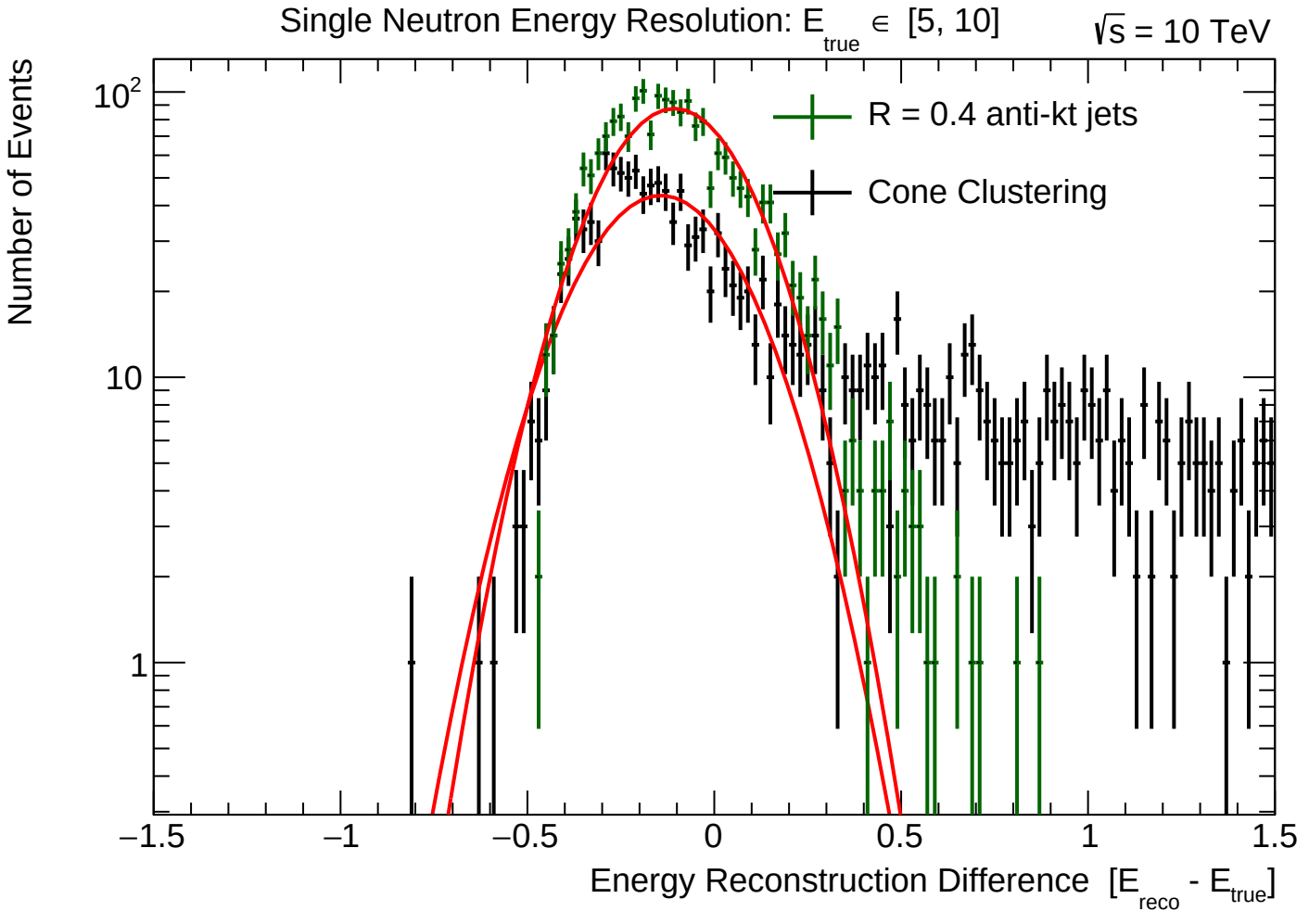
- **Next Steps**
  - Compare today's results with the previous 3 TeV plots to better understand the relative performance differences
  - Work with Rose to do energy correction for neutrons and photons following Tova's presentation last week
  - Add in more cuts (eg: remove events in the nozzle)
    - Add energy matching criteria to remove non-gaussian behavior in the fitting

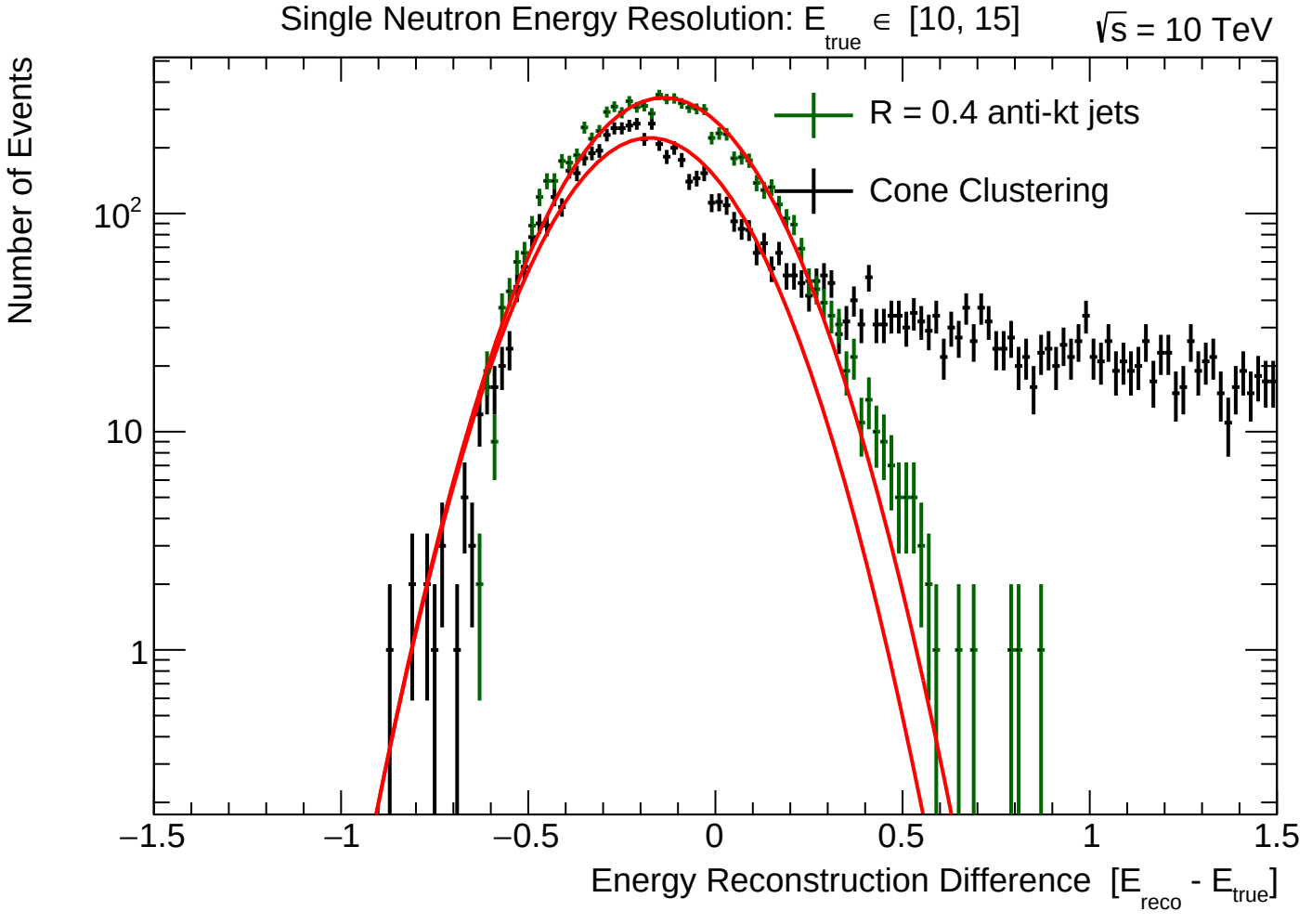
Supplementary Slides

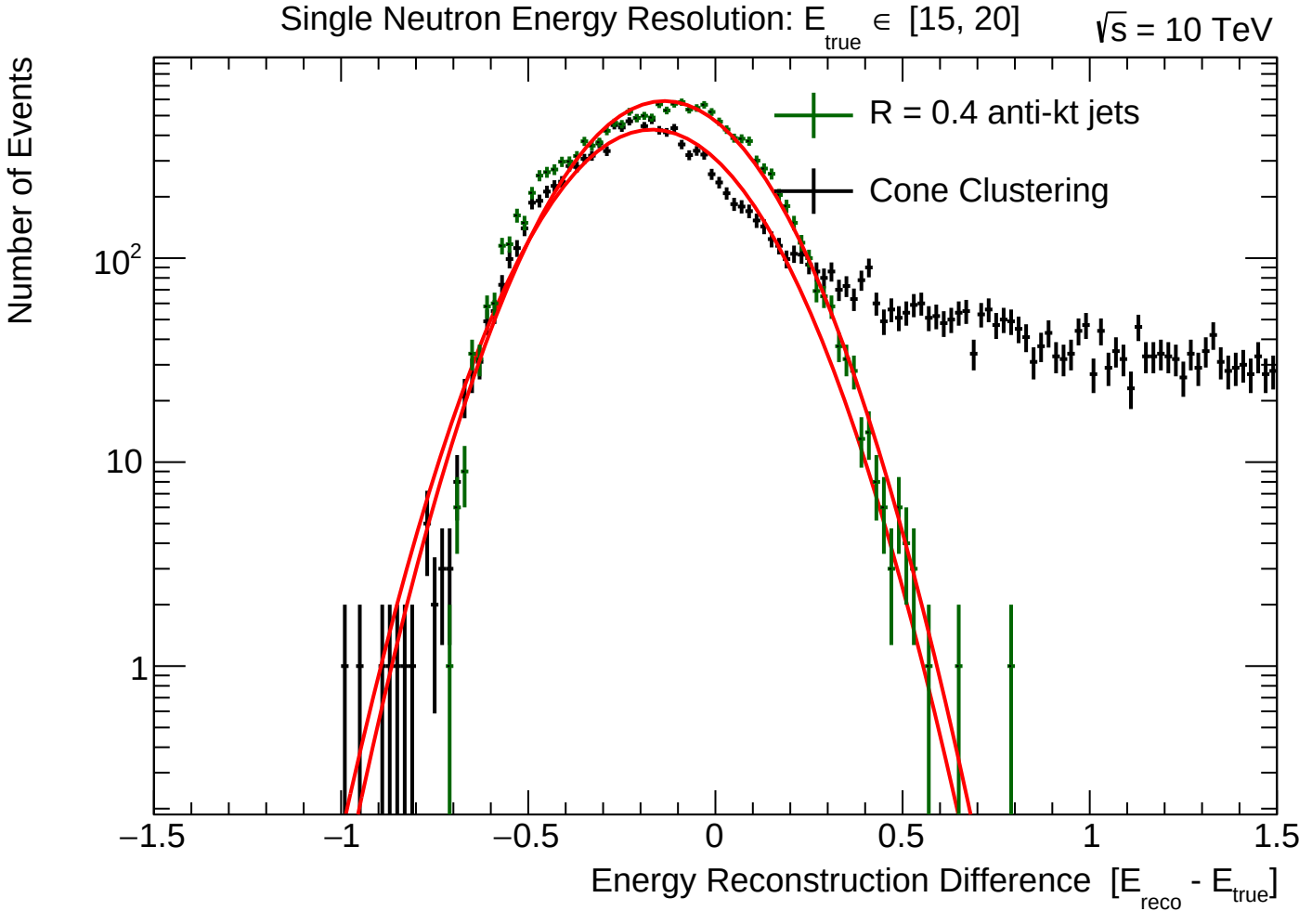
0-50 GeV Subfits

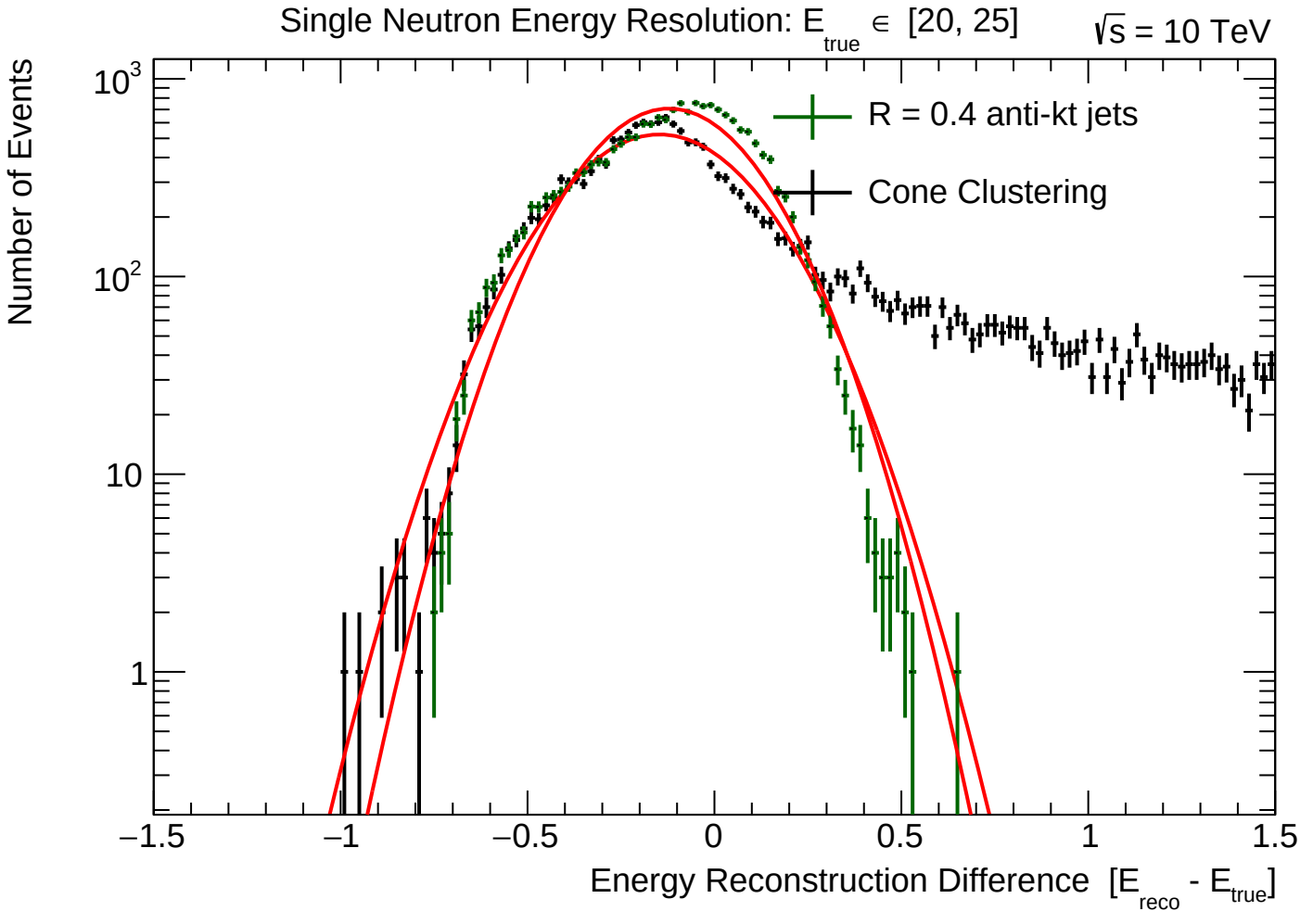
Energy Fits

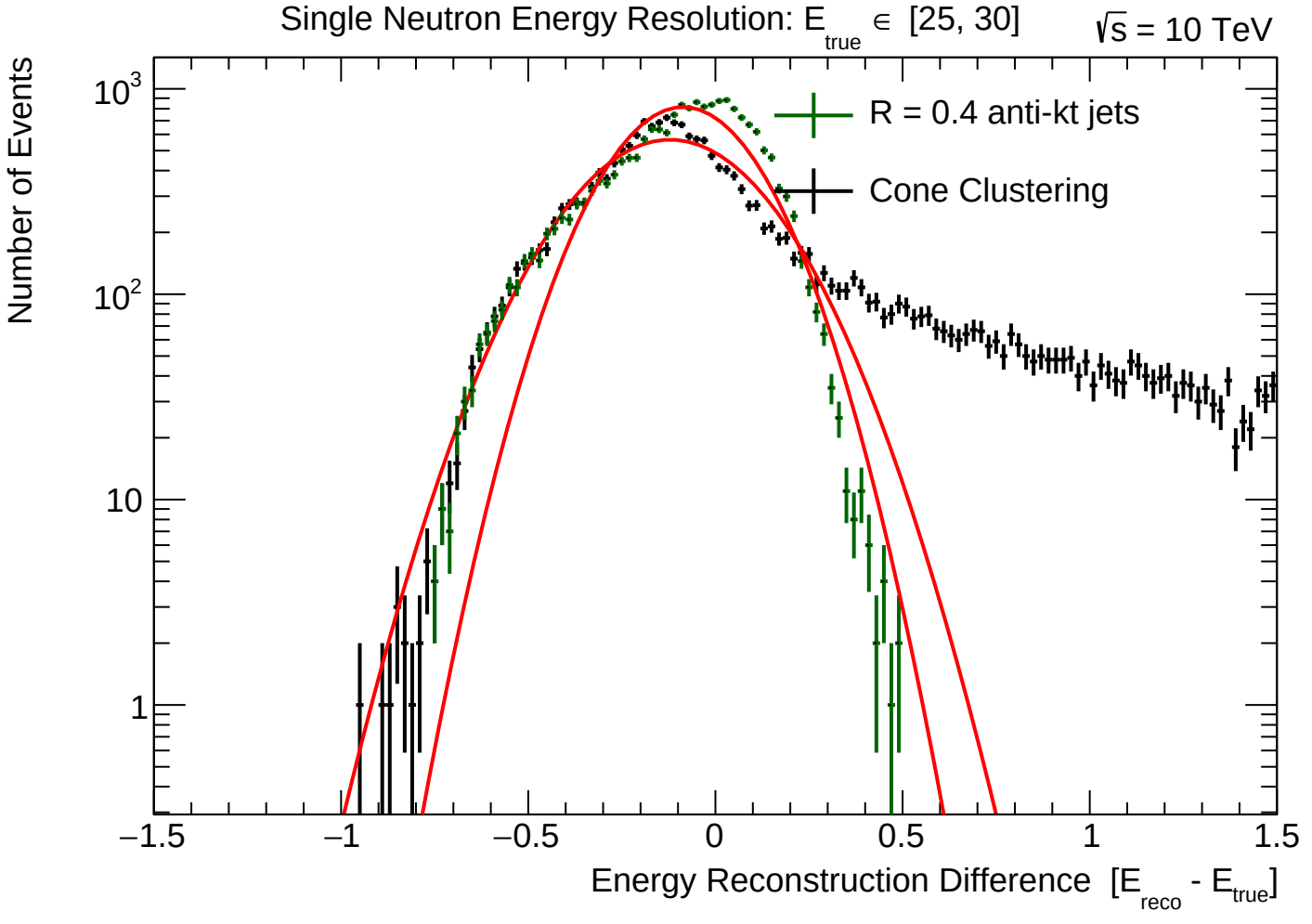

Single Neutron Energy Resolution: E true ∈ [0, 5]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
1
–1.5
–1
–0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

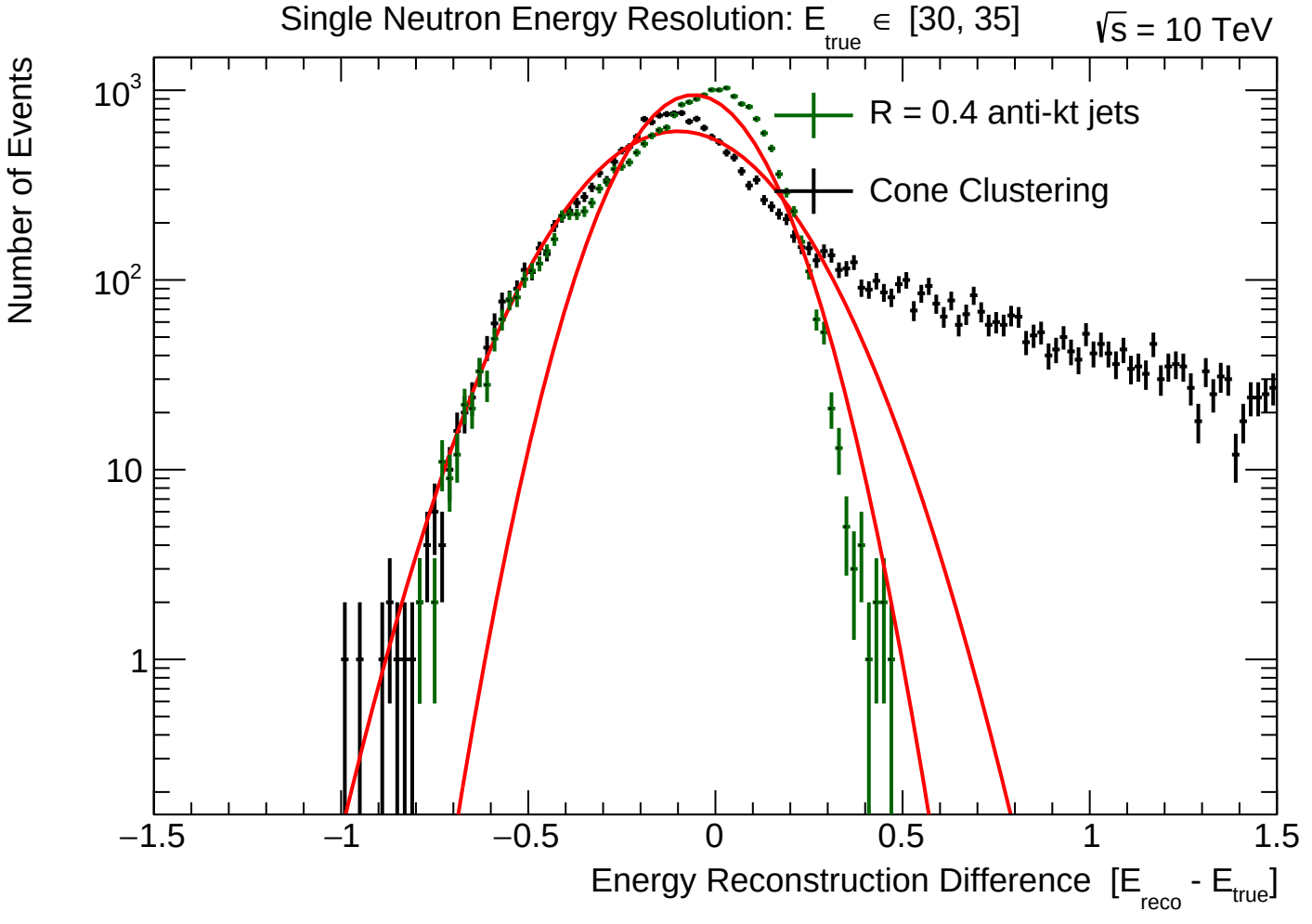

Single Neutron Energy Resolution: $E_{true} \in [5, 10]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

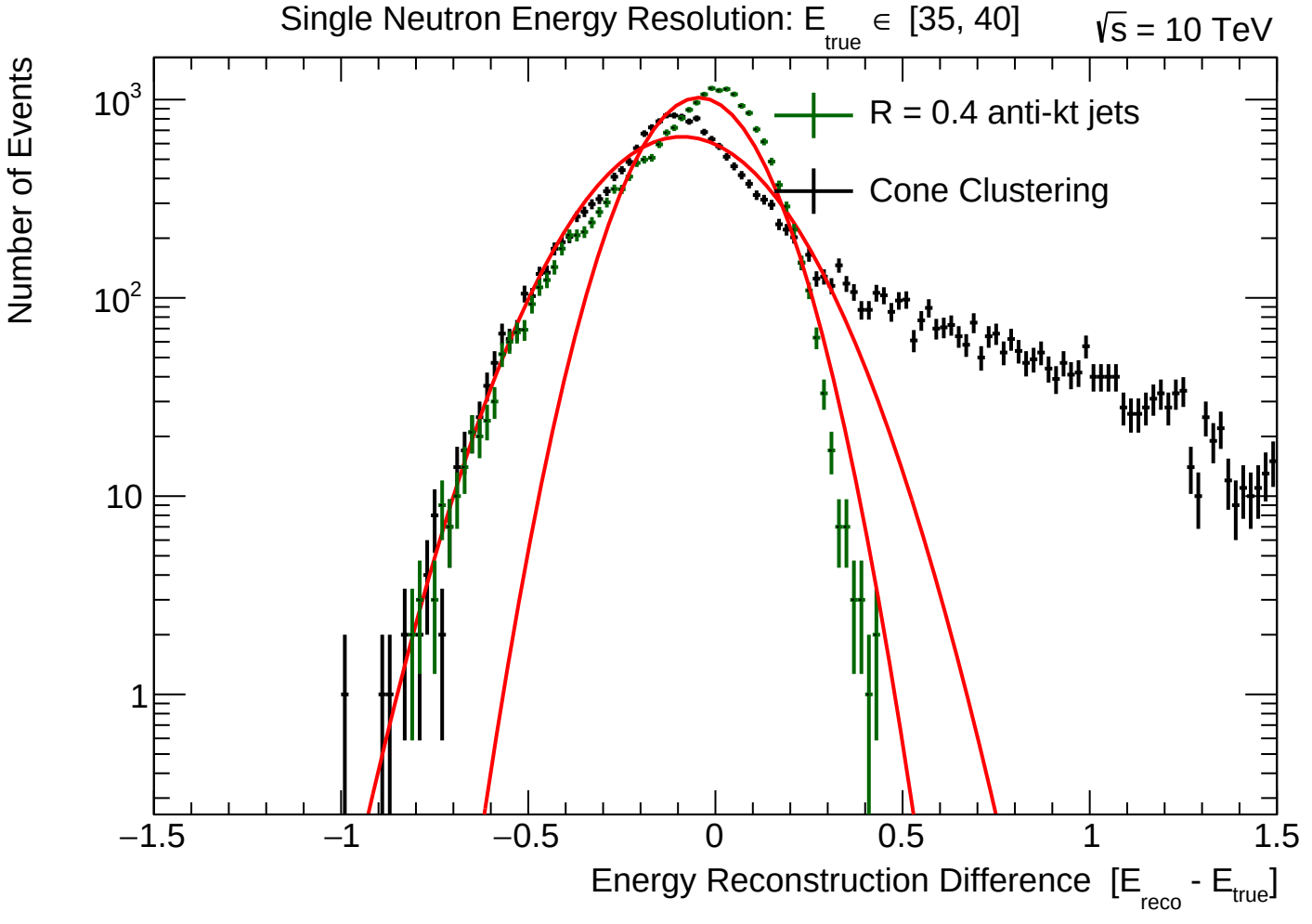

Single Neutron Energy Resolution: $E_{true} \in [10, 15]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

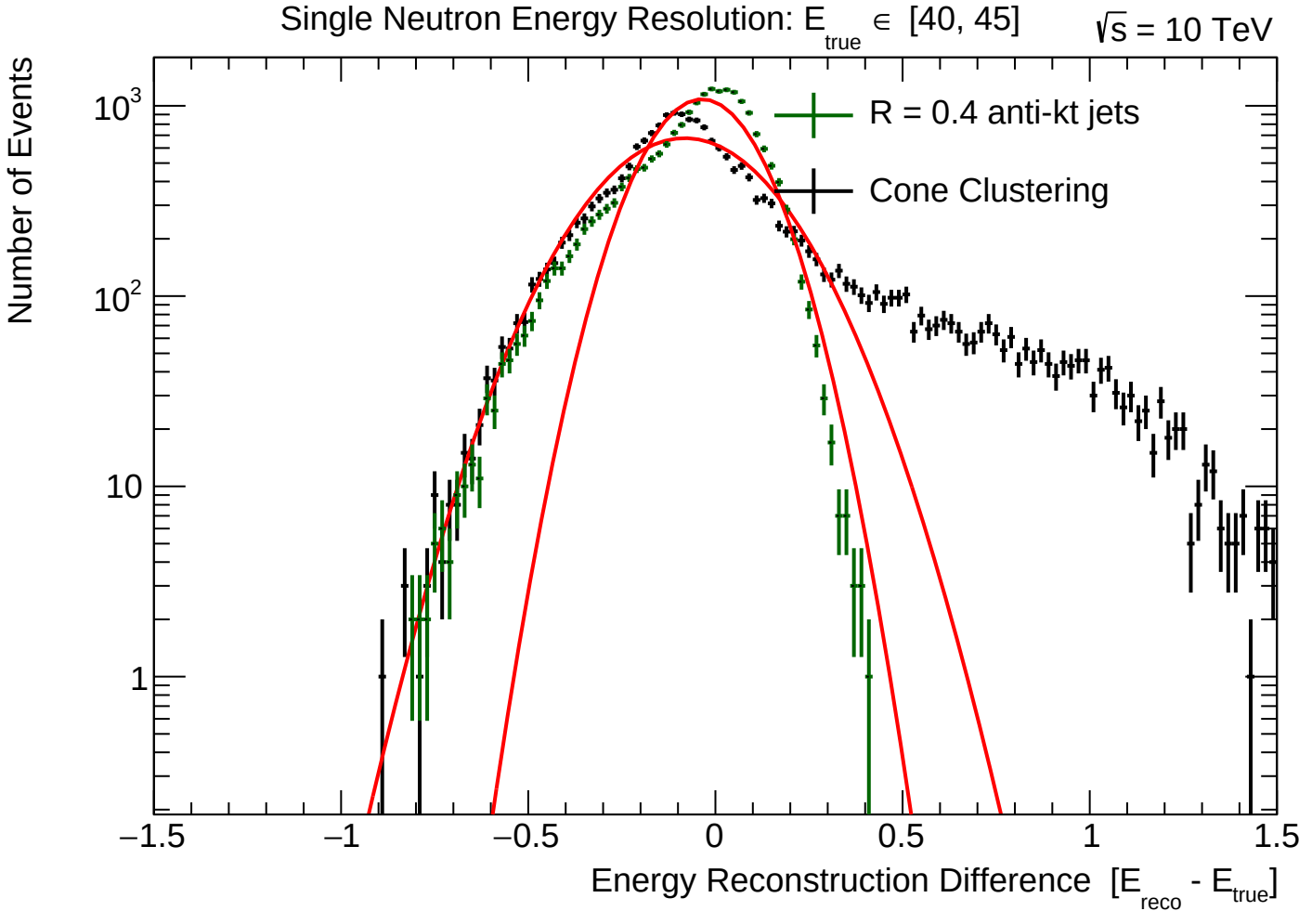

Single Neutron Energy Resolution: E true ∈ [15, 20]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

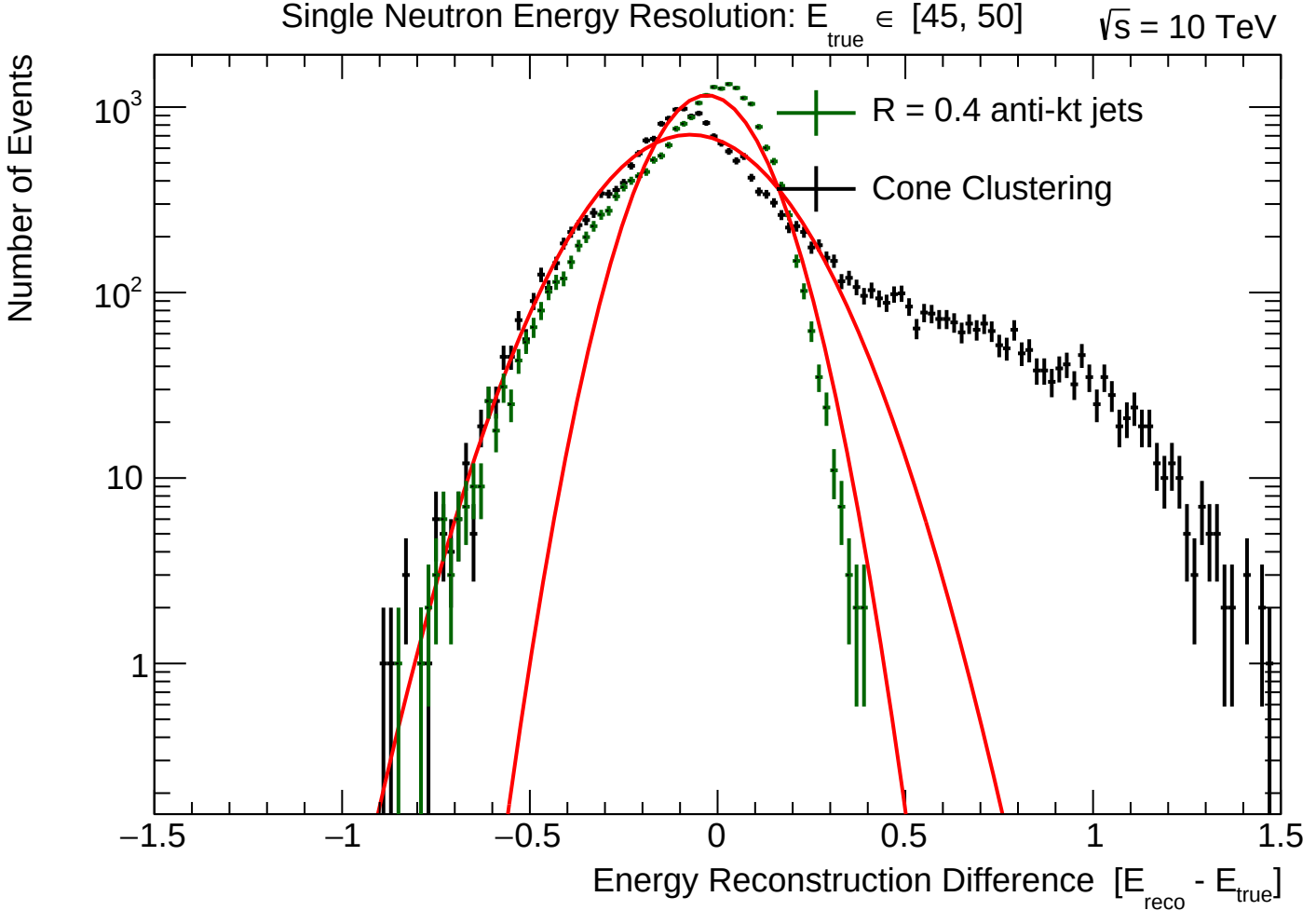

Single Neutron Energy Resolution: $E_{true} \in [20, 25]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $E_{true} \in [25, 30]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

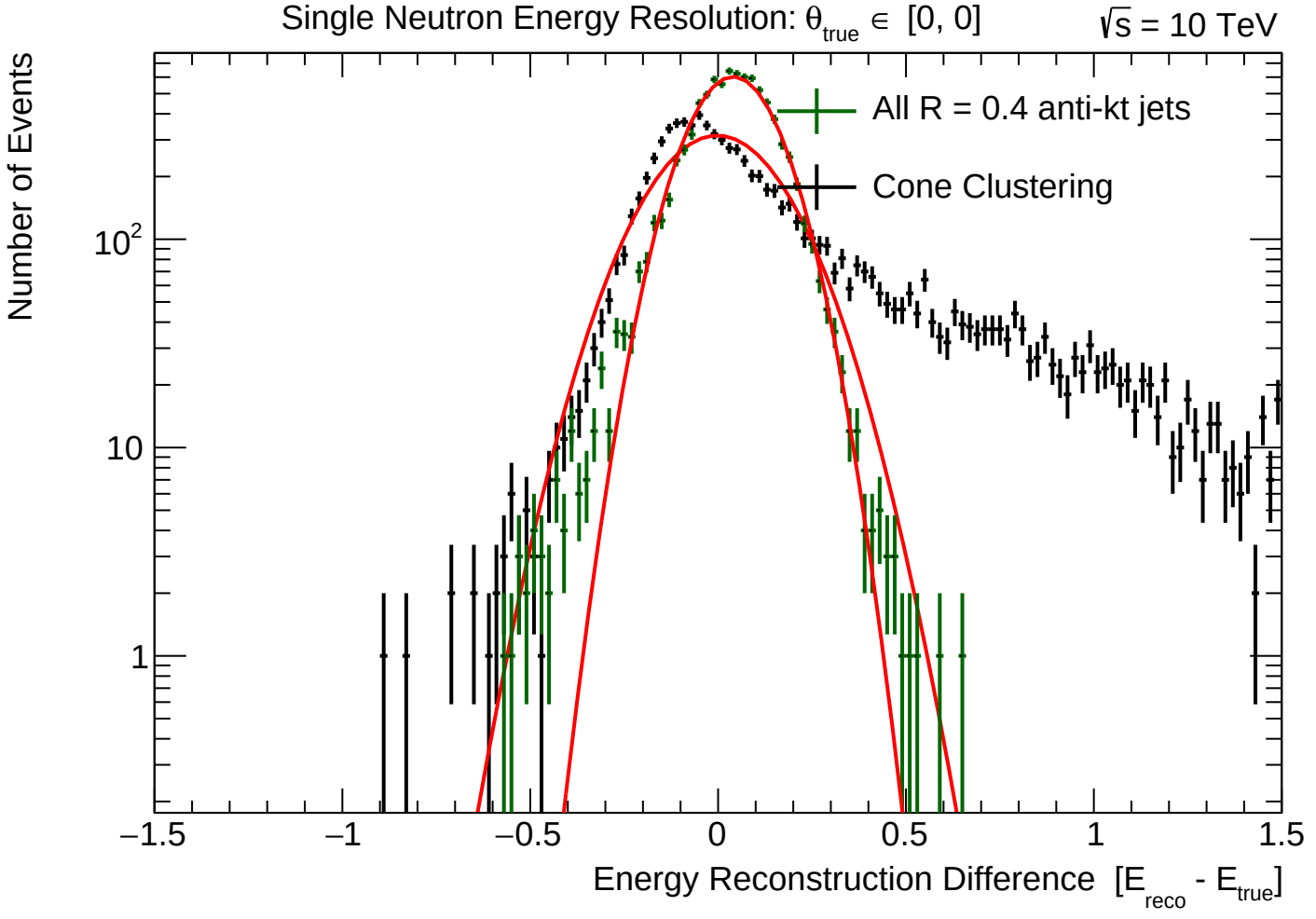

Single Neutron Energy Resolution: $E_{true} \in [30, 35]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

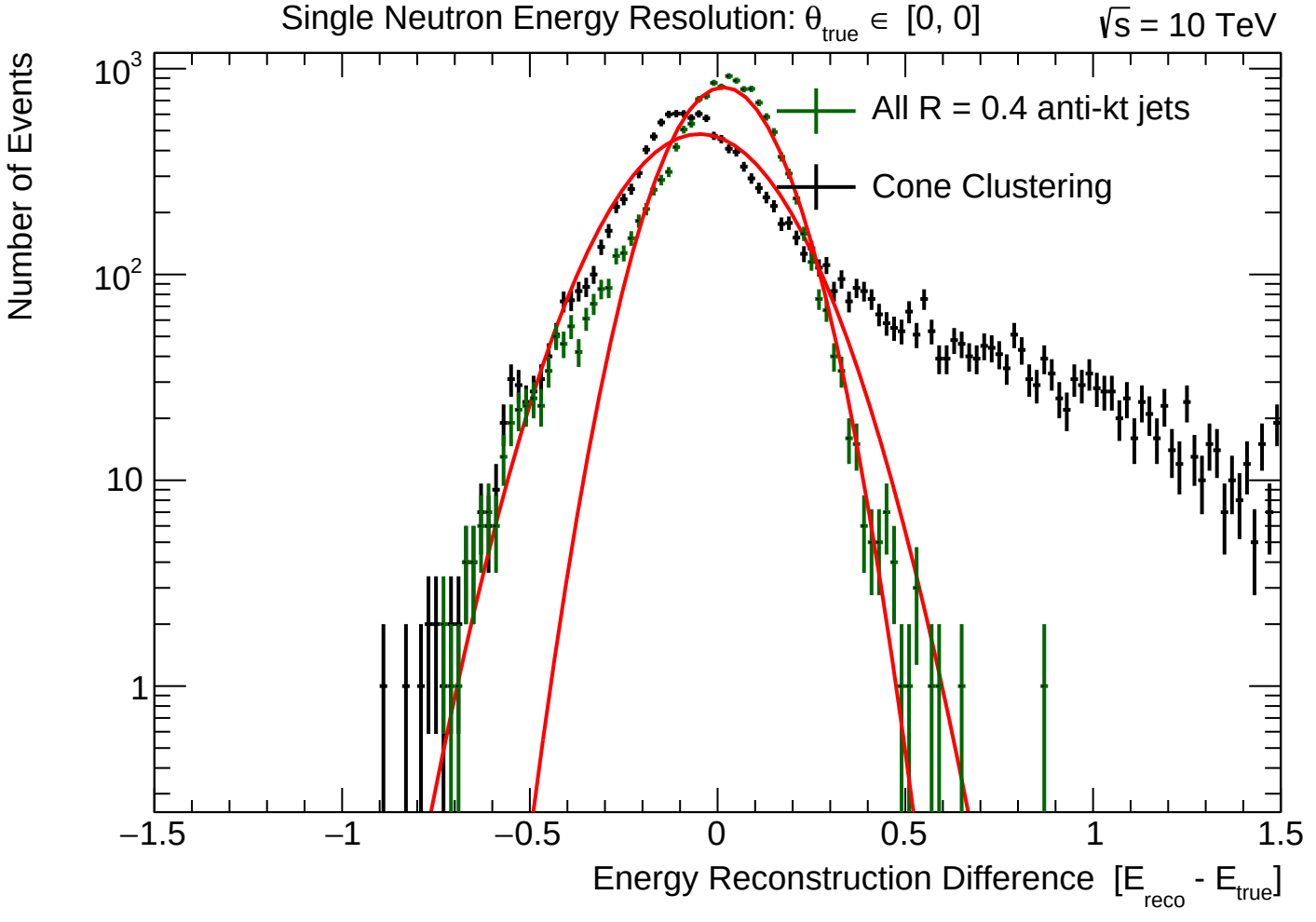

Single Neutron Energy Resolution: E true ∈ [35, 40]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

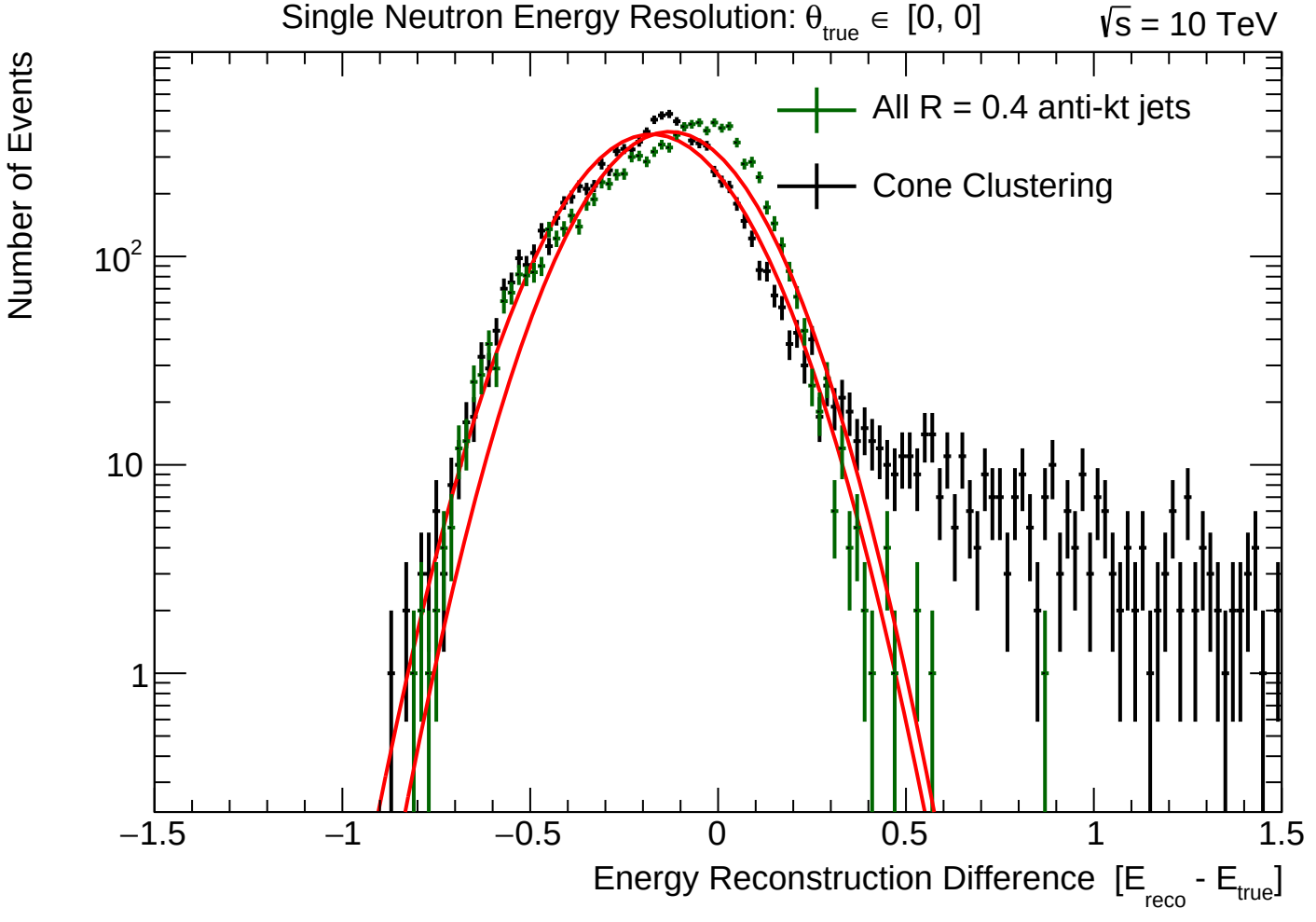

Single Neutron Energy Resolution: $E_{true} \in [40, 45]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

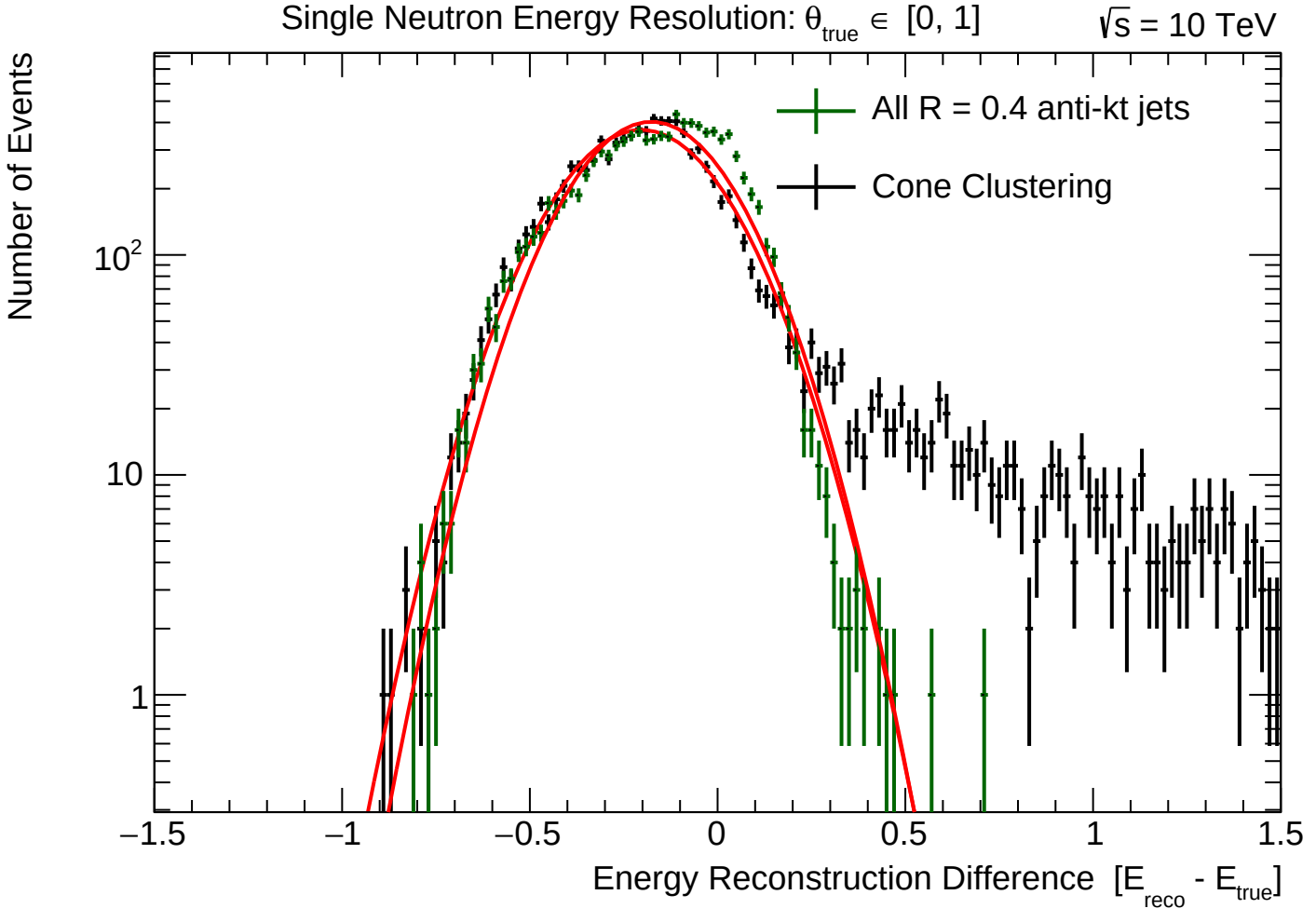

Single Neutron Energy Resolution: $E_{true} \in [45, 50]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

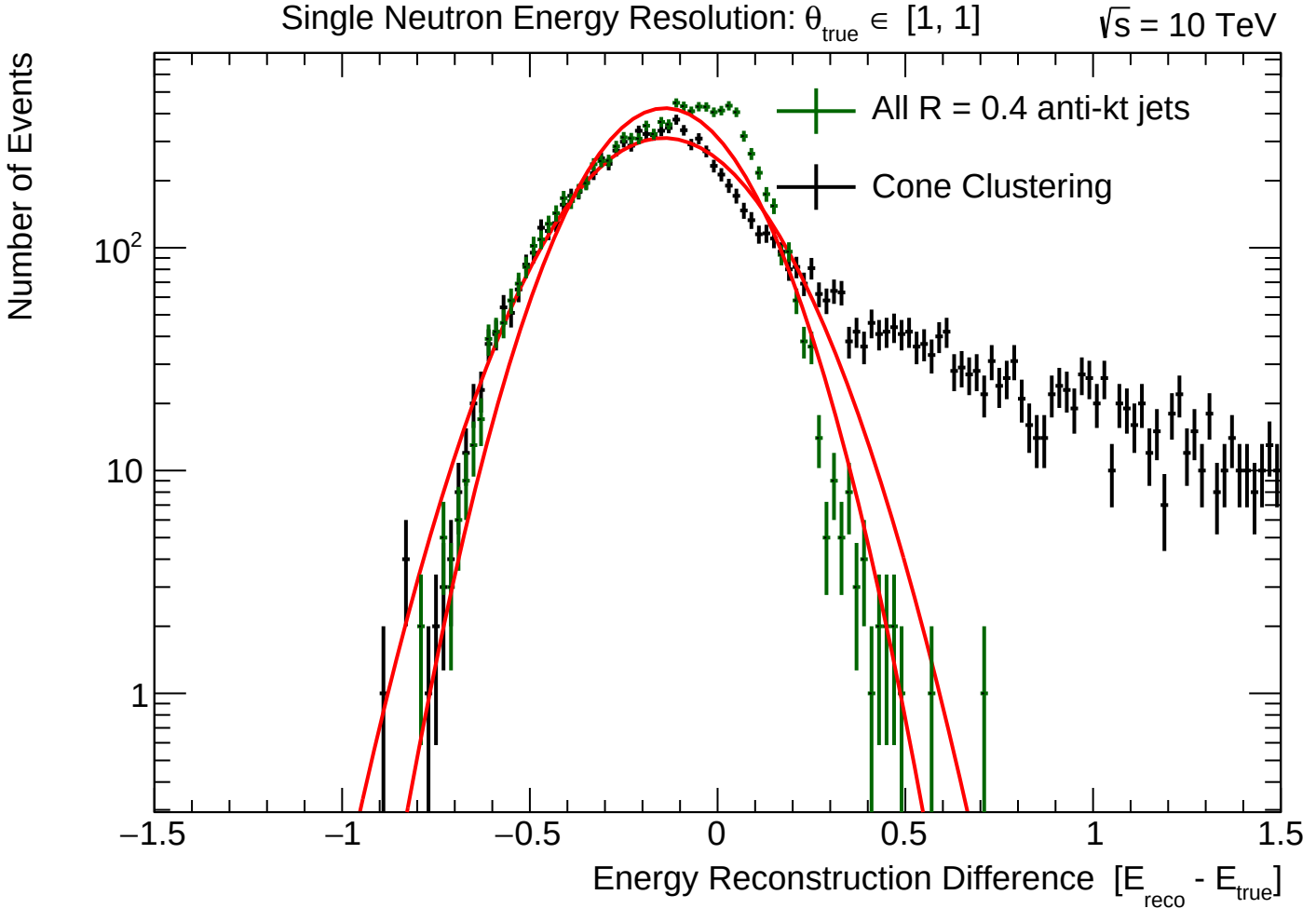
Theta Fits

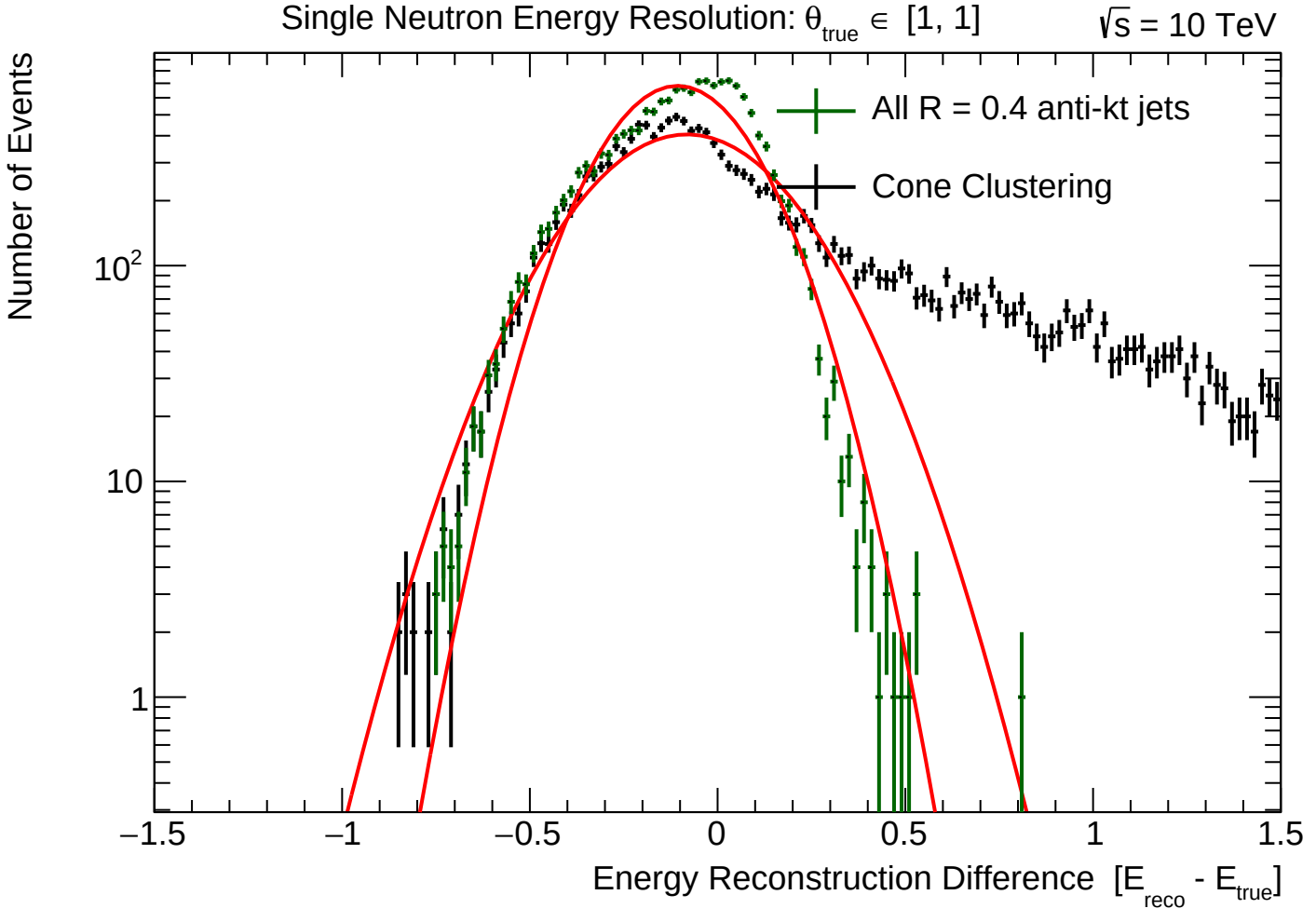

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

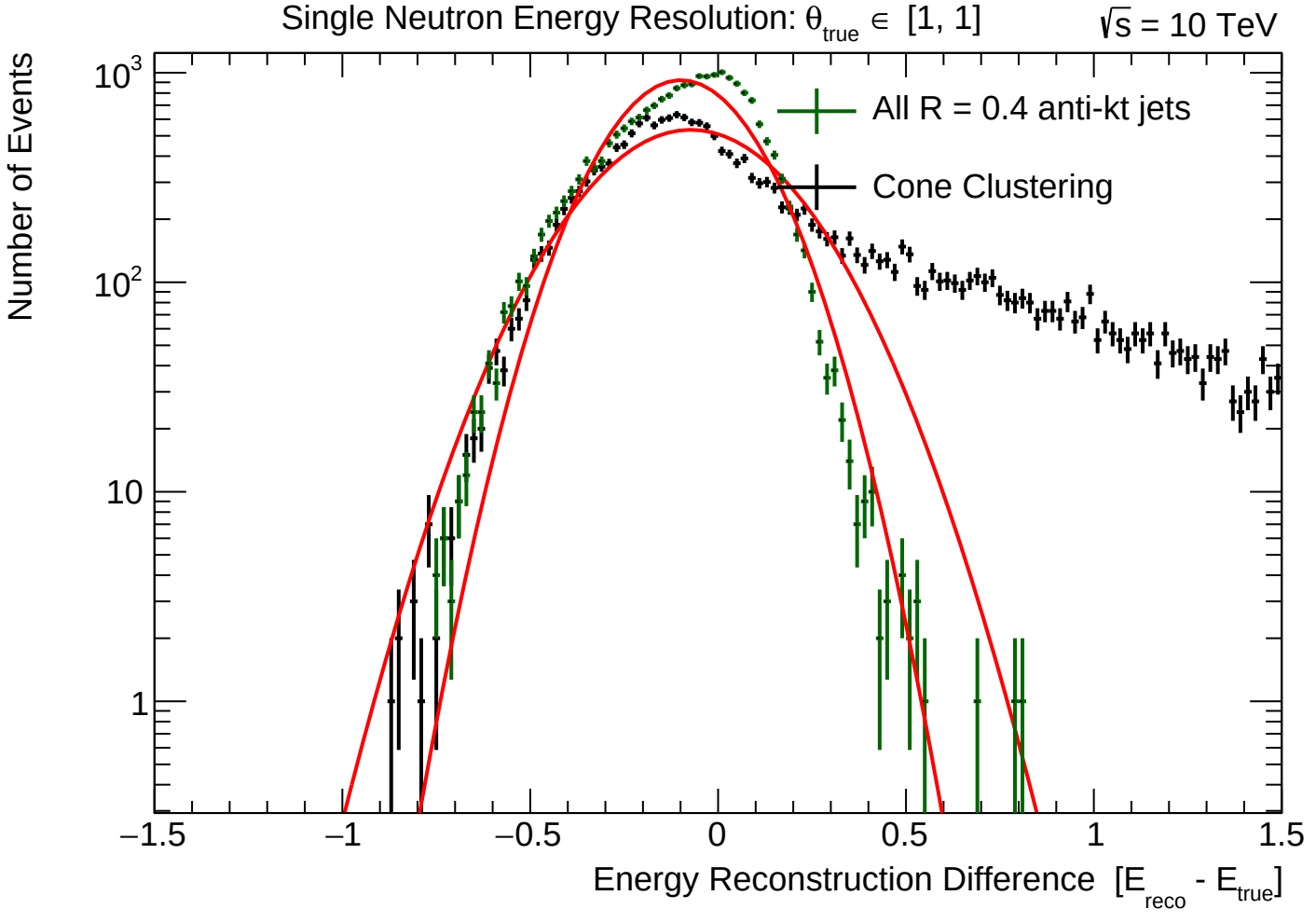

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

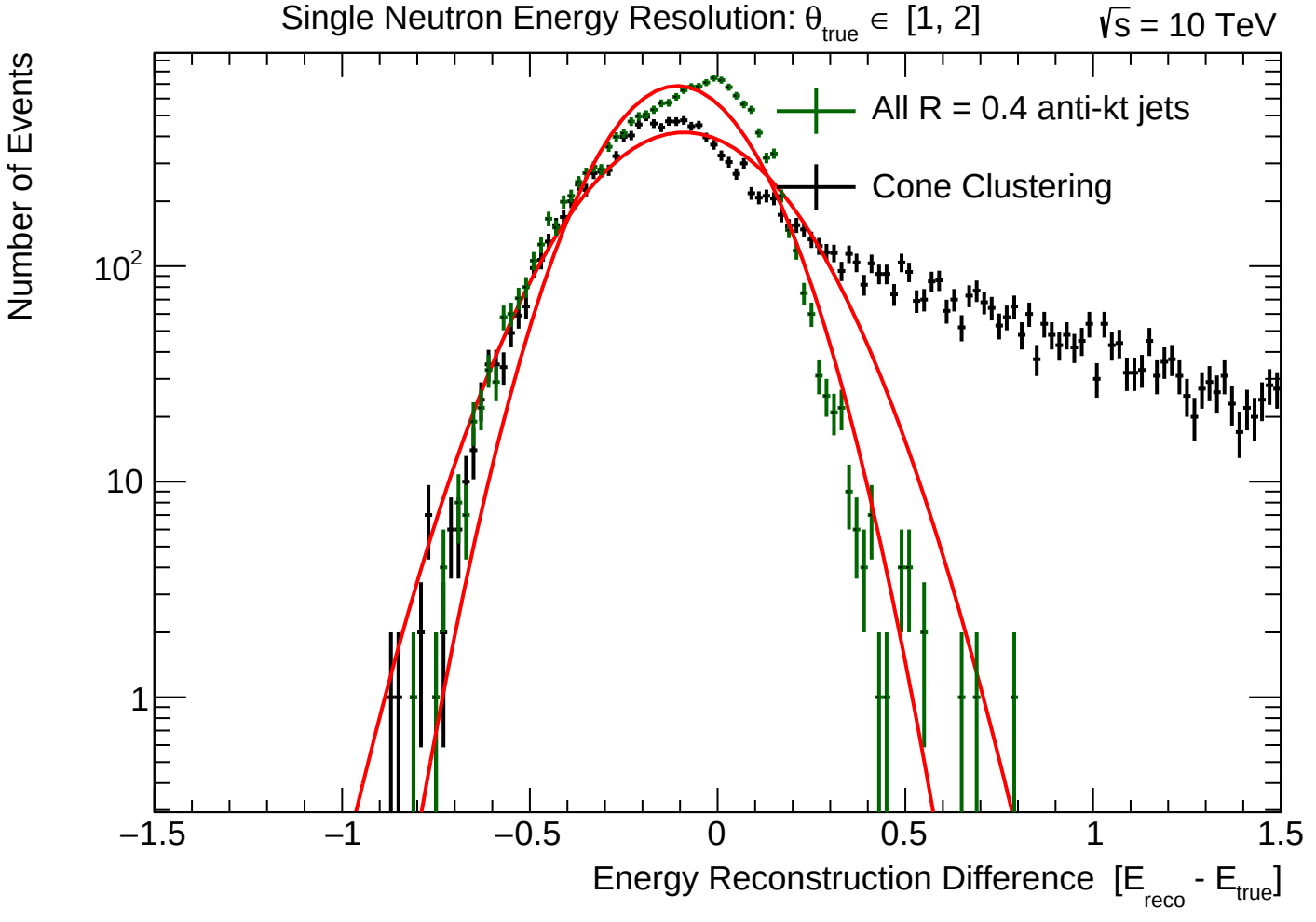

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
–1.5
–1
–0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

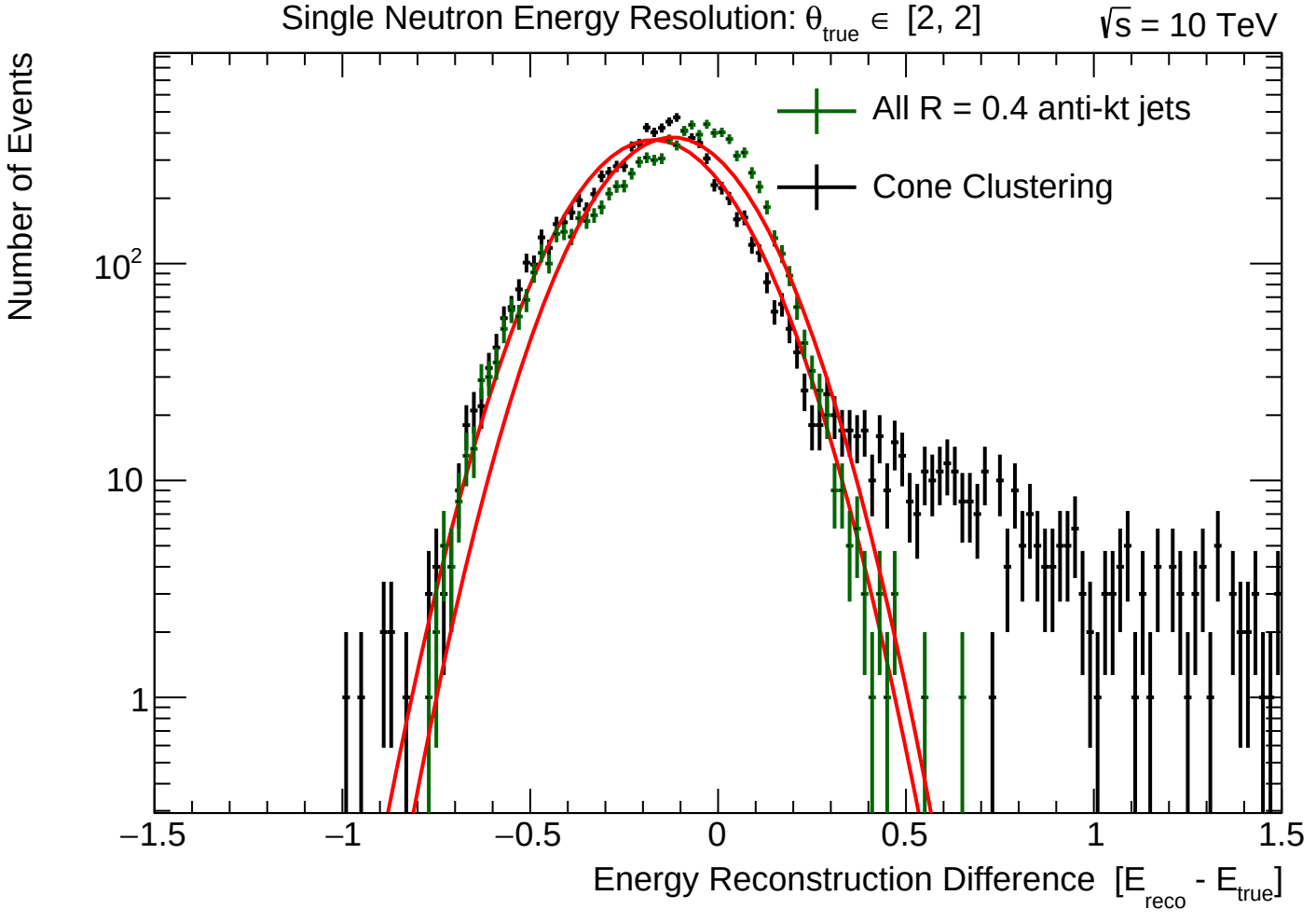

Single Neutron Energy Resolution: $\theta_{true} \in [0, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

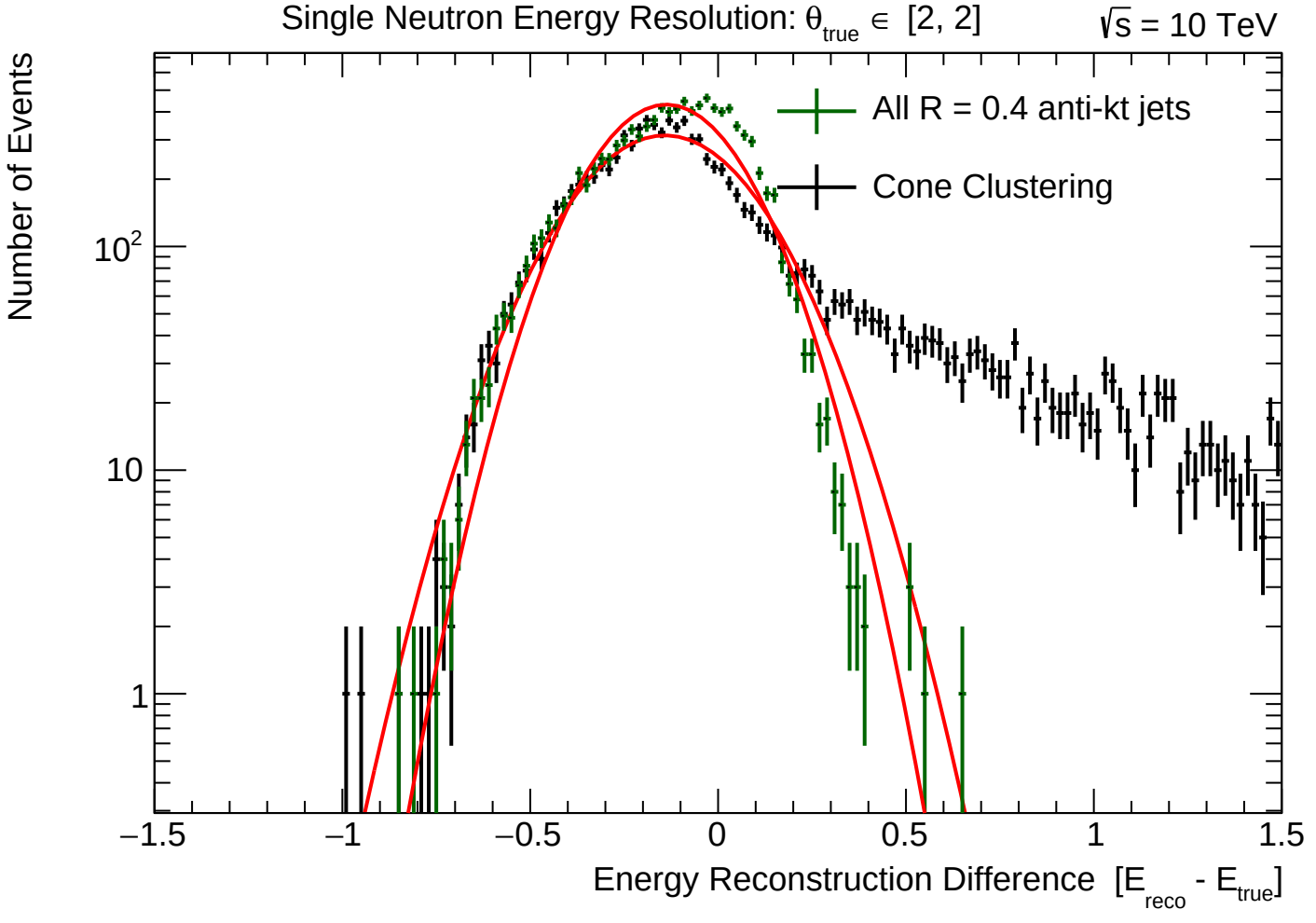

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

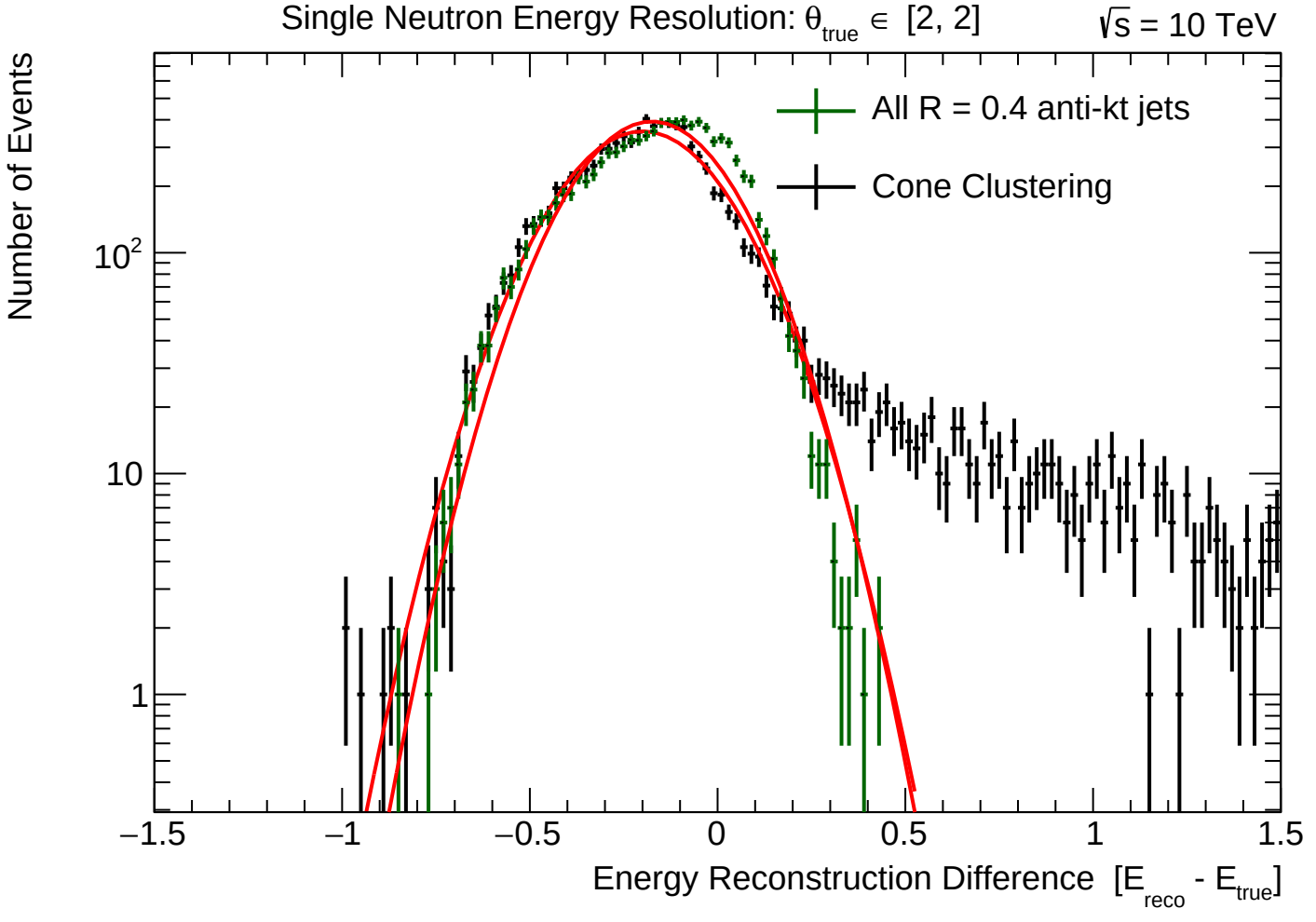

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

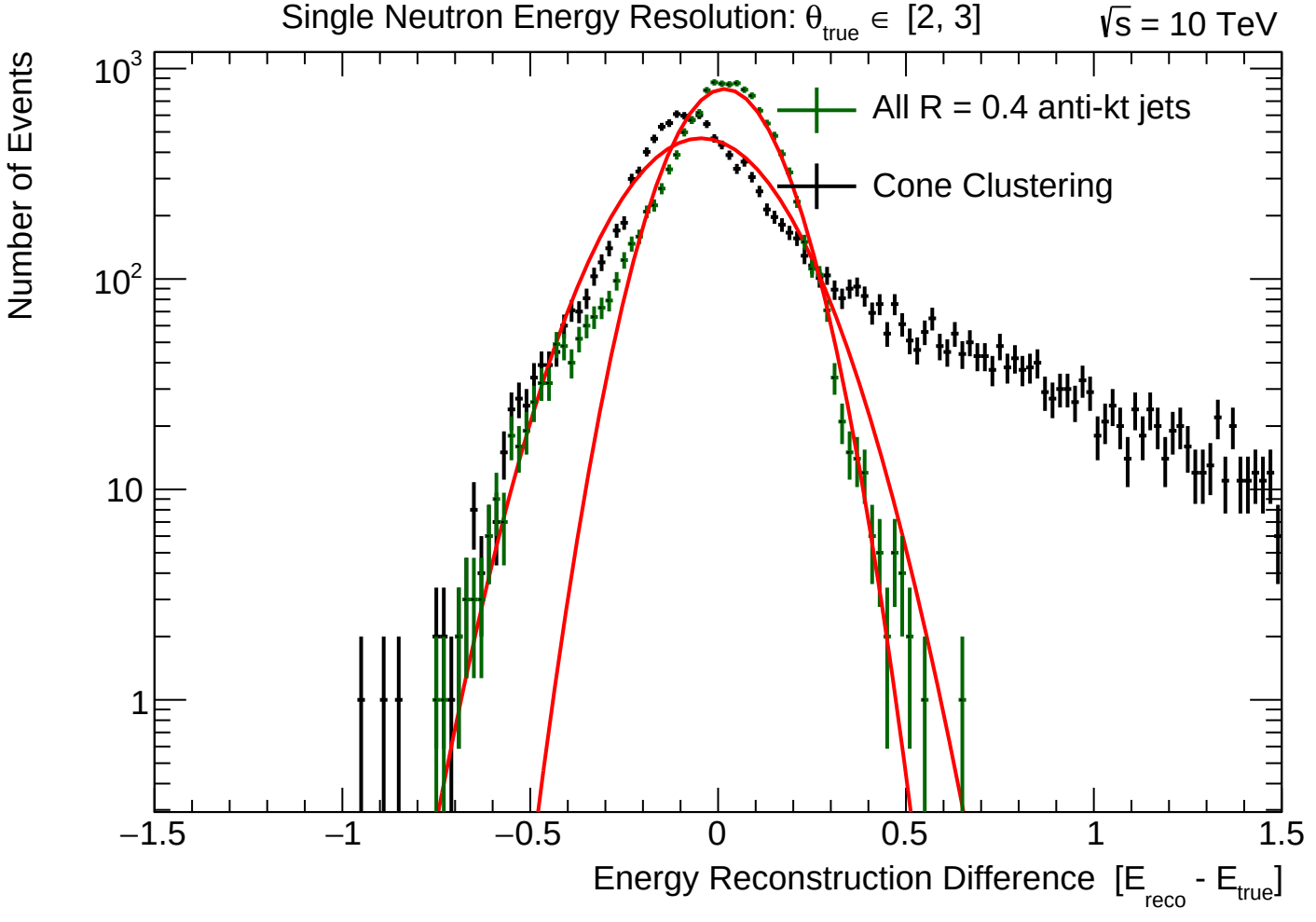

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [1, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

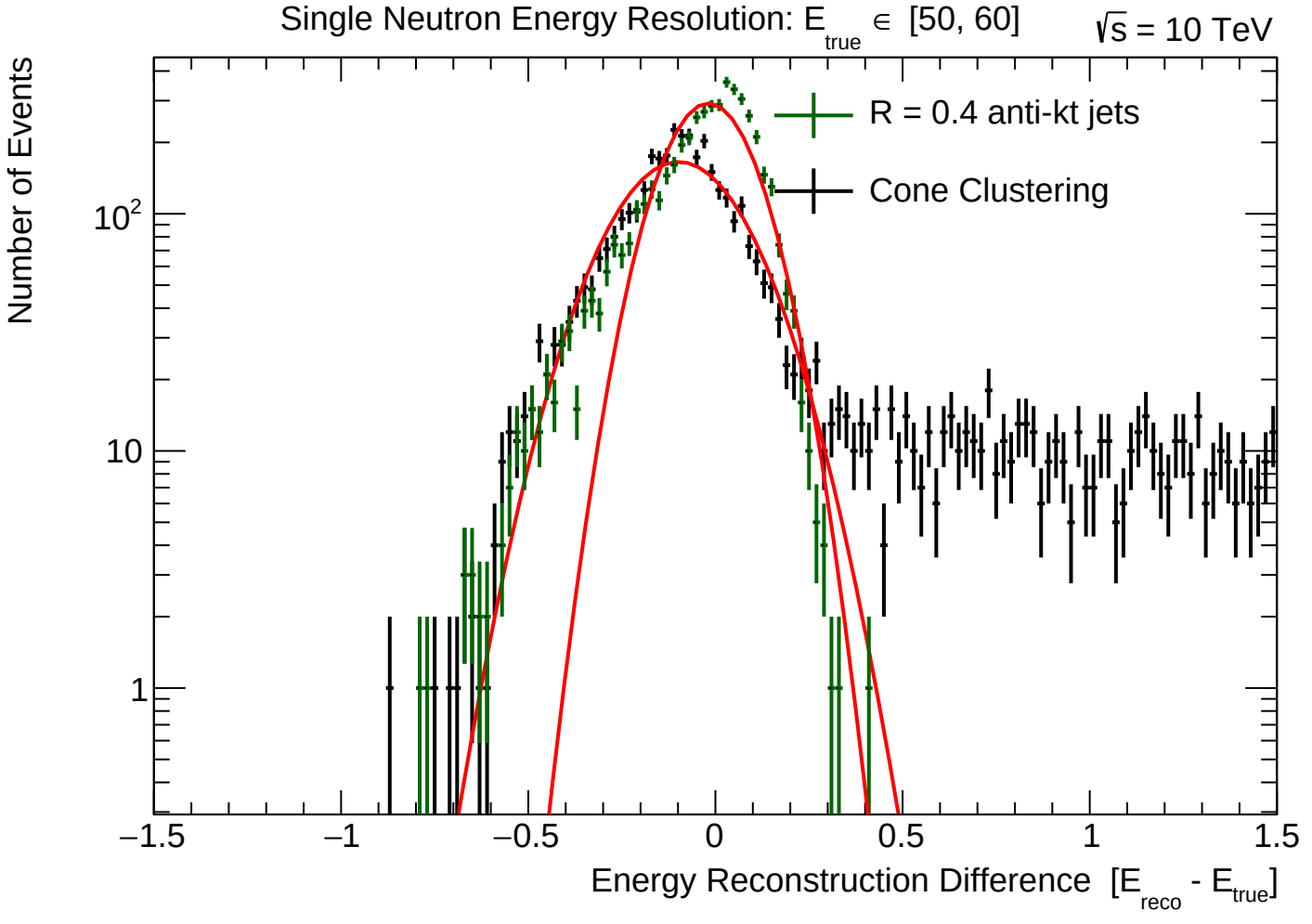

Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

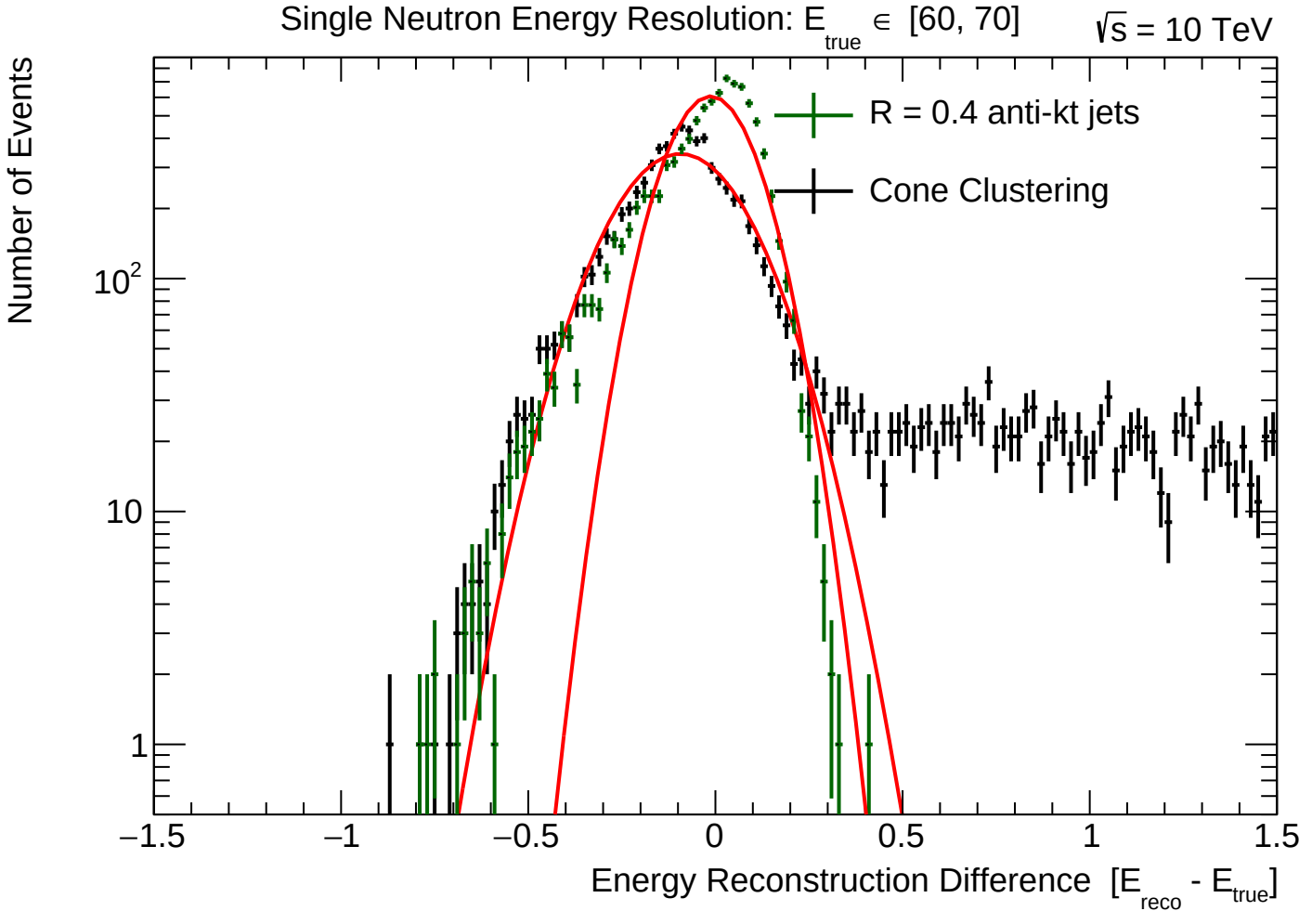

Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

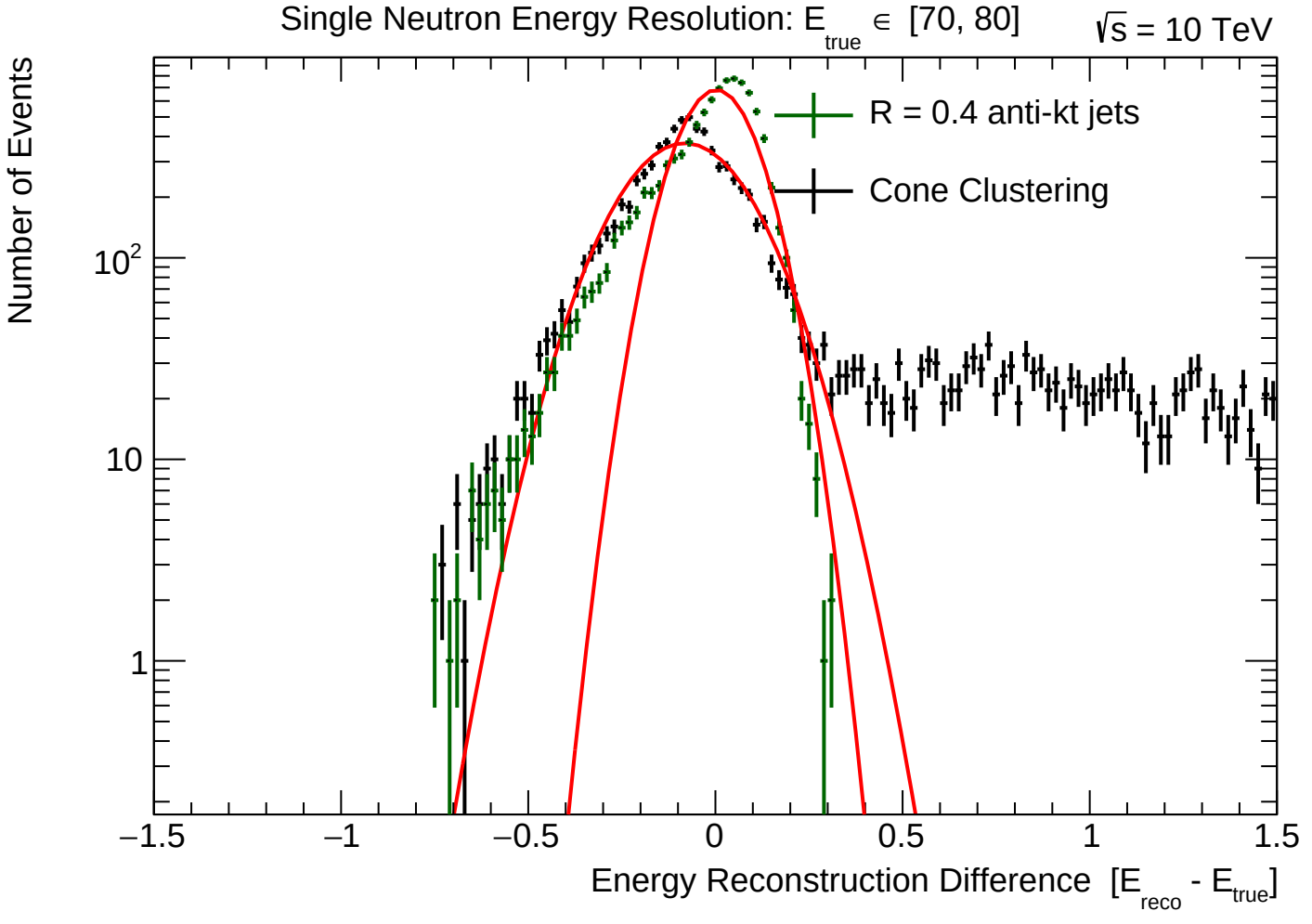

Single Neutron Energy Resolution: $\theta_{true} \in [2, 3]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

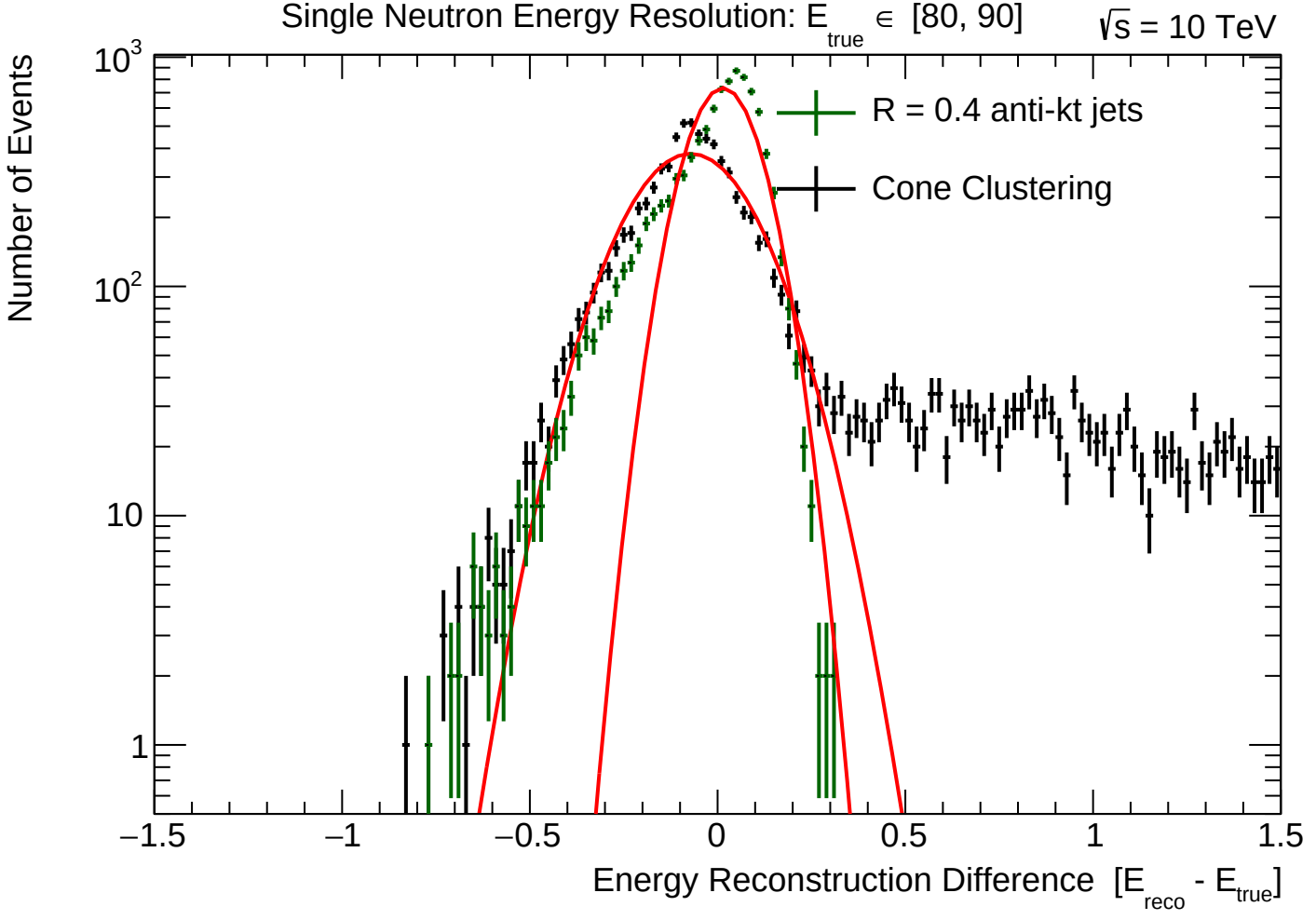
50-250 GeV Subfits

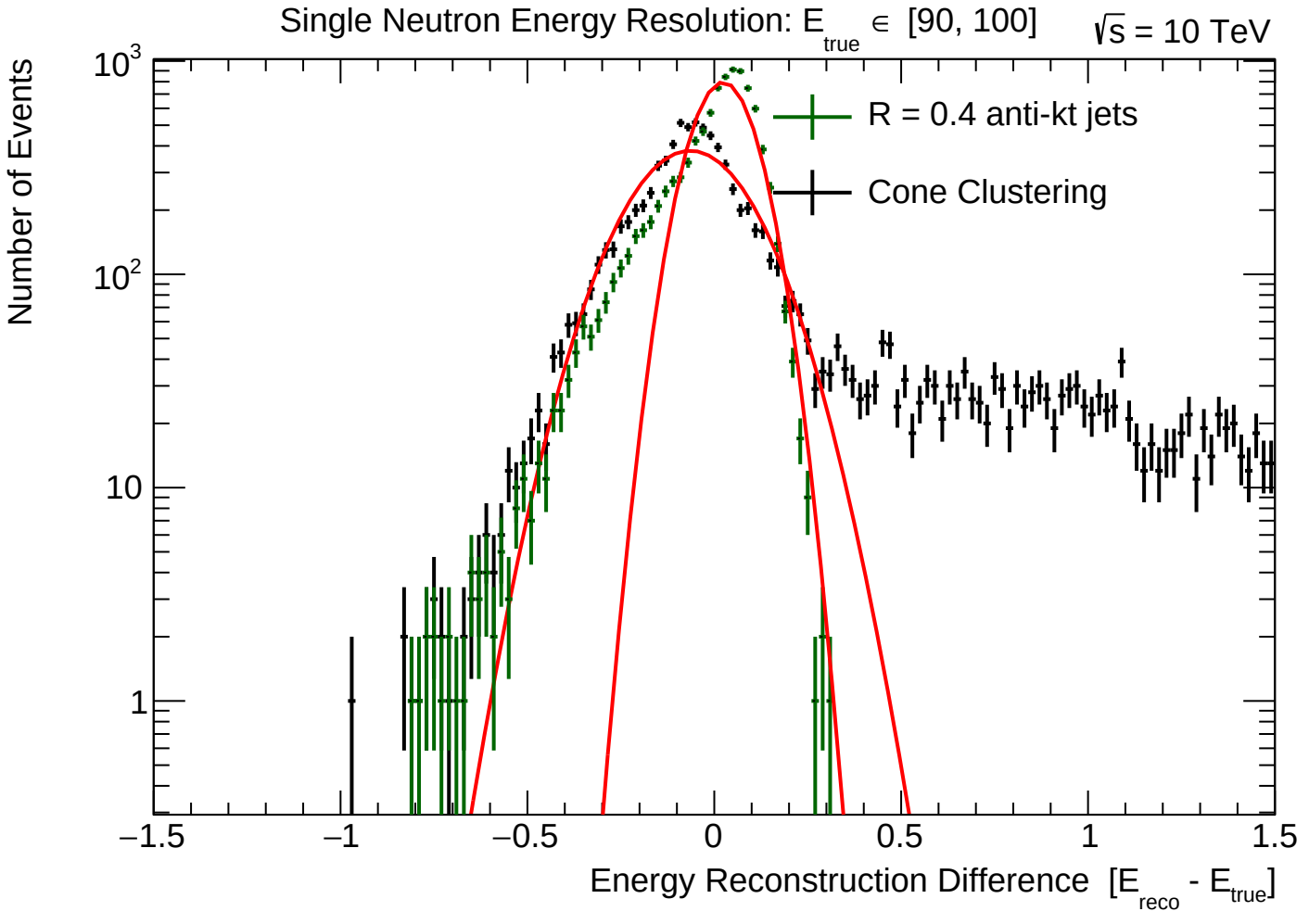
Energy Fits

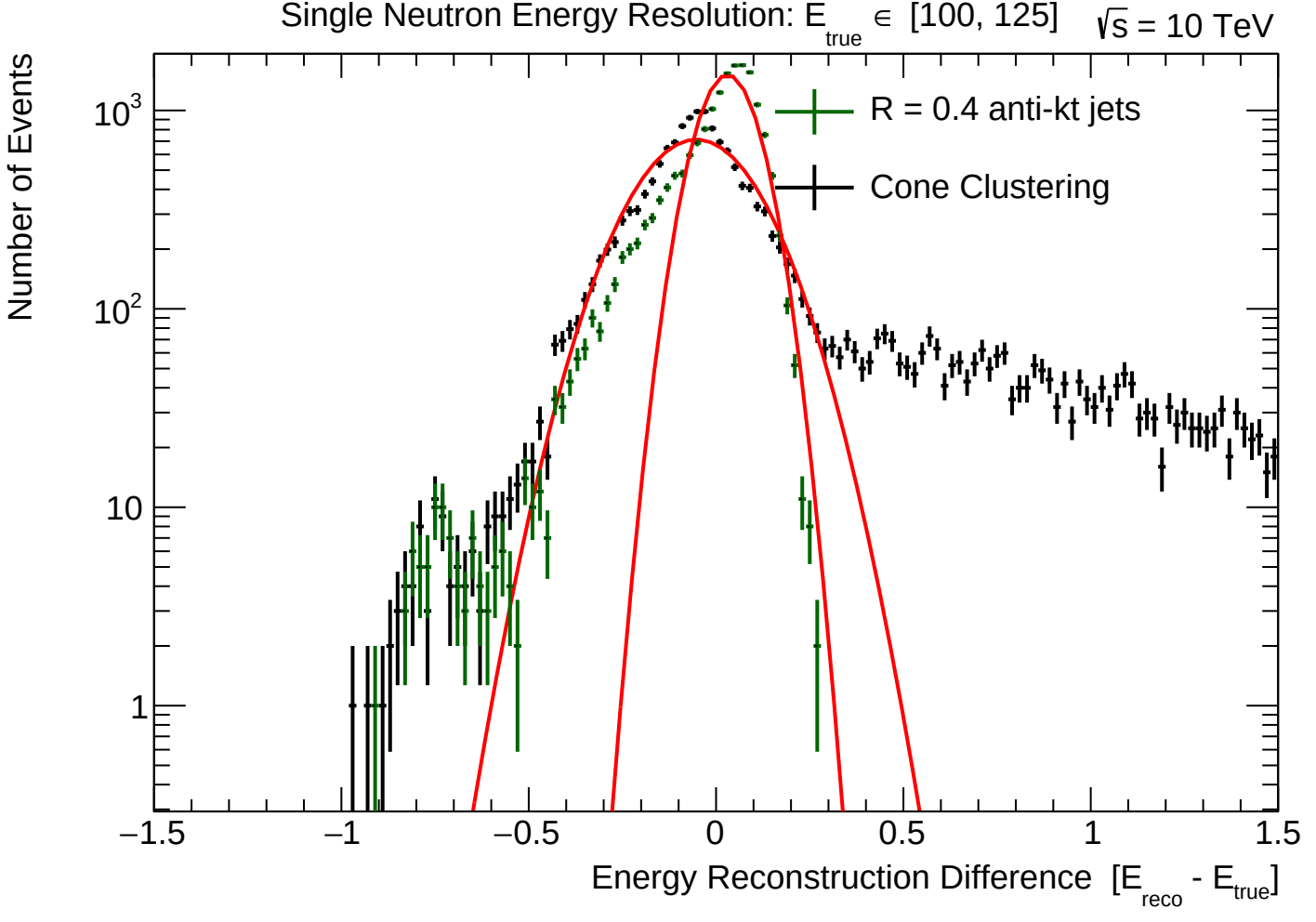

Single Neutron Energy Resolution: $E_{true} \in [50, 60]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

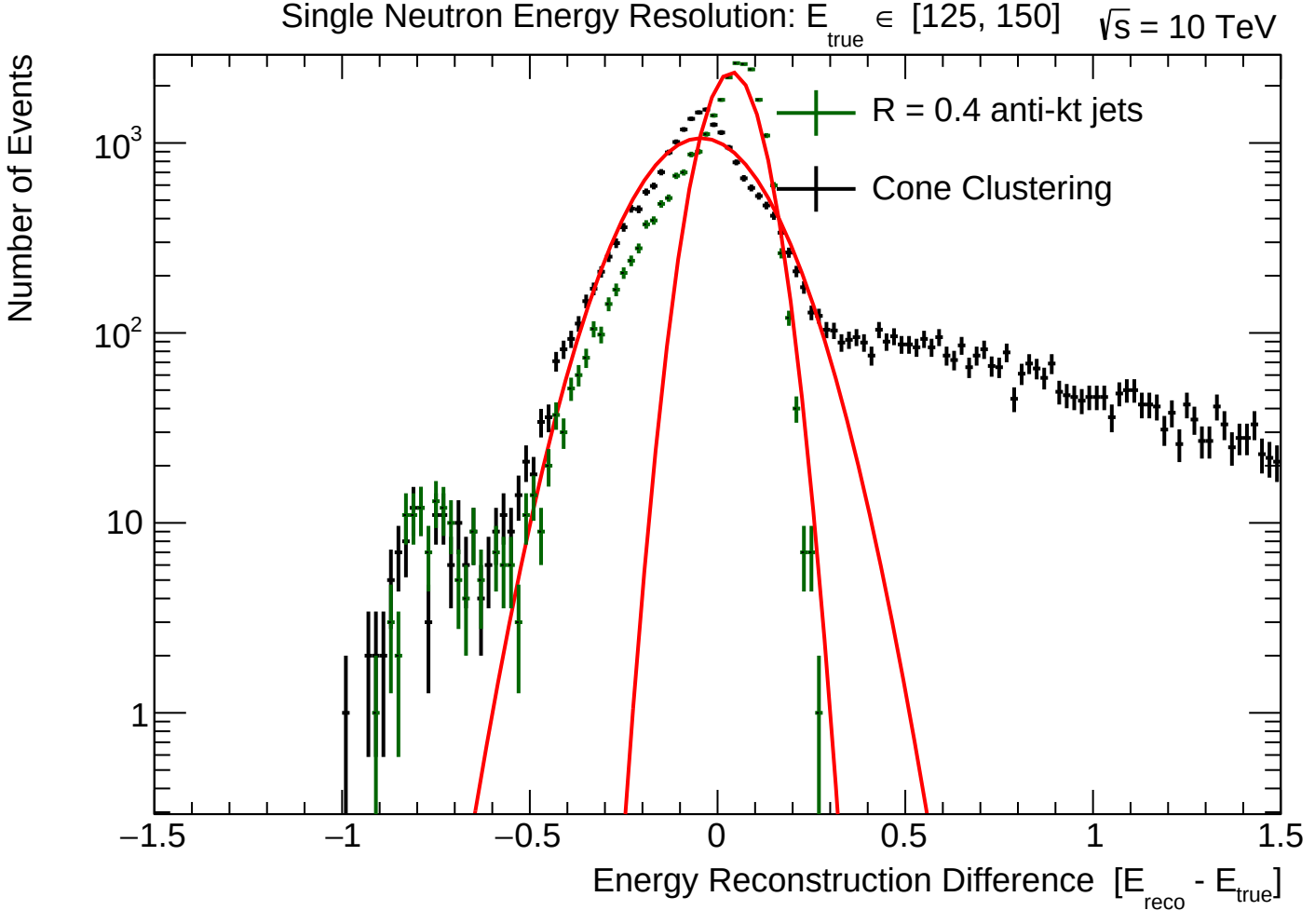

Single Neutron Energy Resolution: $E_{true} \in [60, 70]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

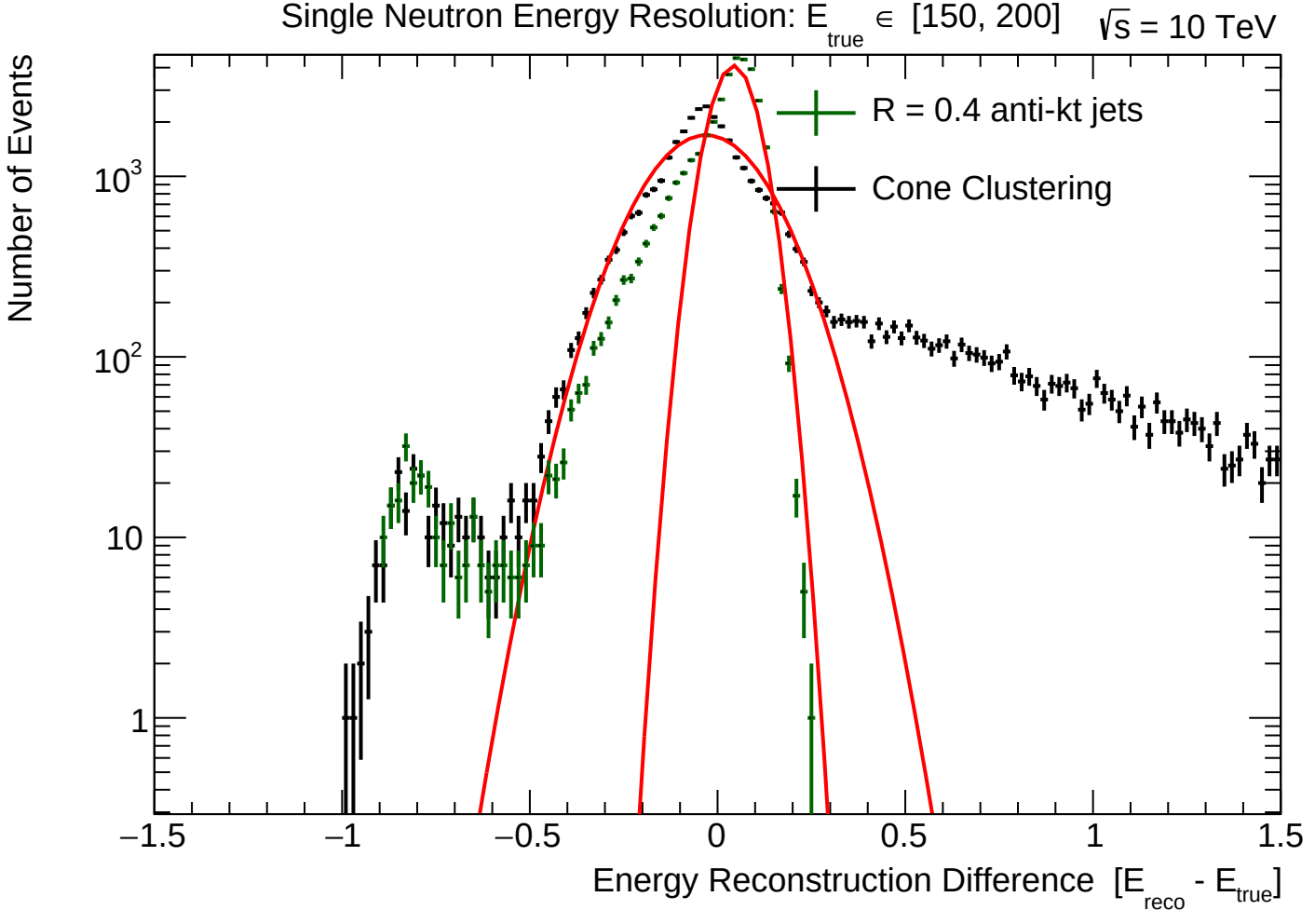

Single Neutron Energy Resolution: $E_{true} \in [70, 80]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

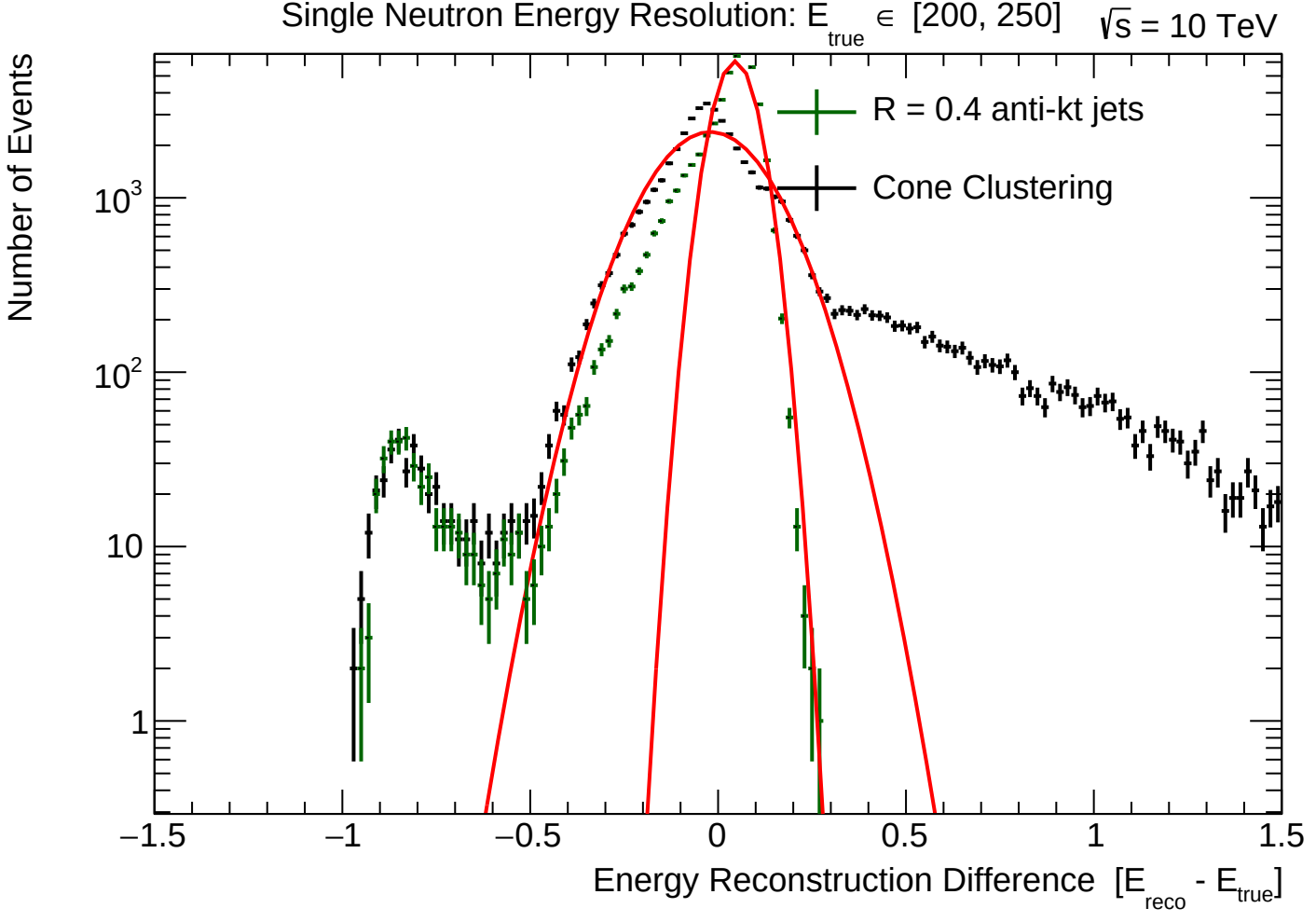

Single Neutron Energy Resolution: $E_{true} \in [80, 90]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $E_{true} \in [90, 100]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

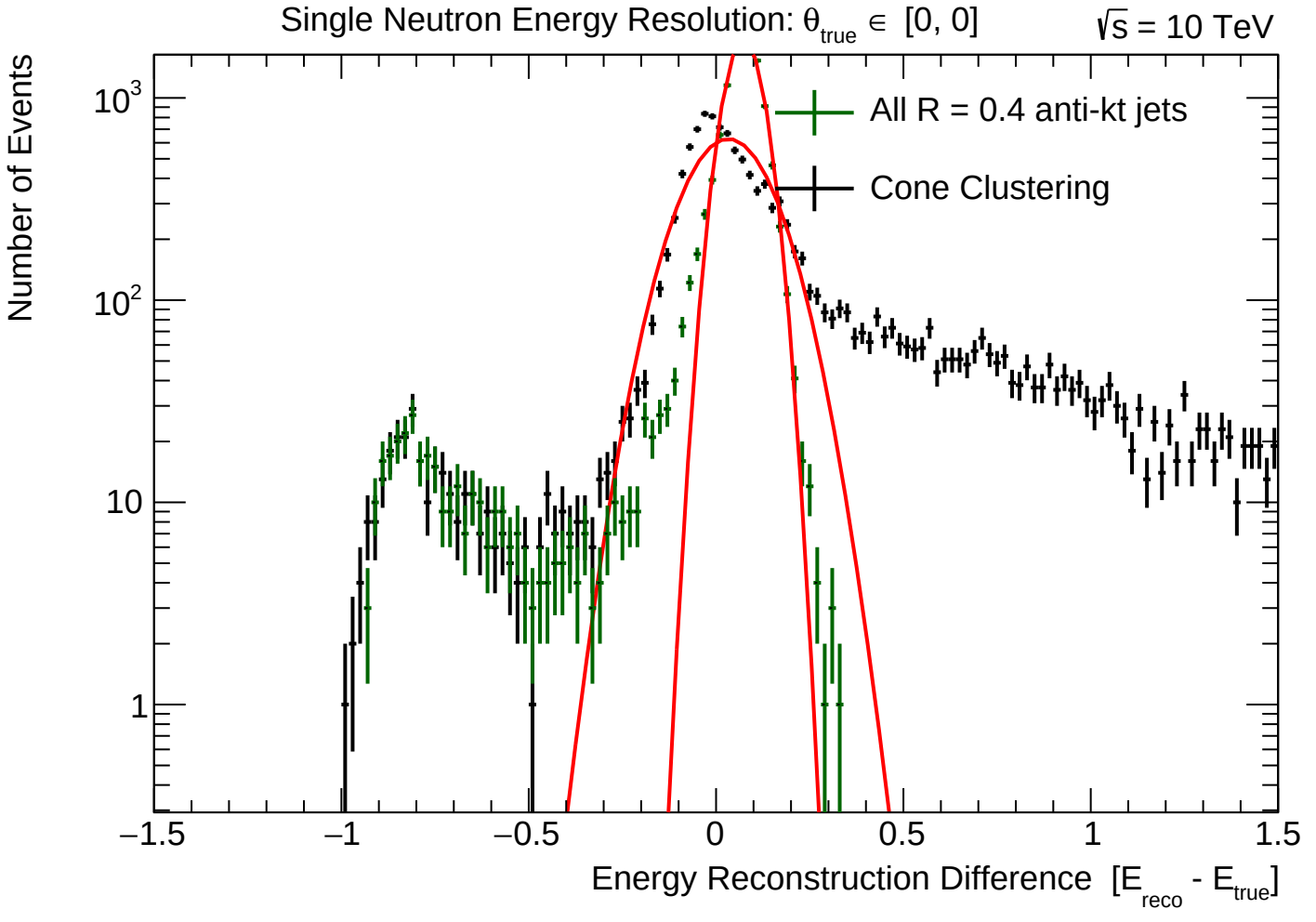

Single Neutron Energy Resolution: $E_{true} \in [100, 125]$
$\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

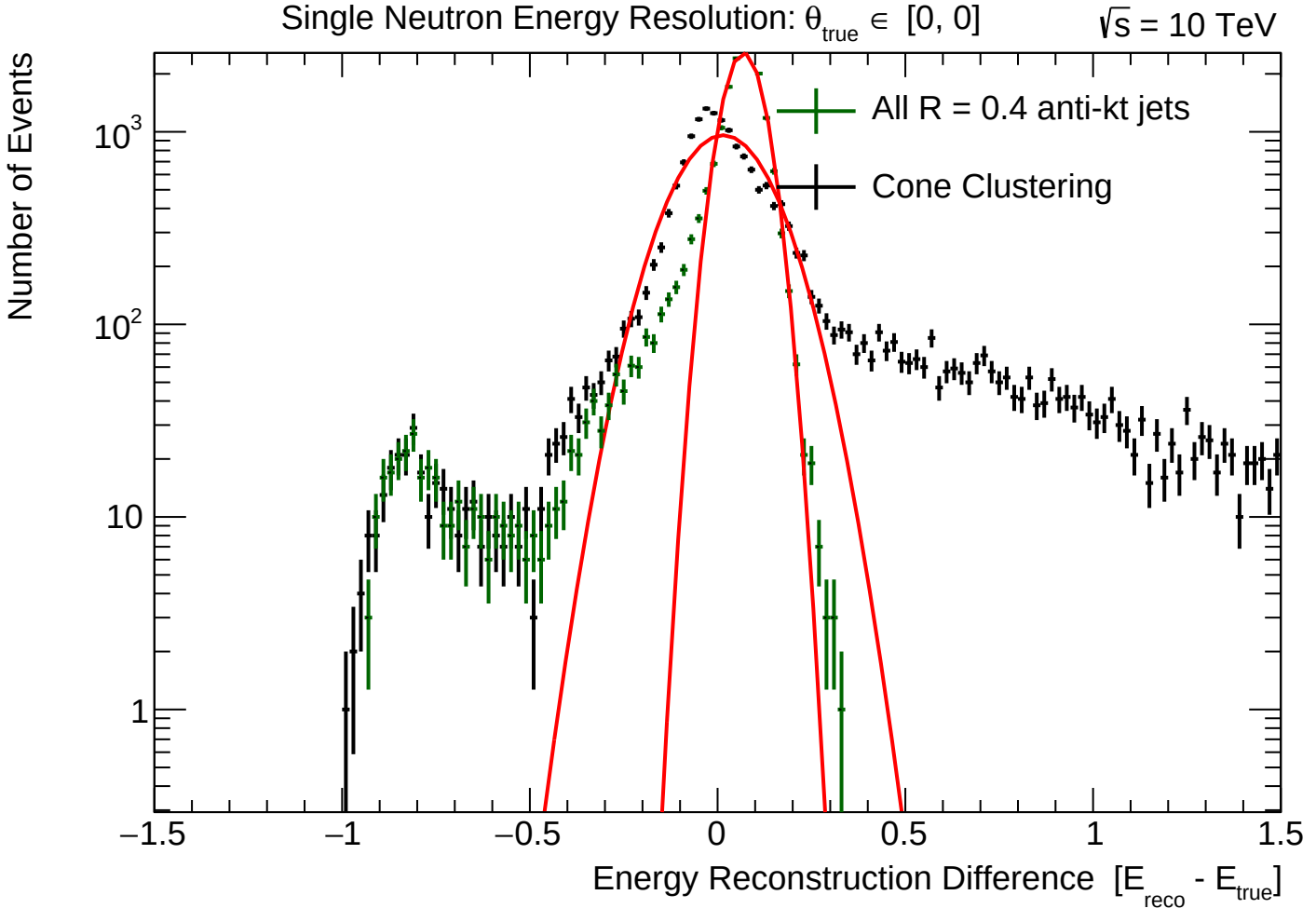

Single Neutron Energy Resolution: E true ∈ [125, 150]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

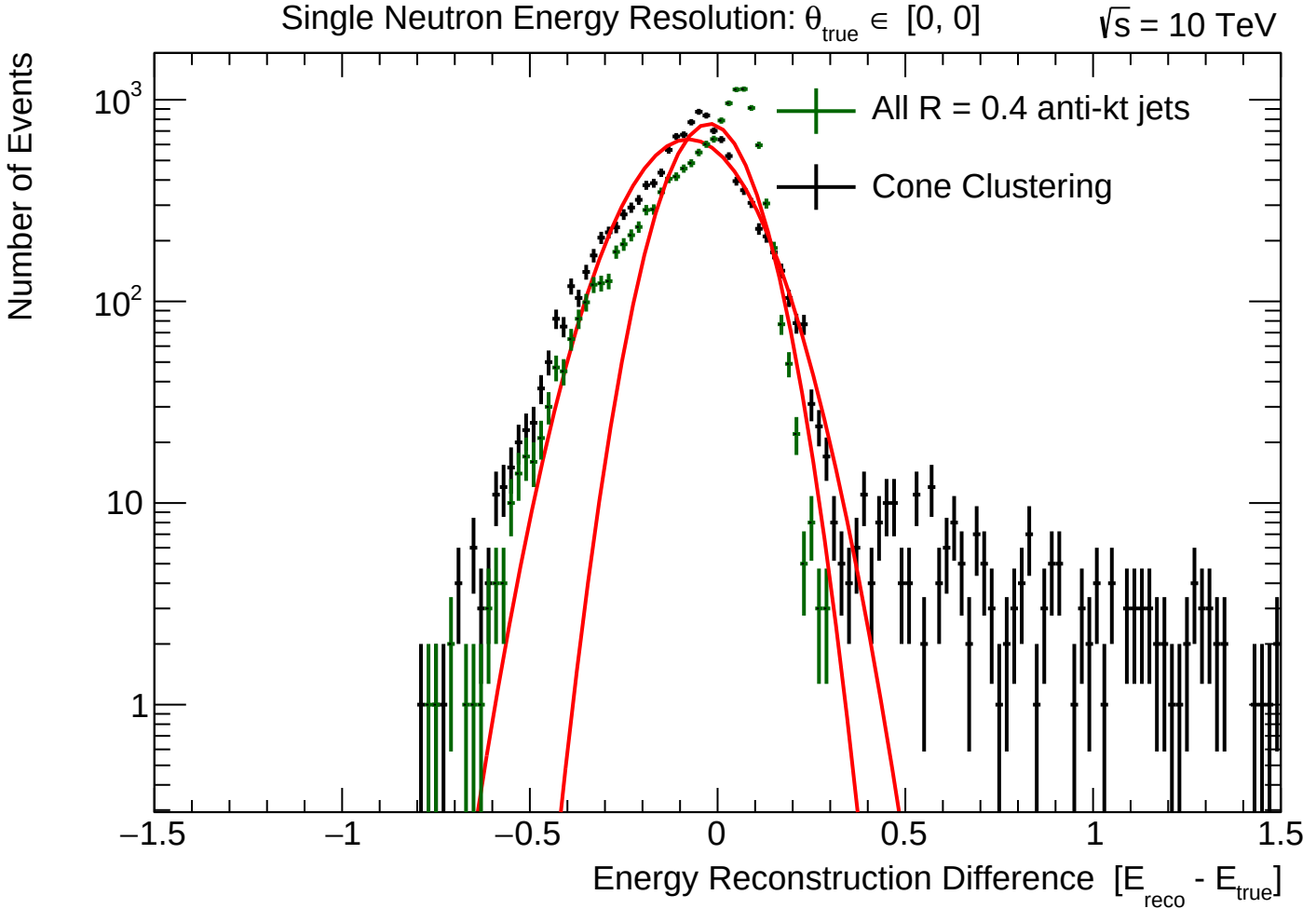

Single Neutron Energy Resolution: E true ∈ [150, 200]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

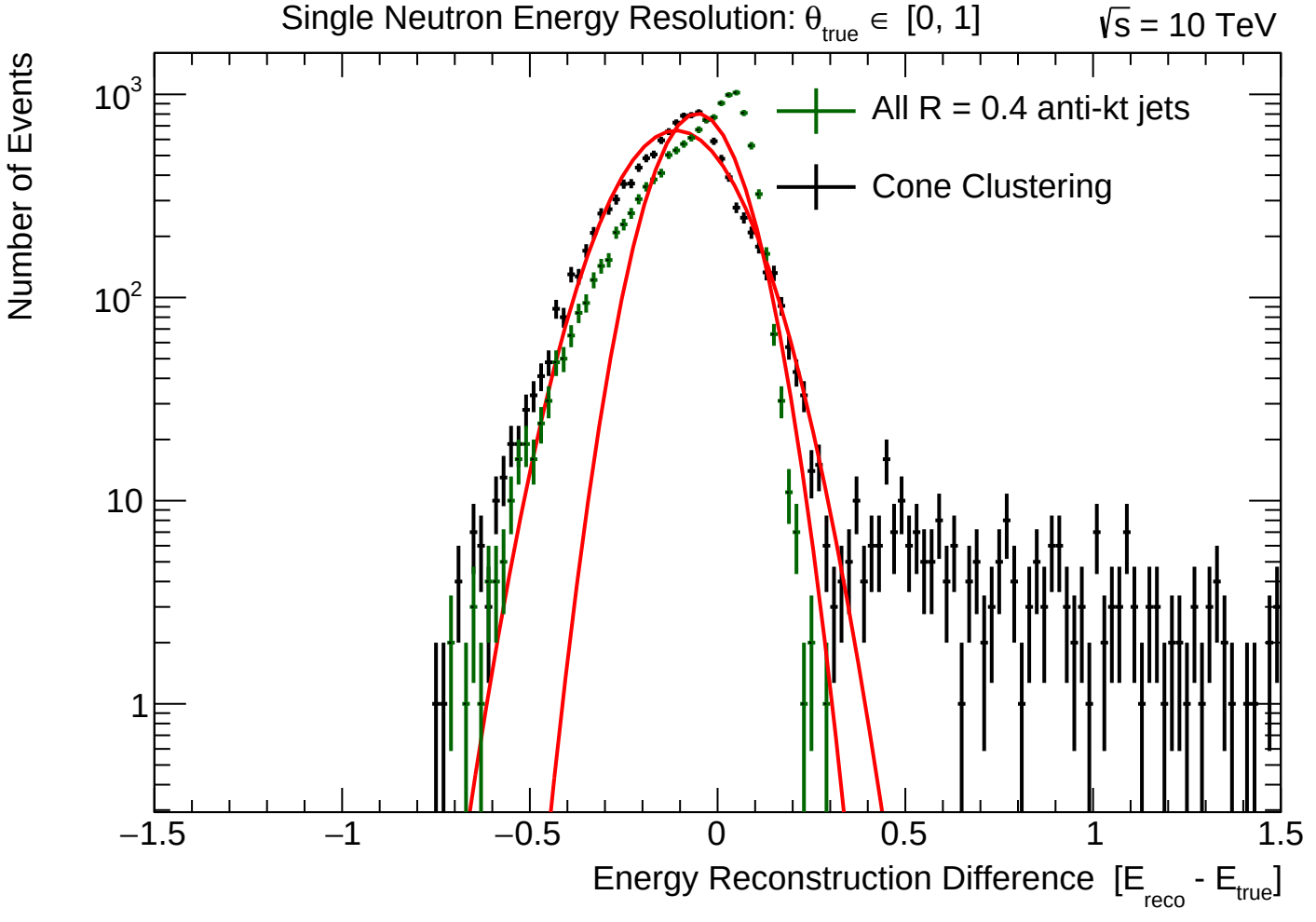

Single Neutron Energy Resolution: E true ∈ [200, 250]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

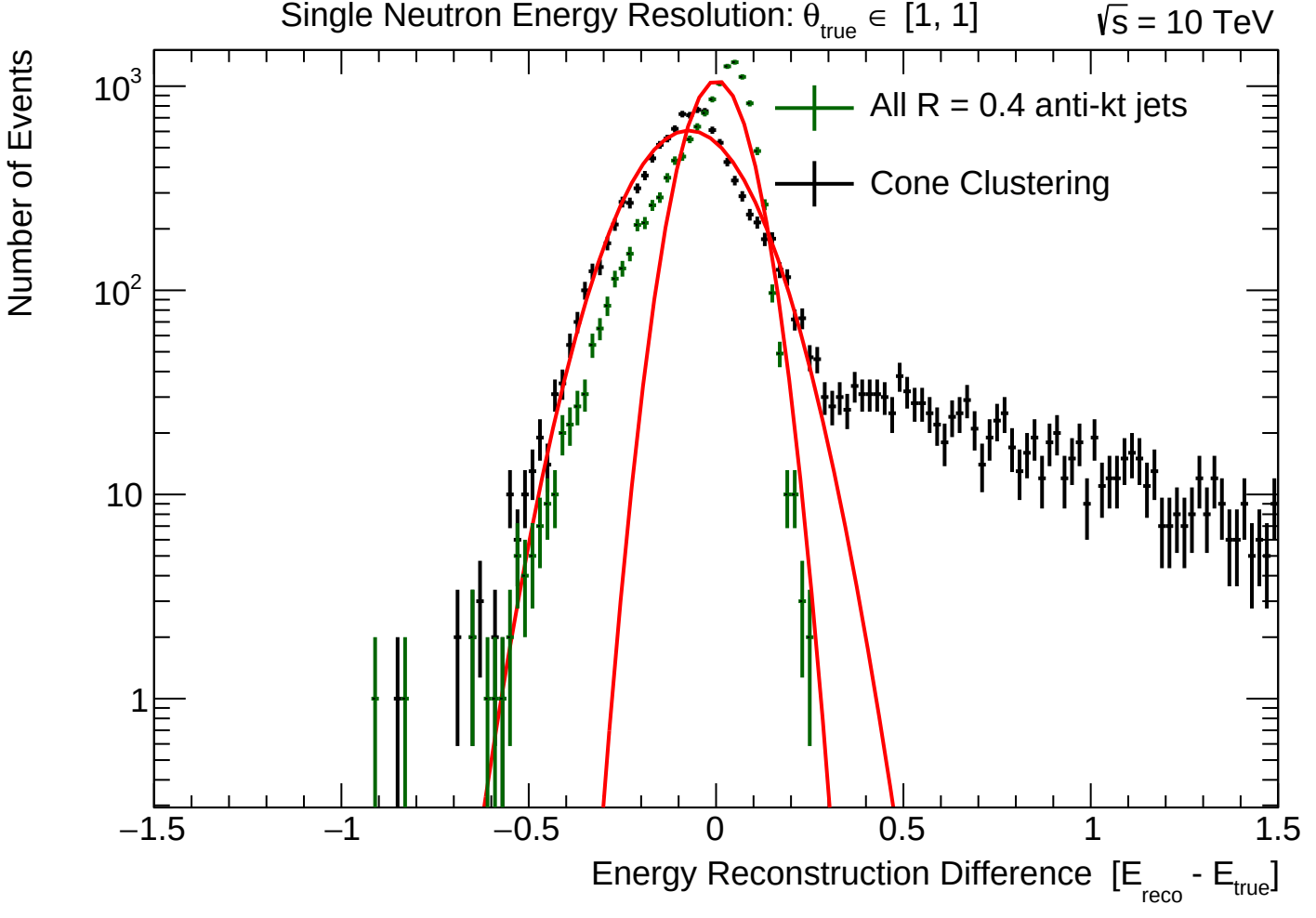
Theta Fits

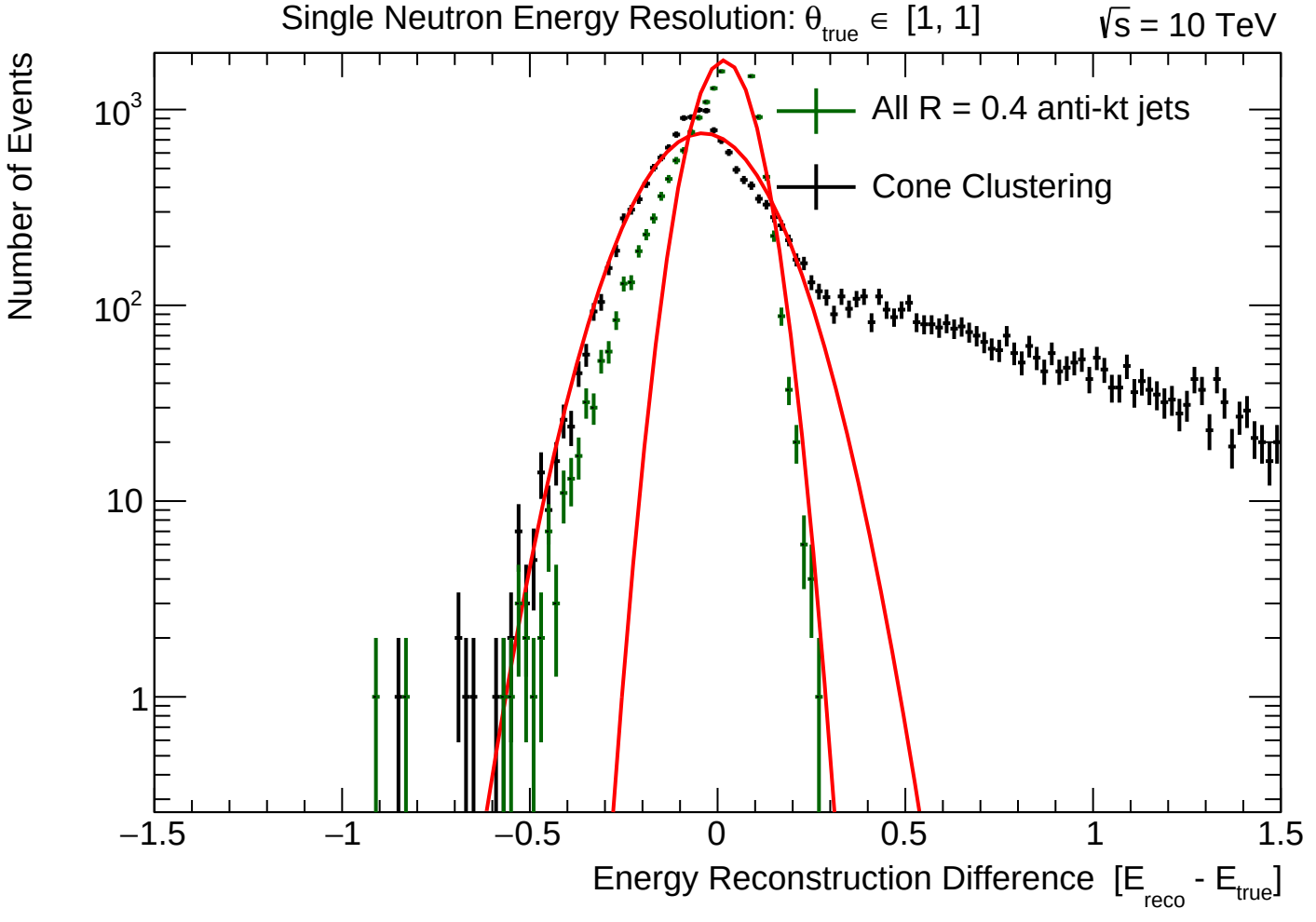

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

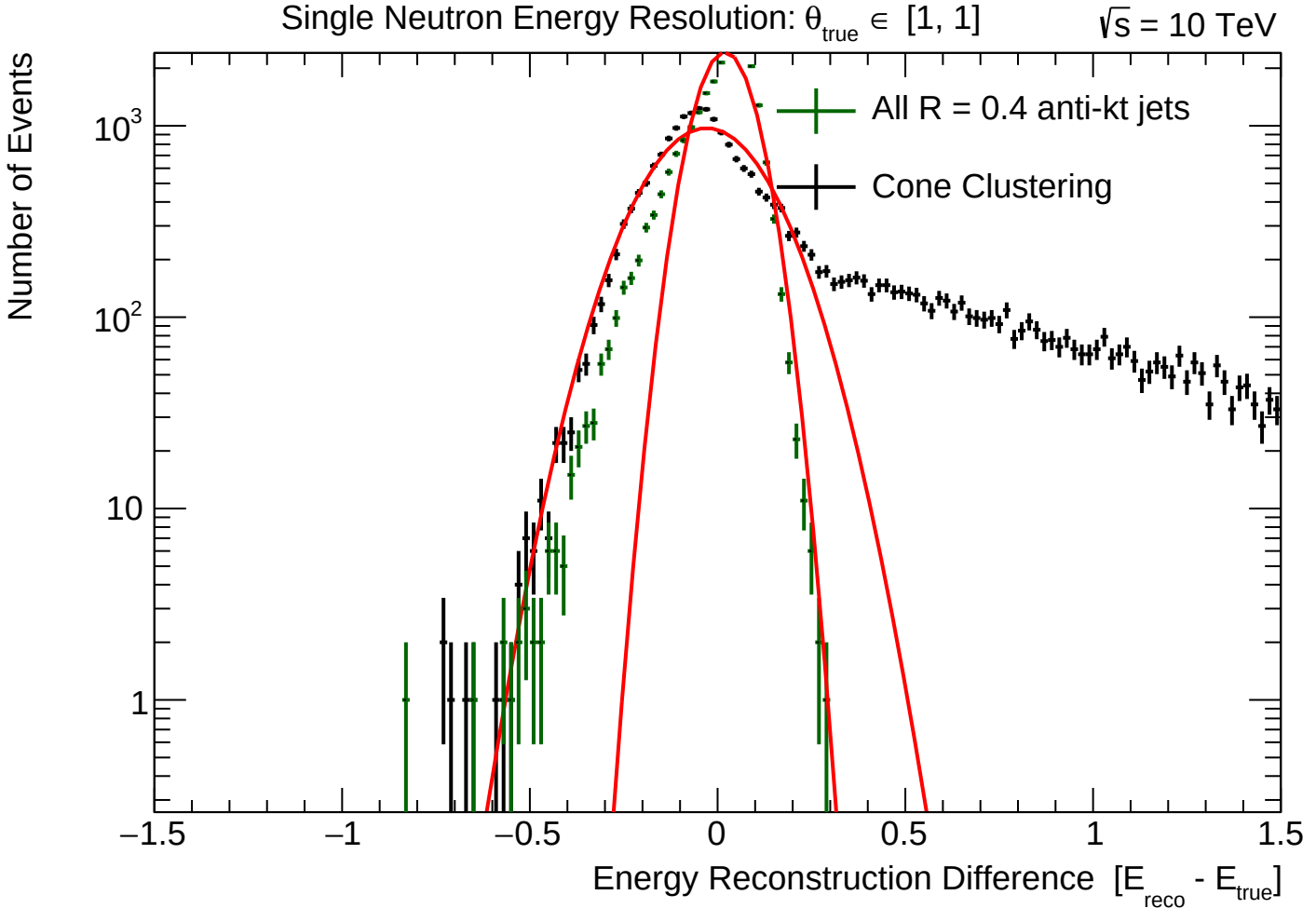

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

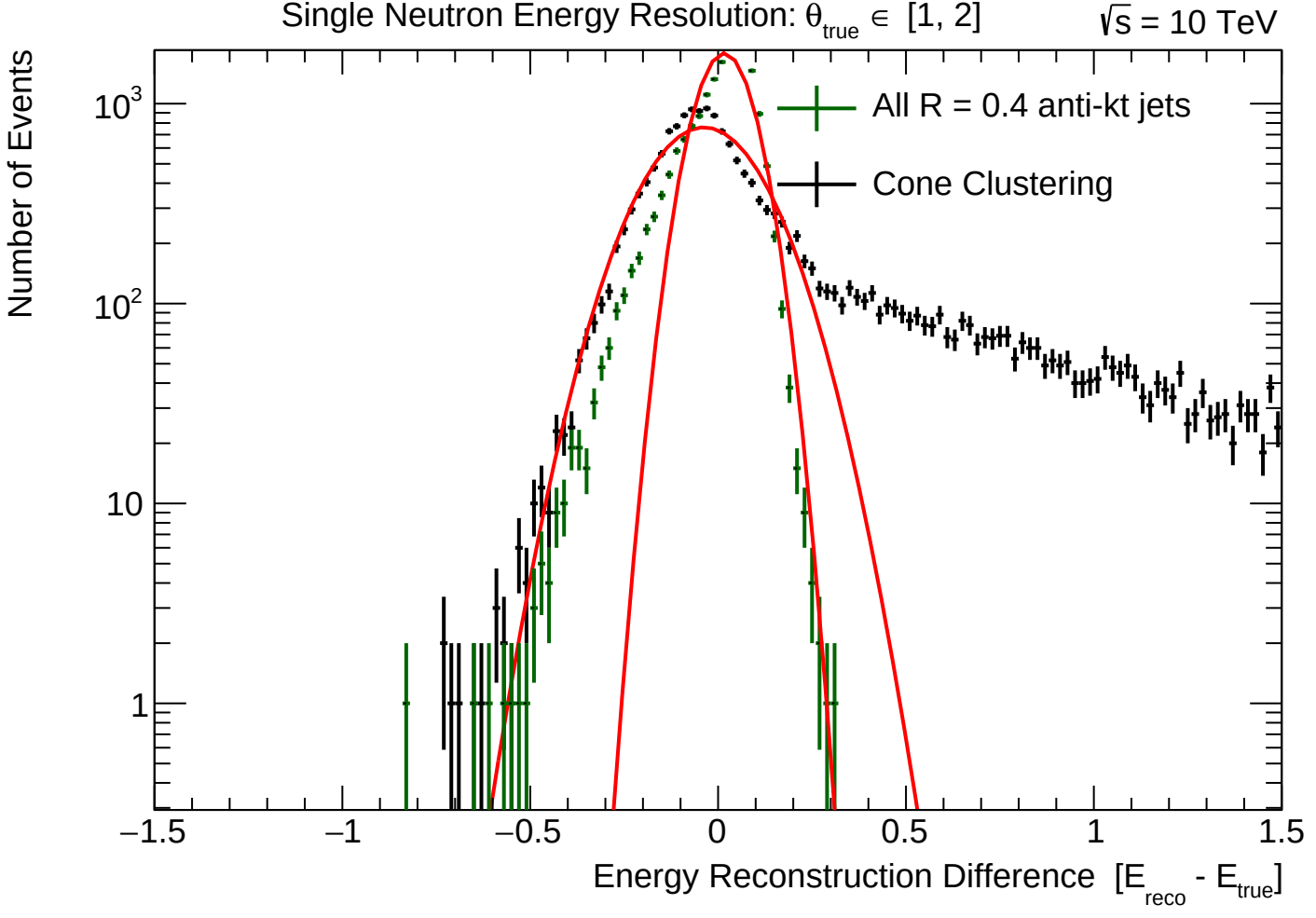

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
–1.5
–1
–0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

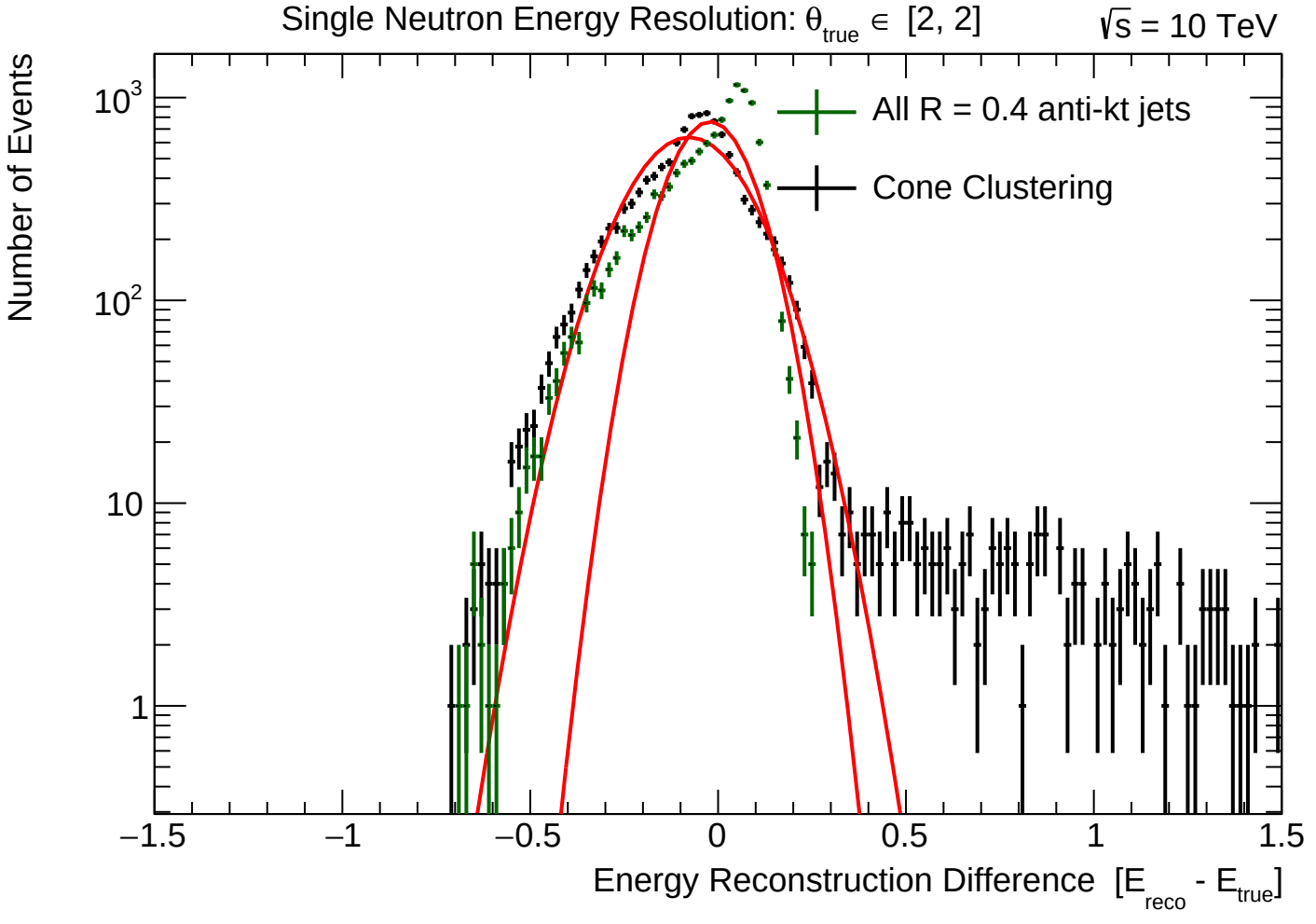

Single Neutron Energy Resolution: $\theta_{true} \in [0, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

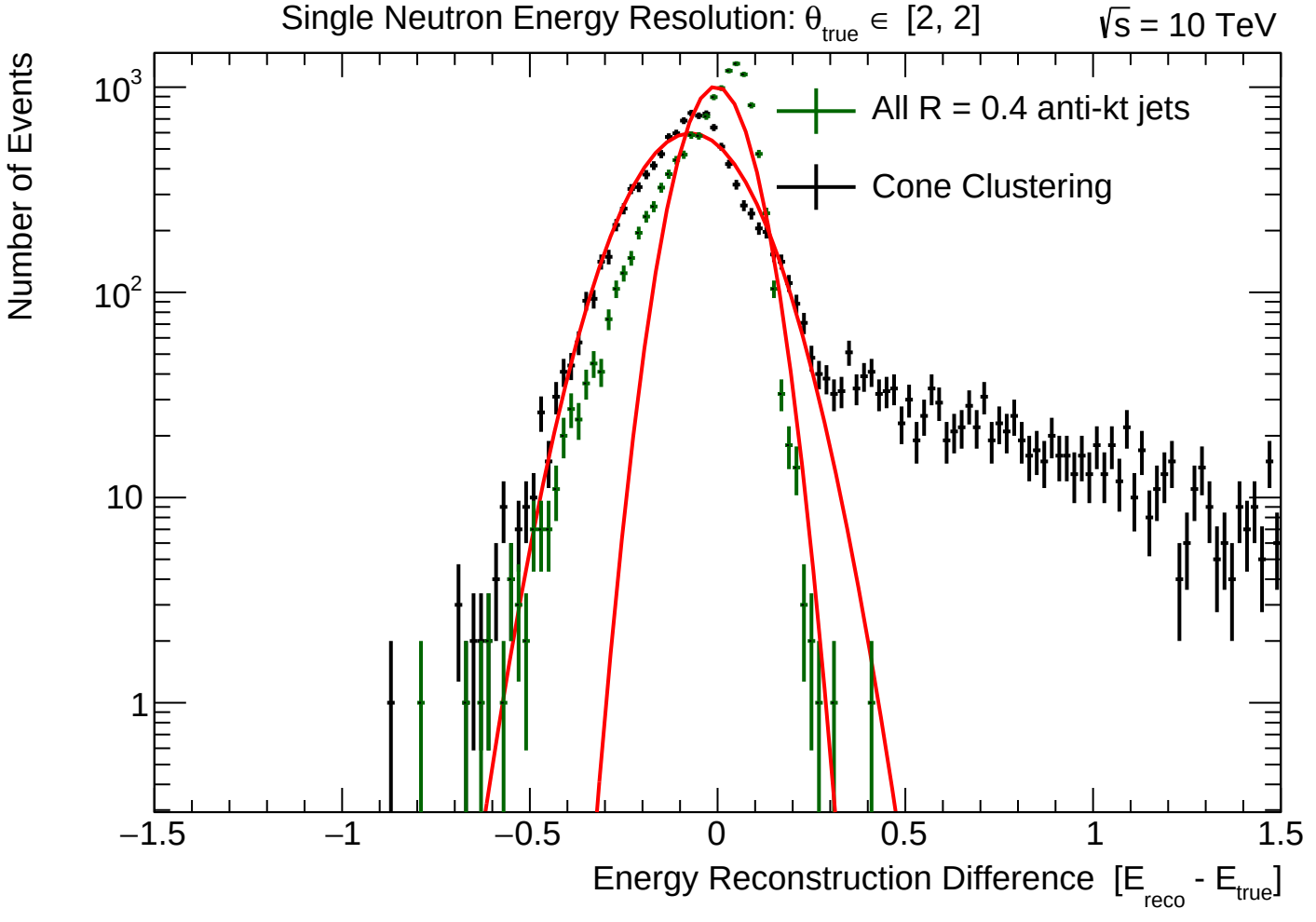

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

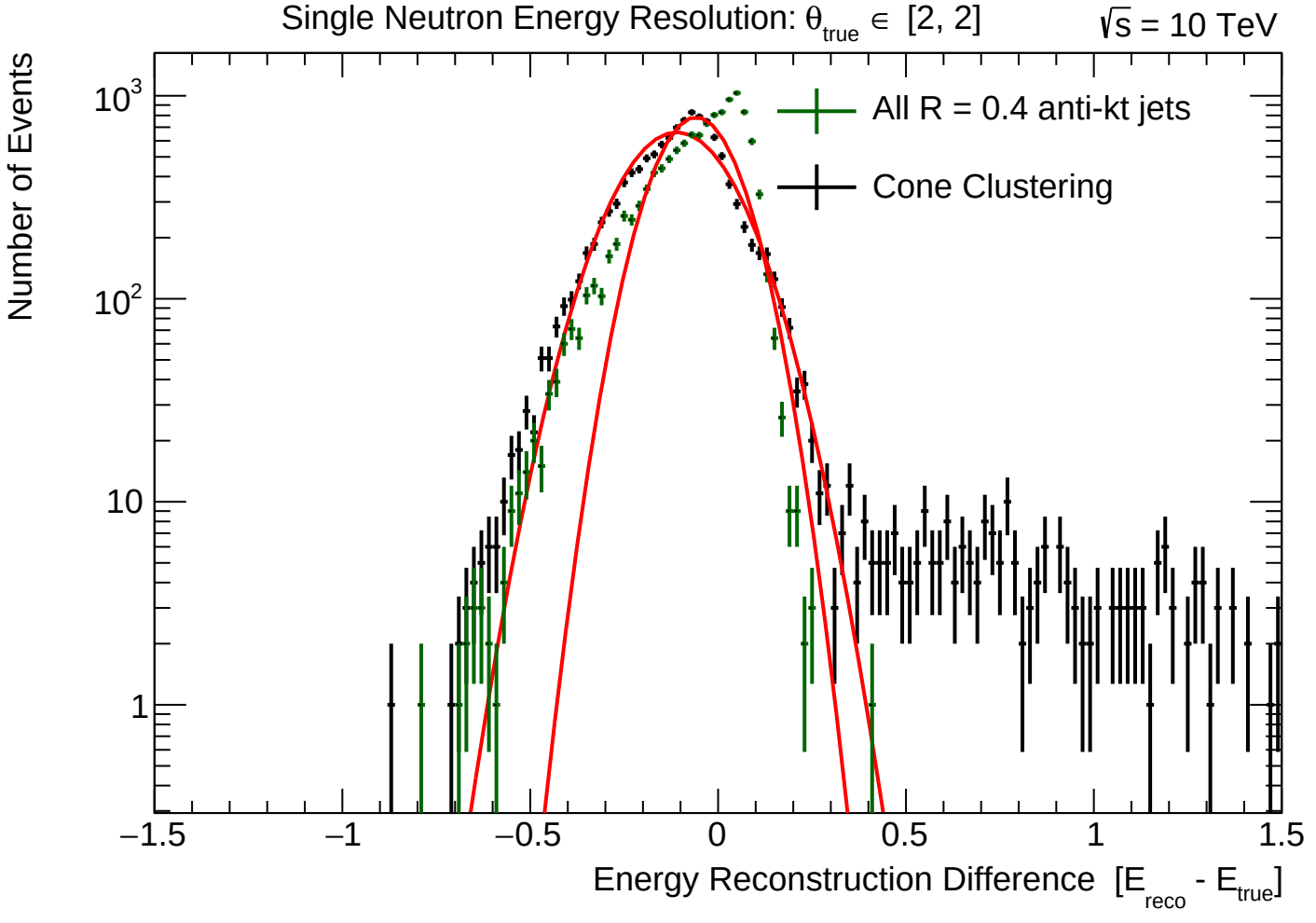

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

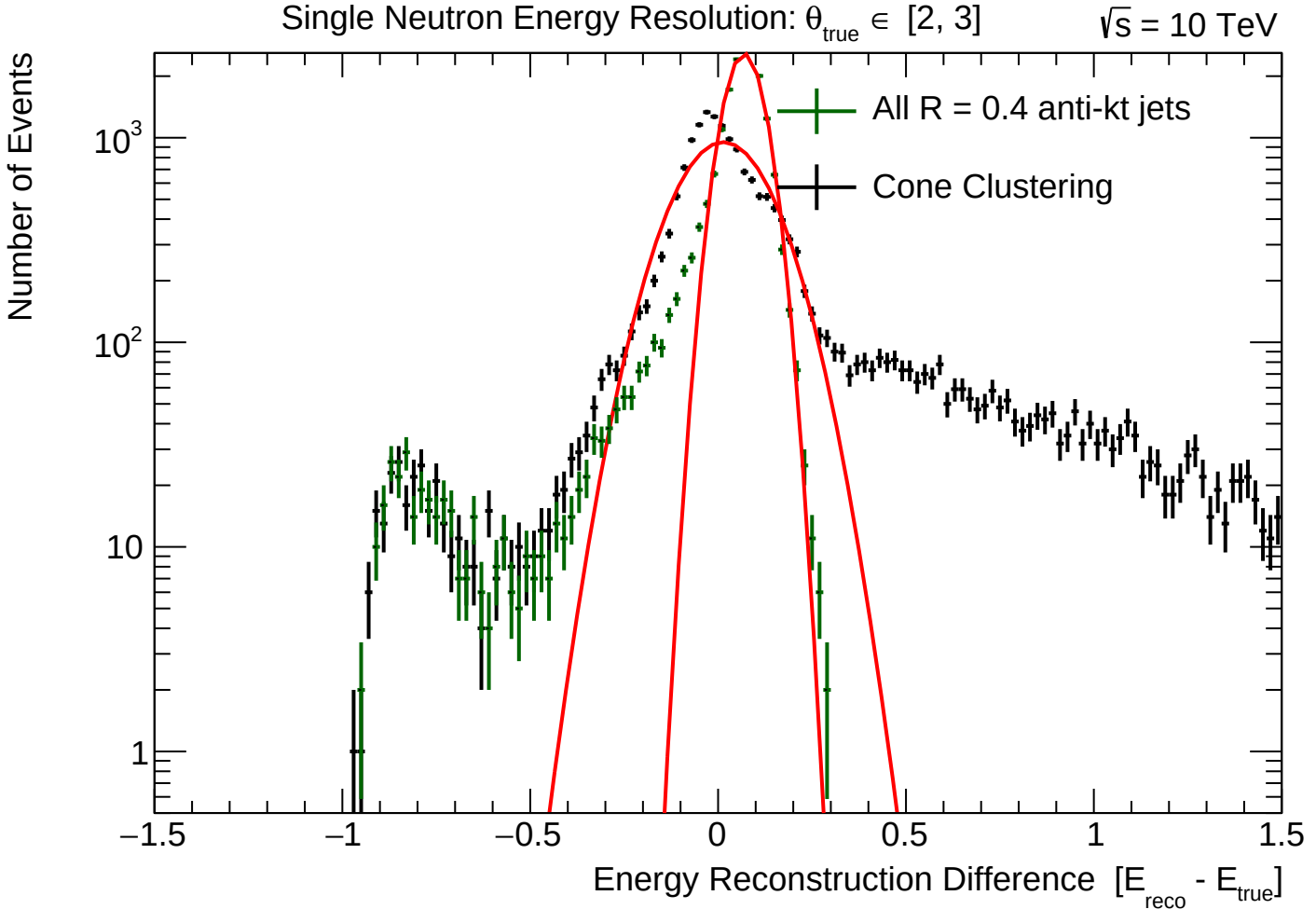

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [1, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

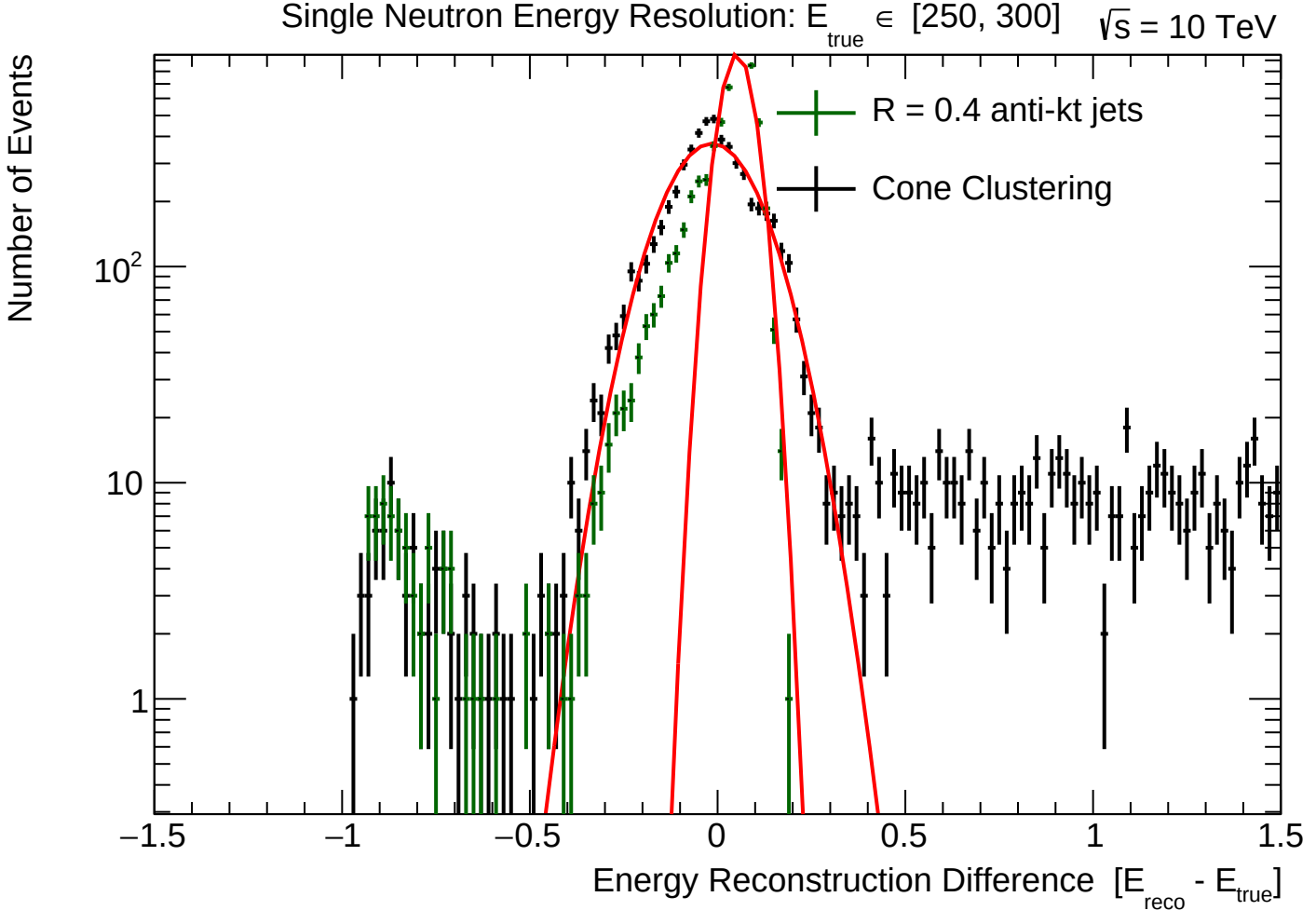

Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

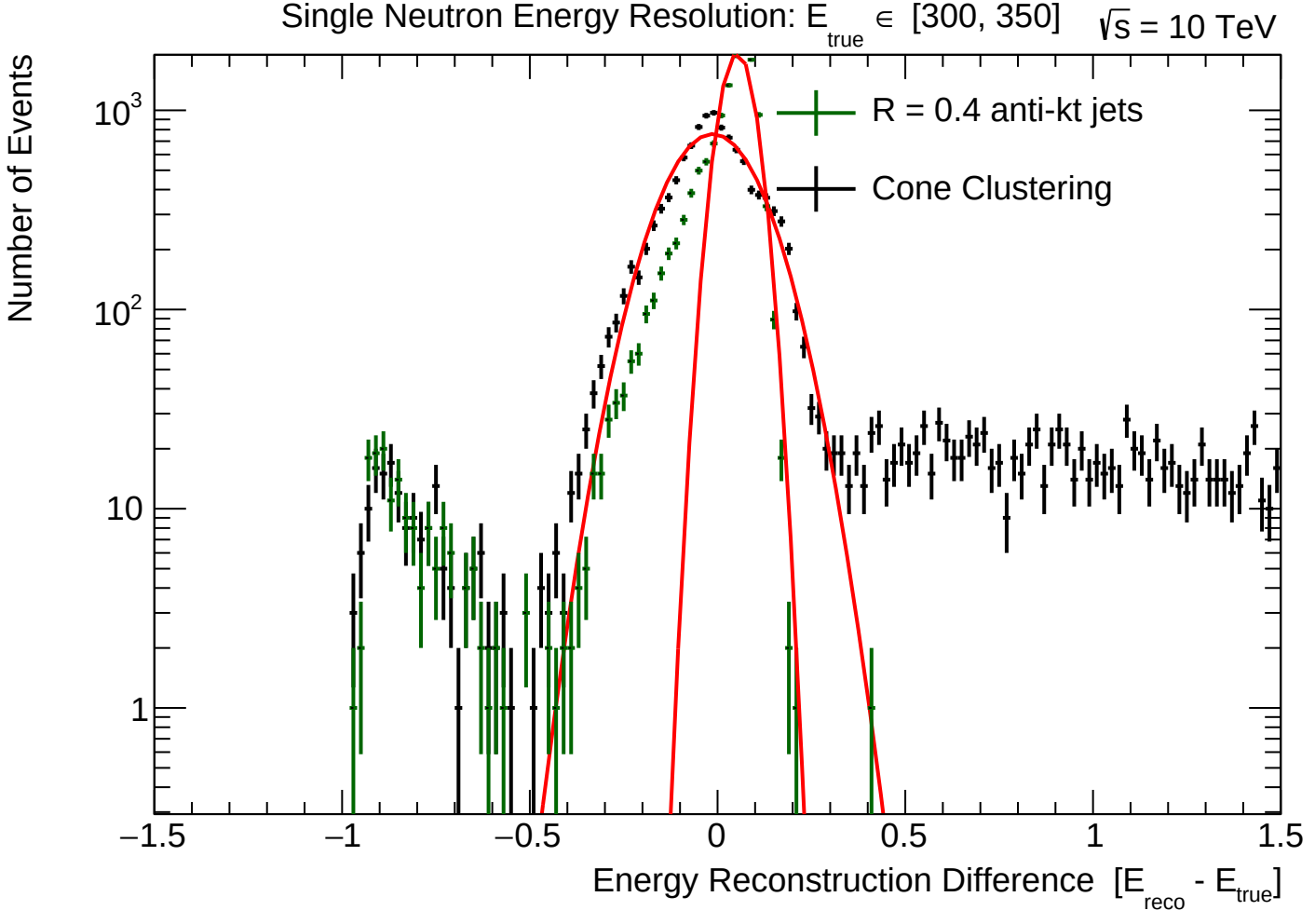

Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

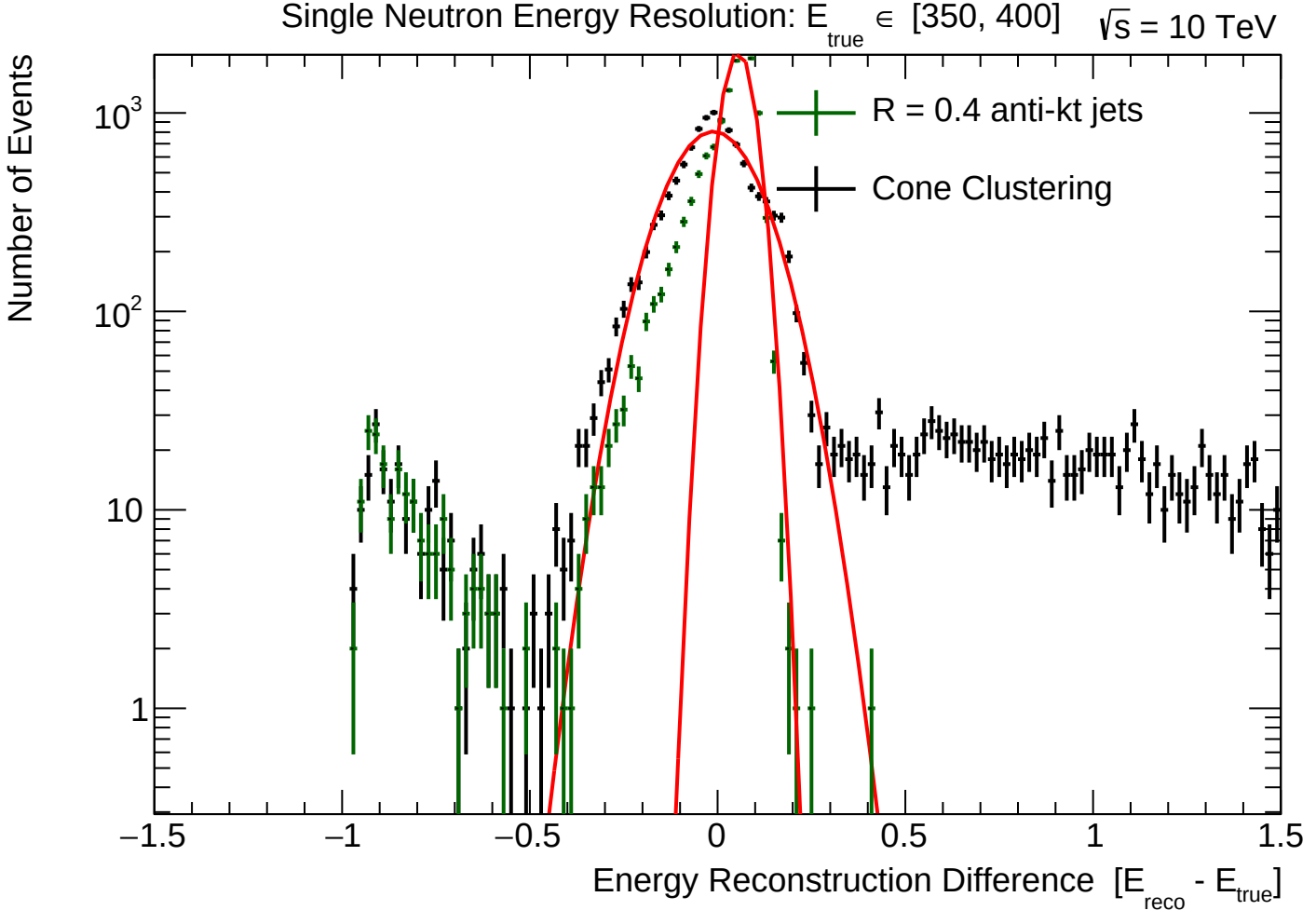

Single Neutron Energy Resolution: $\theta_{true} \in [2, 3]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

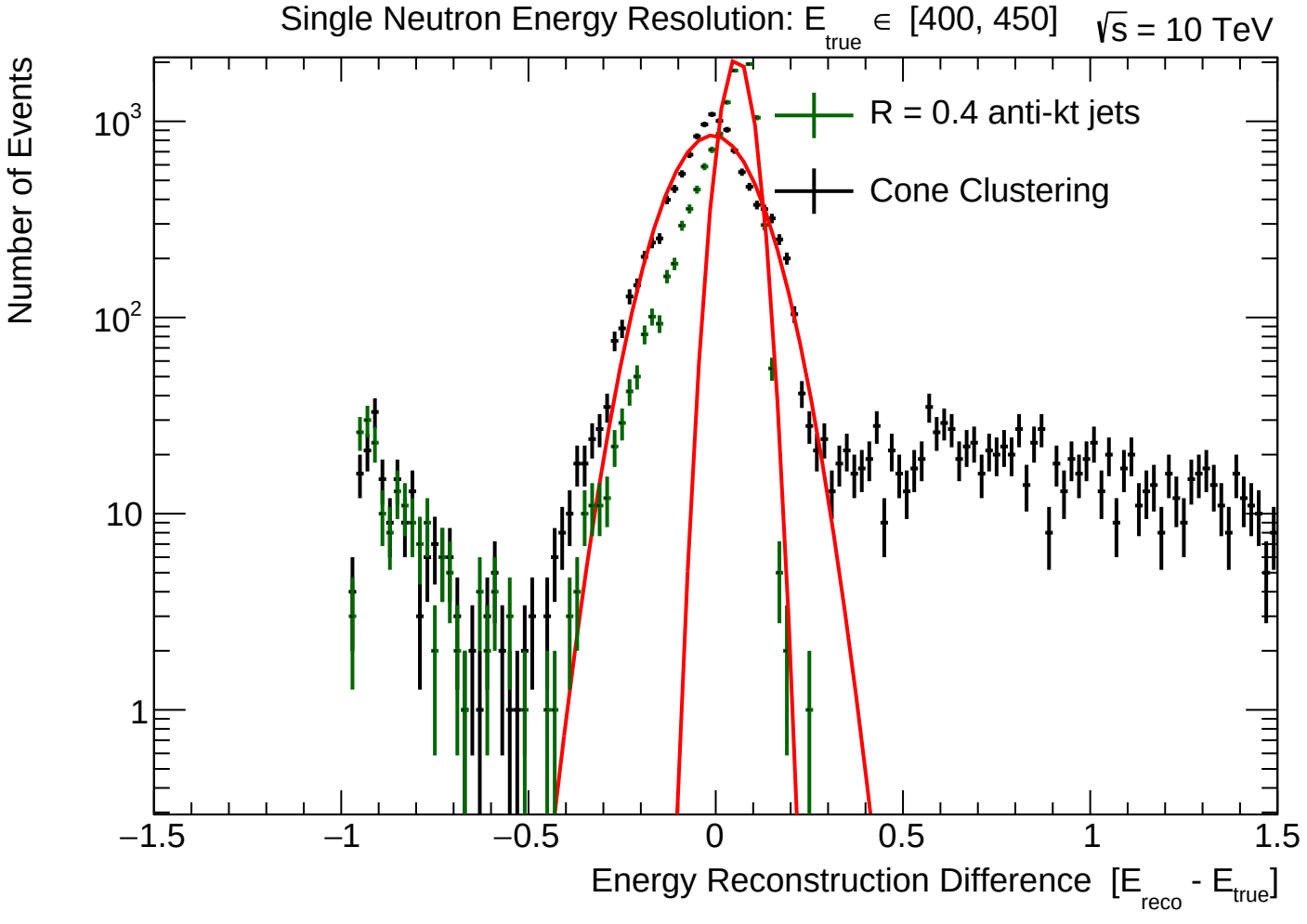
250-1000 GeV Subfits

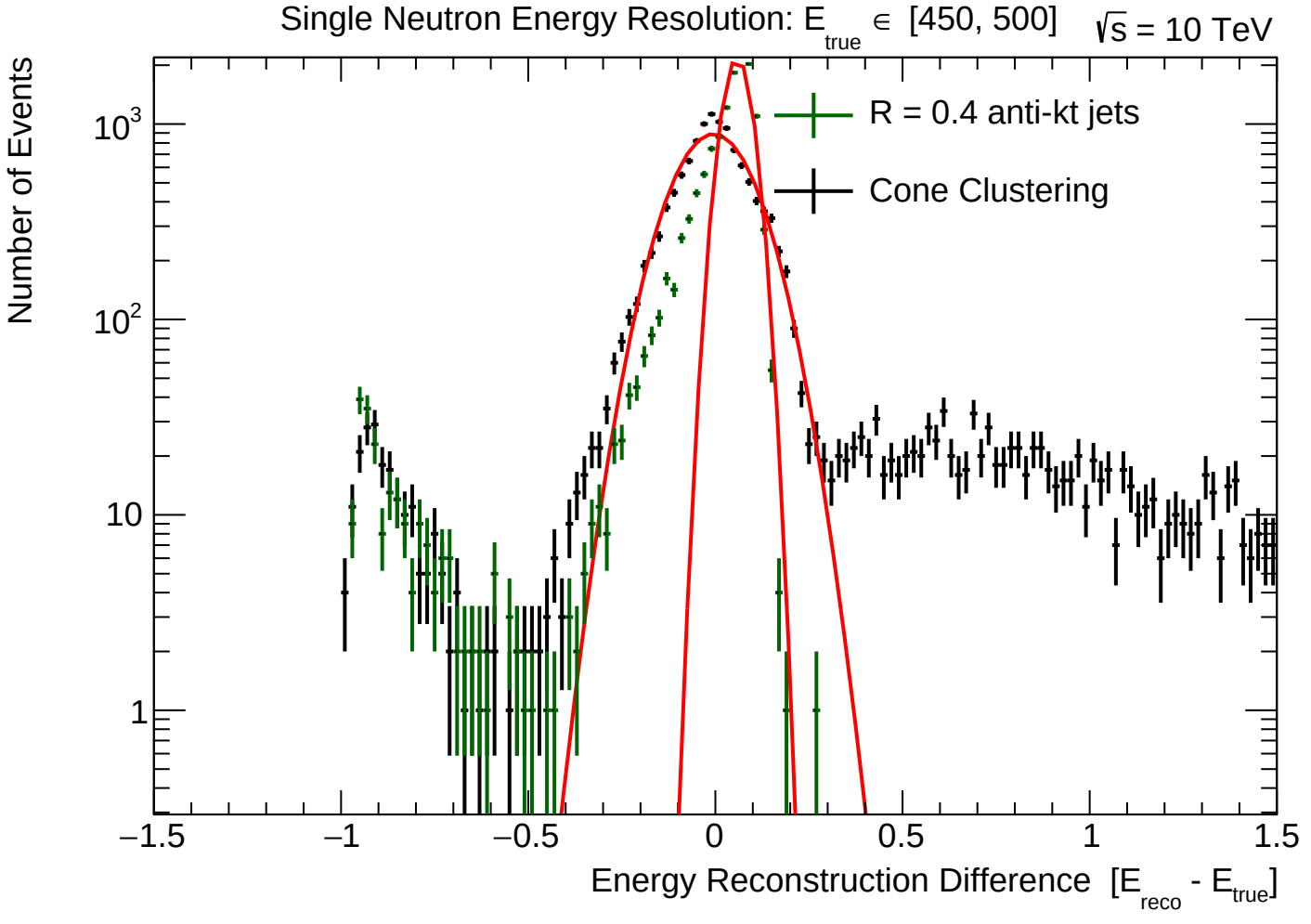
Energy Fits

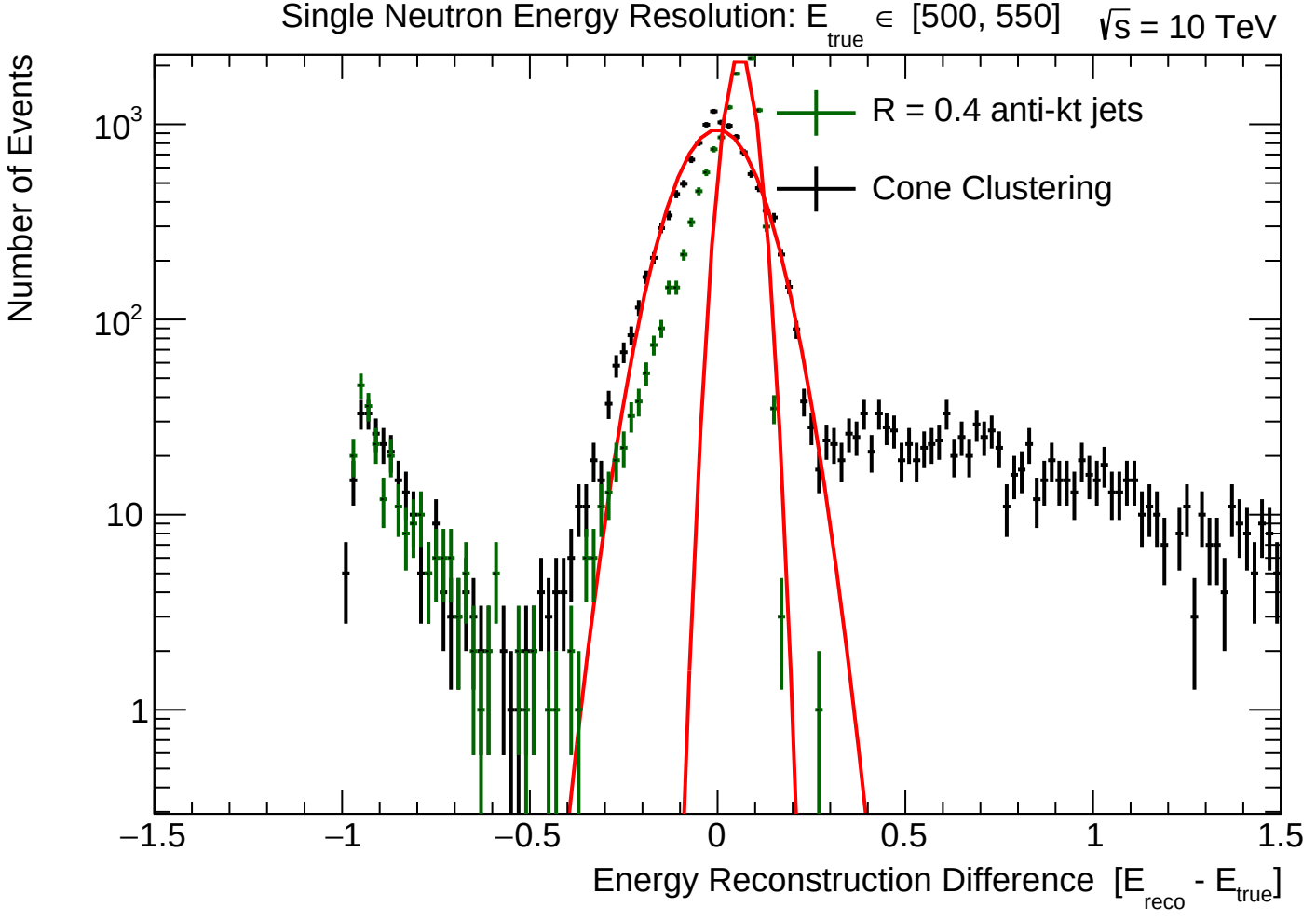

Single Neutron Energy Resolution: E true ∈ [250, 300]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

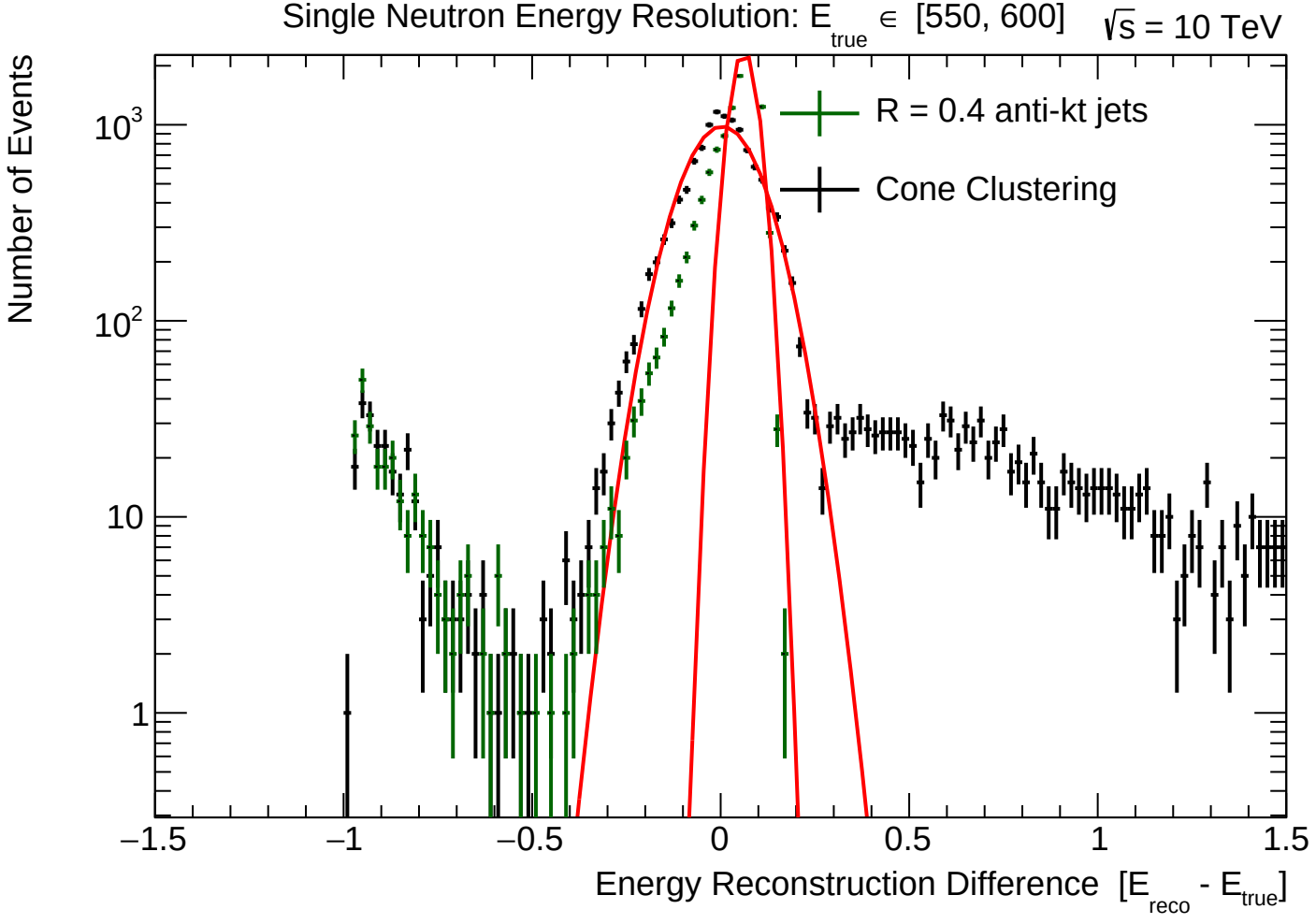

Single Neutron Energy Resolution: E true ∈ [300, 350]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

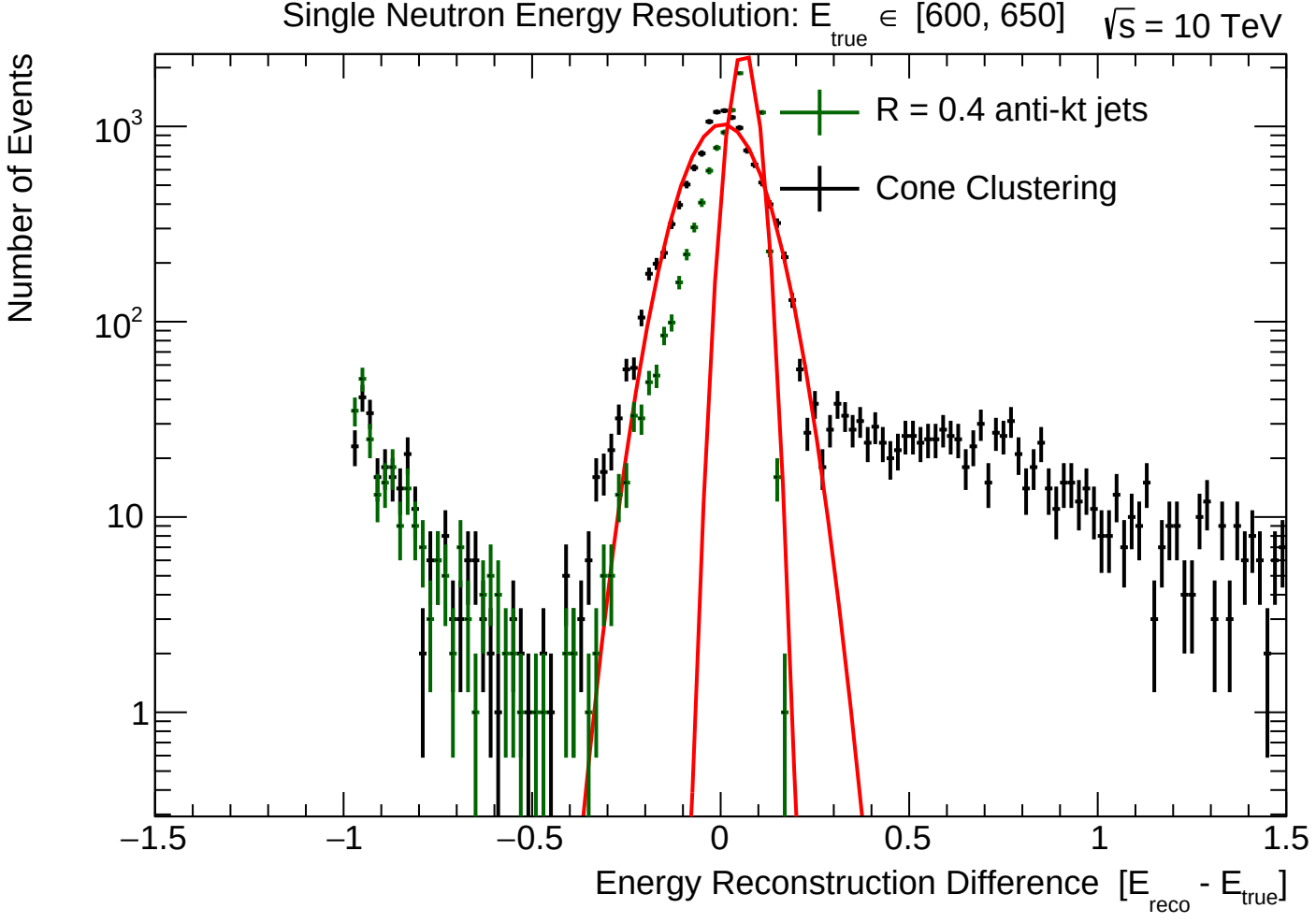

Single Neutron Energy Resolution: E true ∈ [350, 400]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

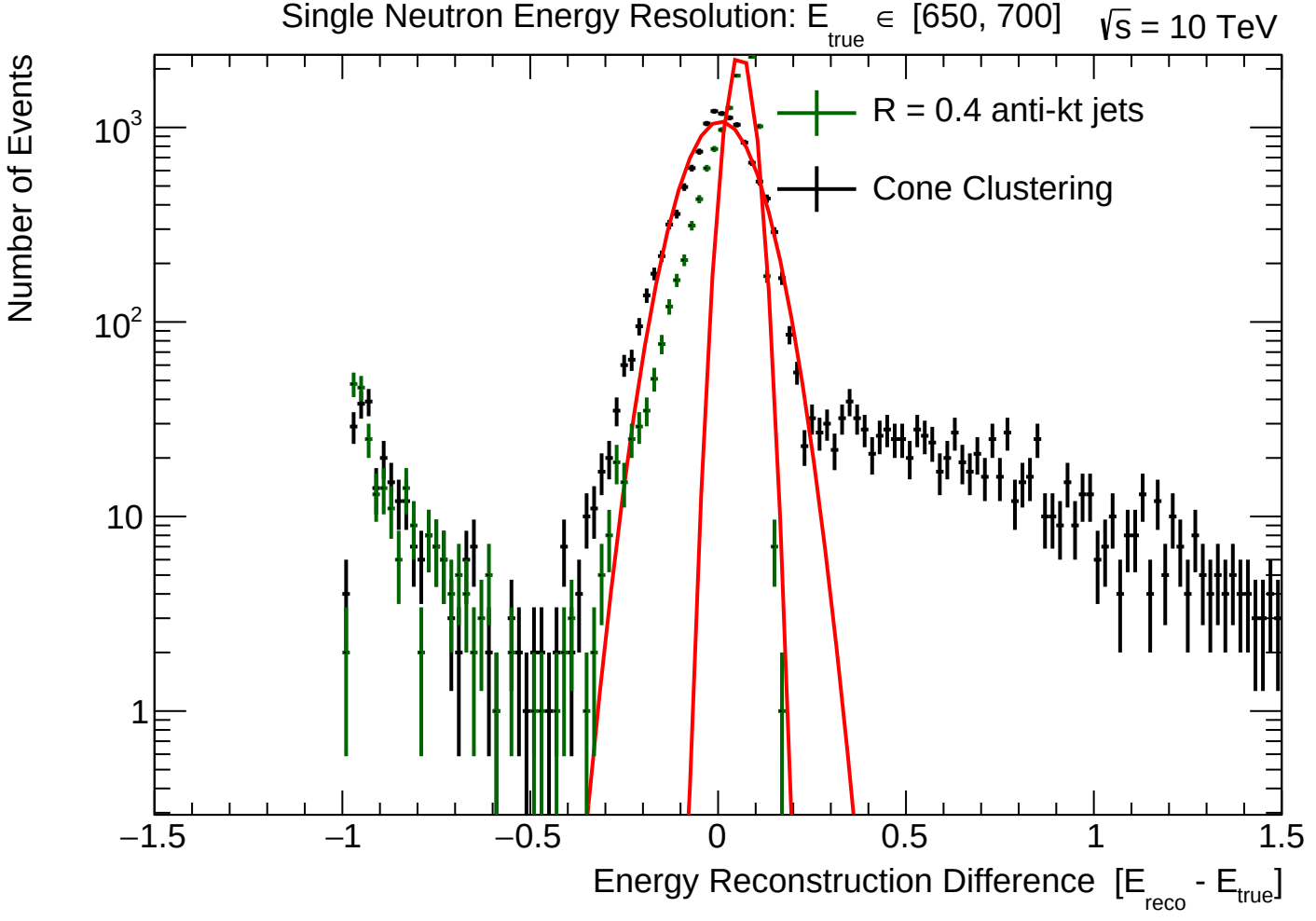

Single Neutron Energy Resolution: E_true ∈ [400, 450]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E_reco - E_true]

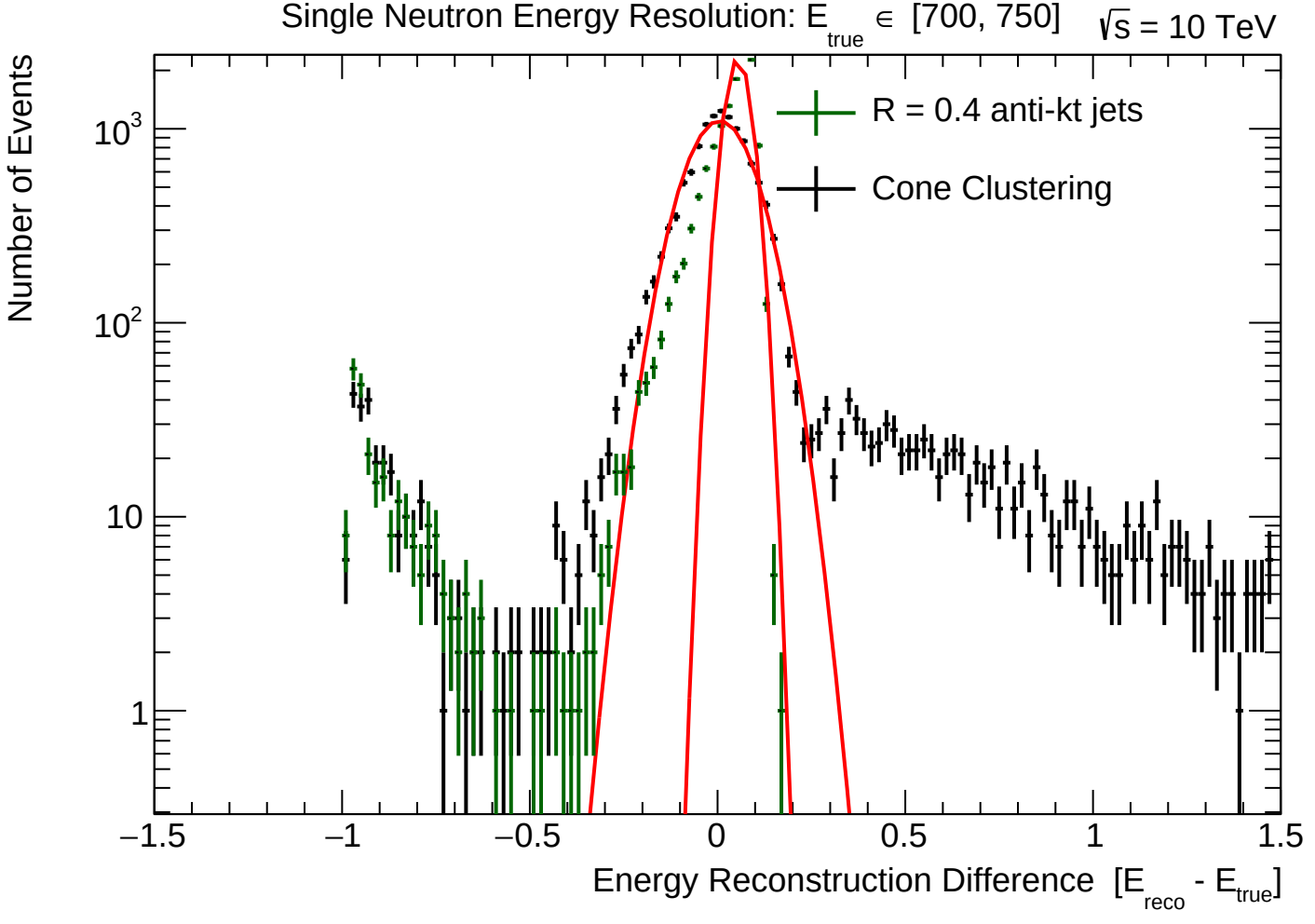

Single Neutron Energy Resolution: E true ∈ [450, 500]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

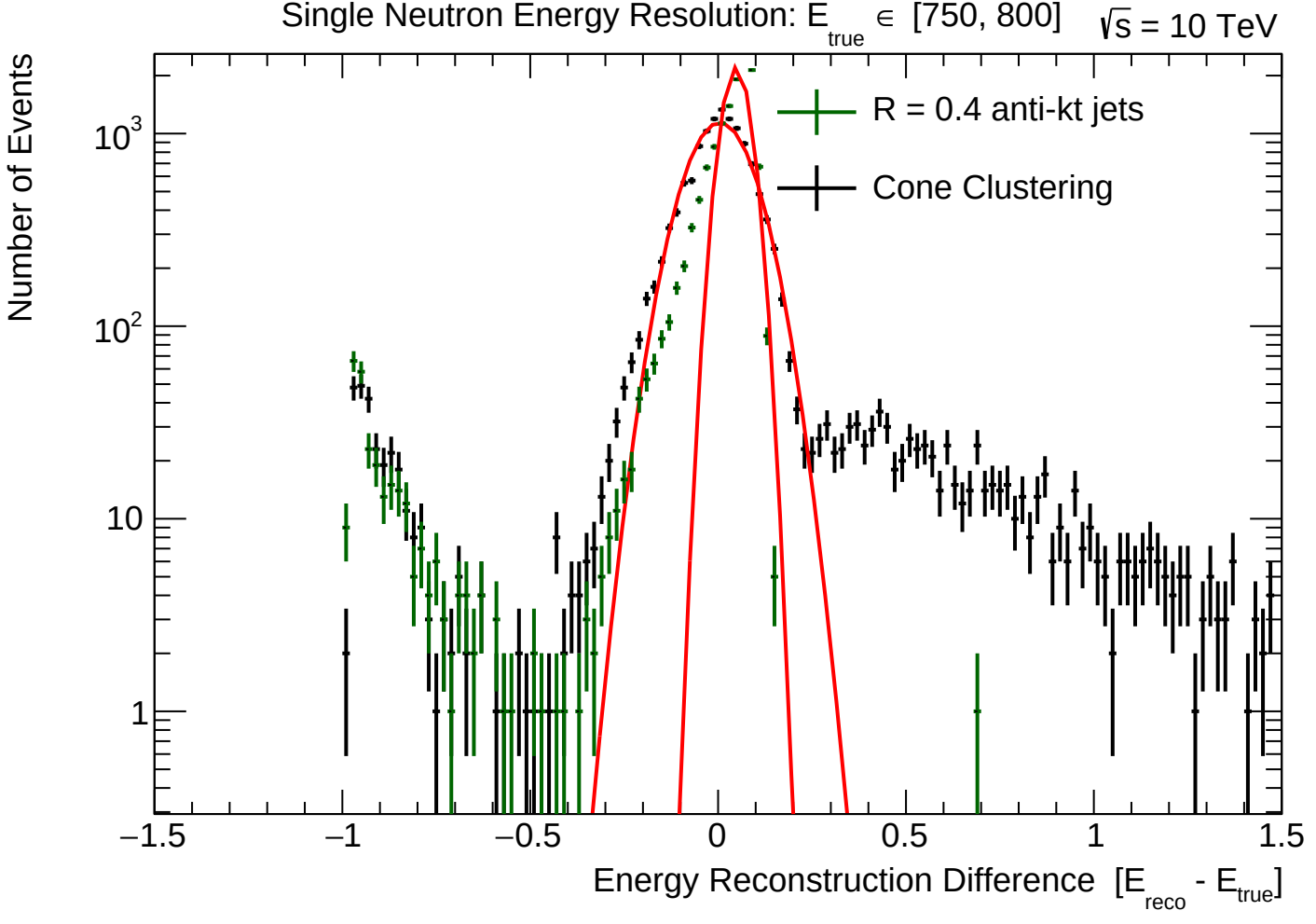

Single Neutron Energy Resolution: E true ∈ [500, 550]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

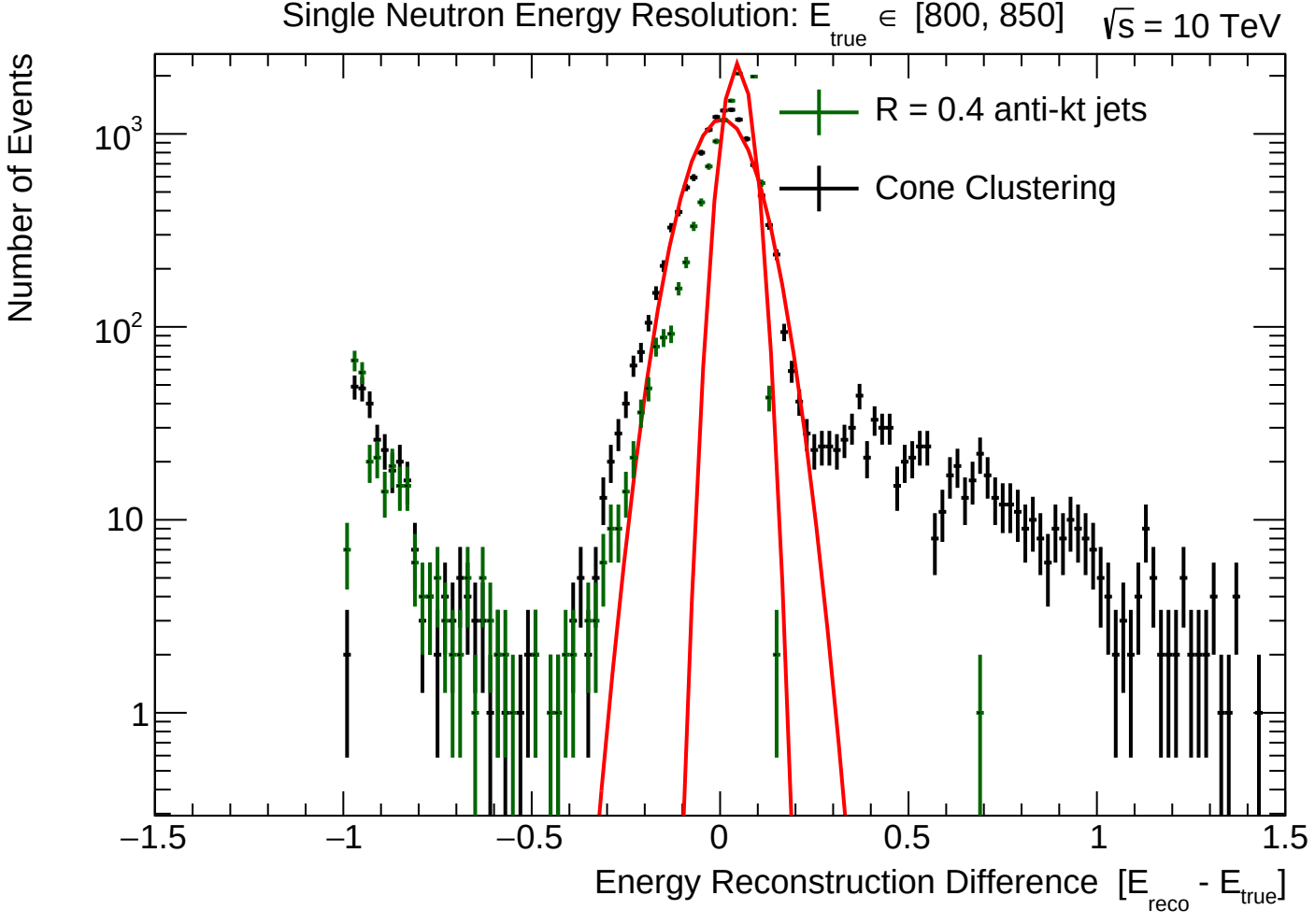

Single Neutron Energy Resolution: E true ∈ [550, 600]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

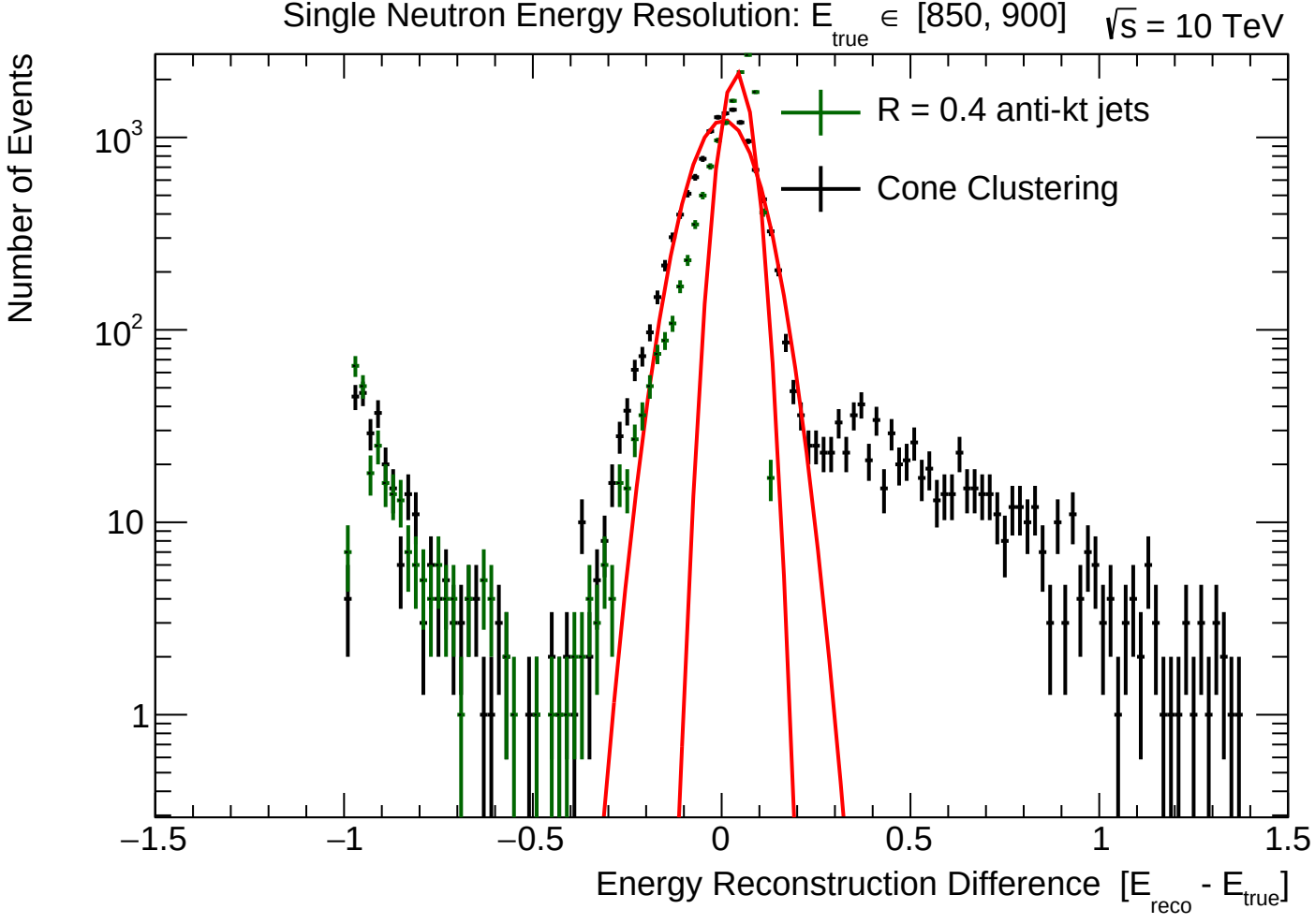

Single Neutron Energy Resolution: E true ∈ [600, 650]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

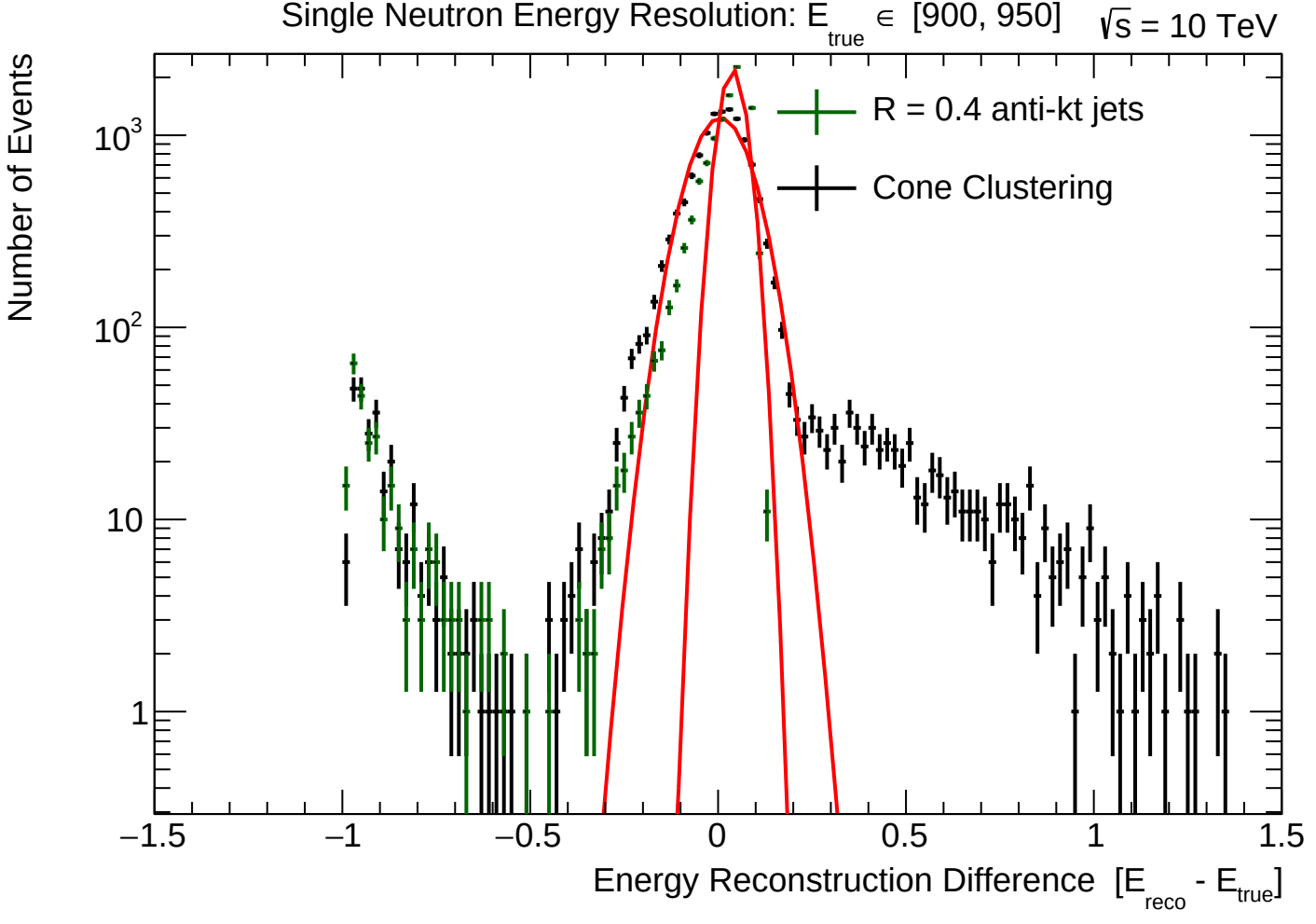

Single Neutron Energy Resolution: E true ∈ [650, 700]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

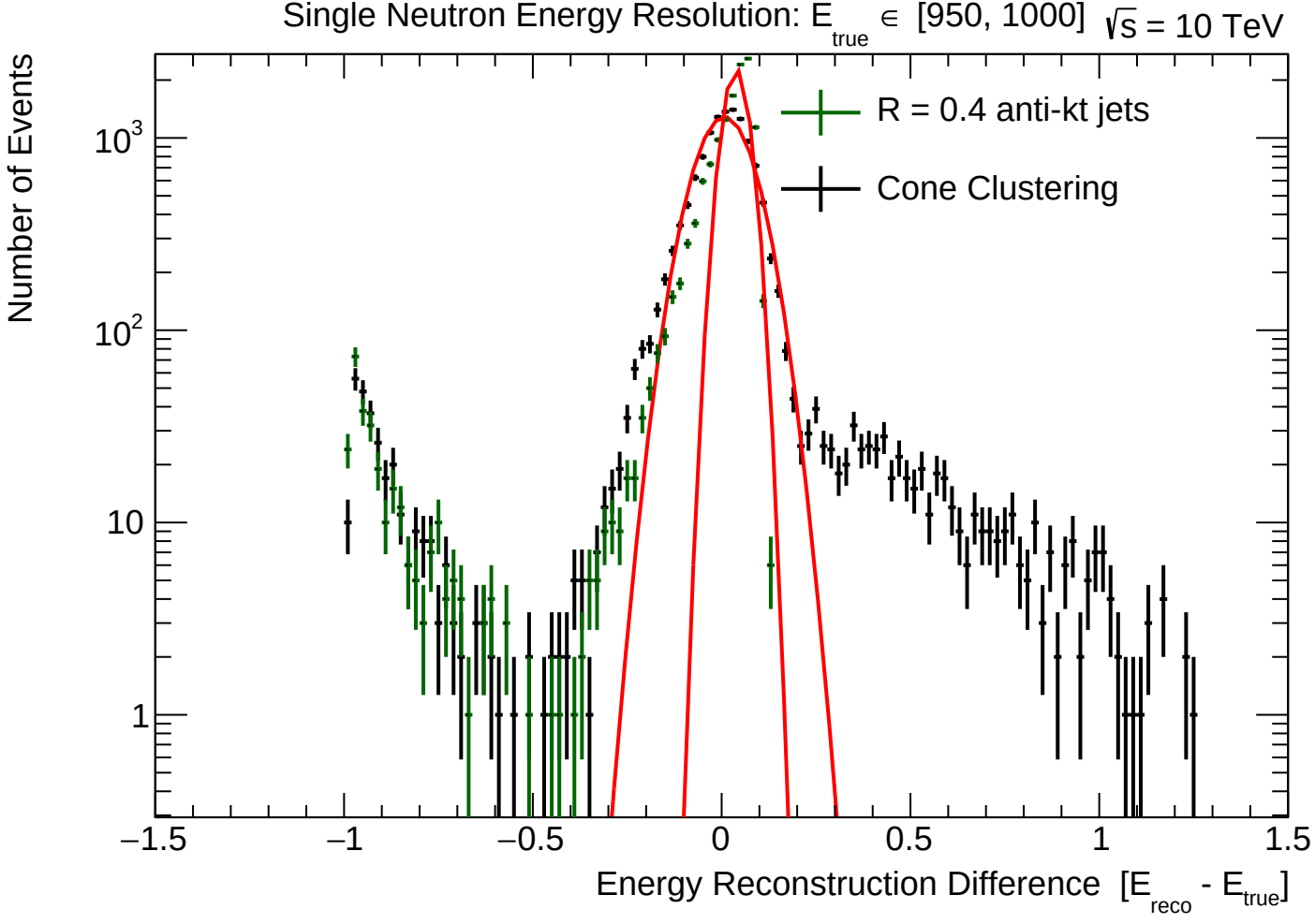

Single Neutron Energy Resolution: E true ∈ [700, 750]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]


Single Neutron Energy Resolution: E true ∈ [750, 800]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

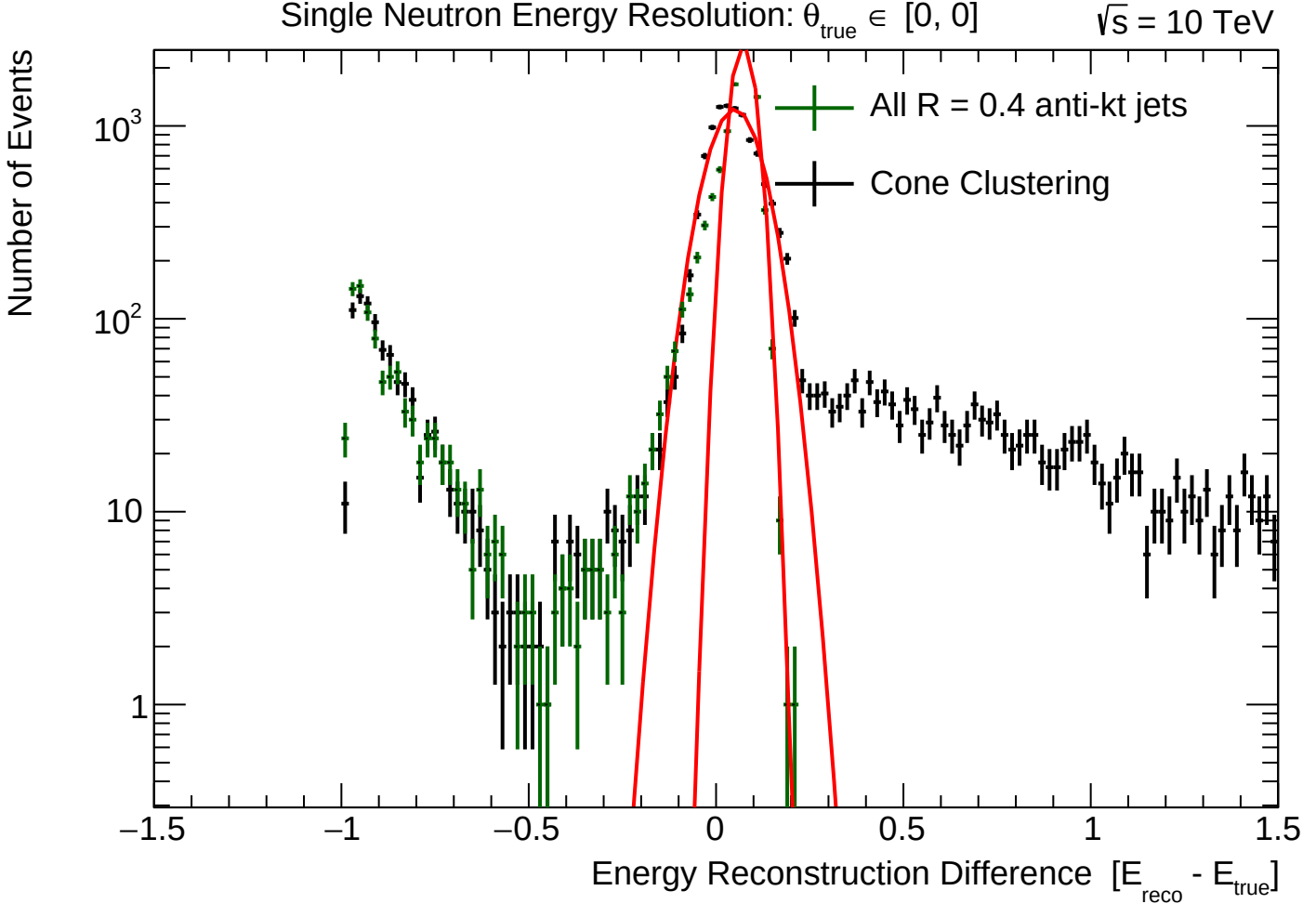

Single Neutron Energy Resolution: E_true ∈ [800, 850]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E_reco - E_true]

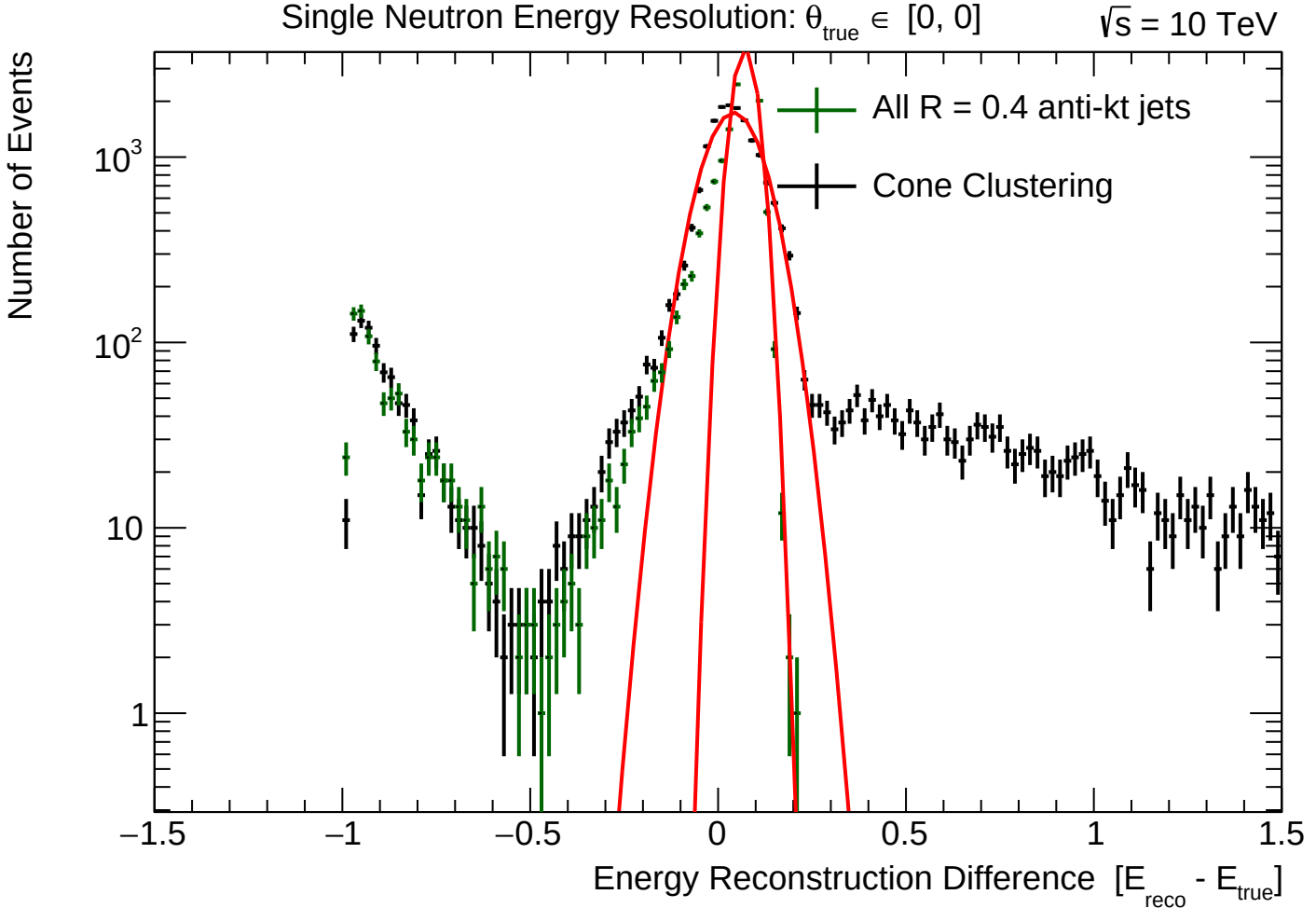

Single Neutron Energy Resolution: E_true ∈ [850, 900]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E_reco - E_true]

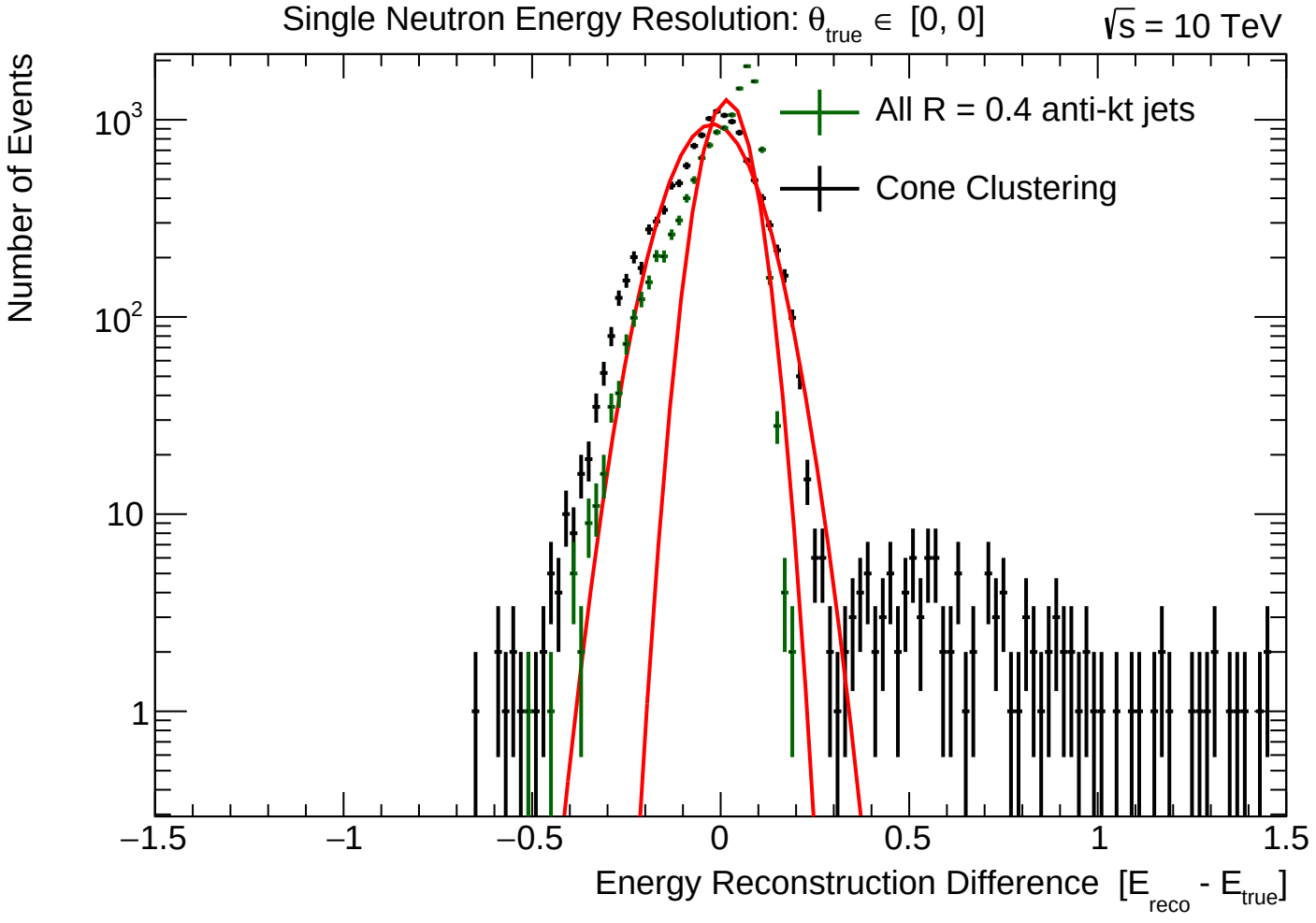

Single Neutron Energy Resolution: E true ∈ [900, 950]
√s = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference [E reco - E true]

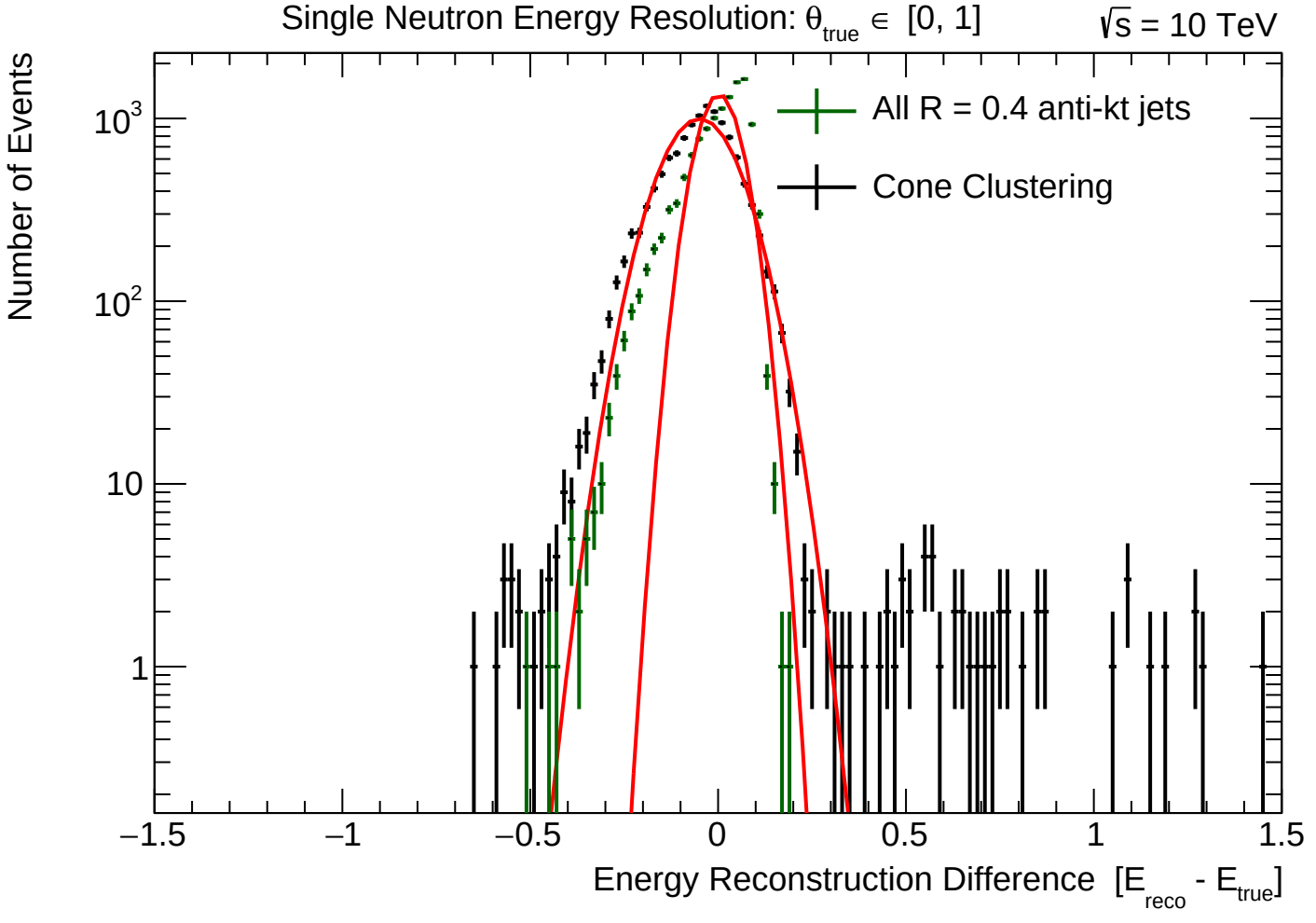

Single Neutron Energy Resolution: $E_{true} \in [950, 1000]$ $\sqrt{s}$ = 10 TeV
R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

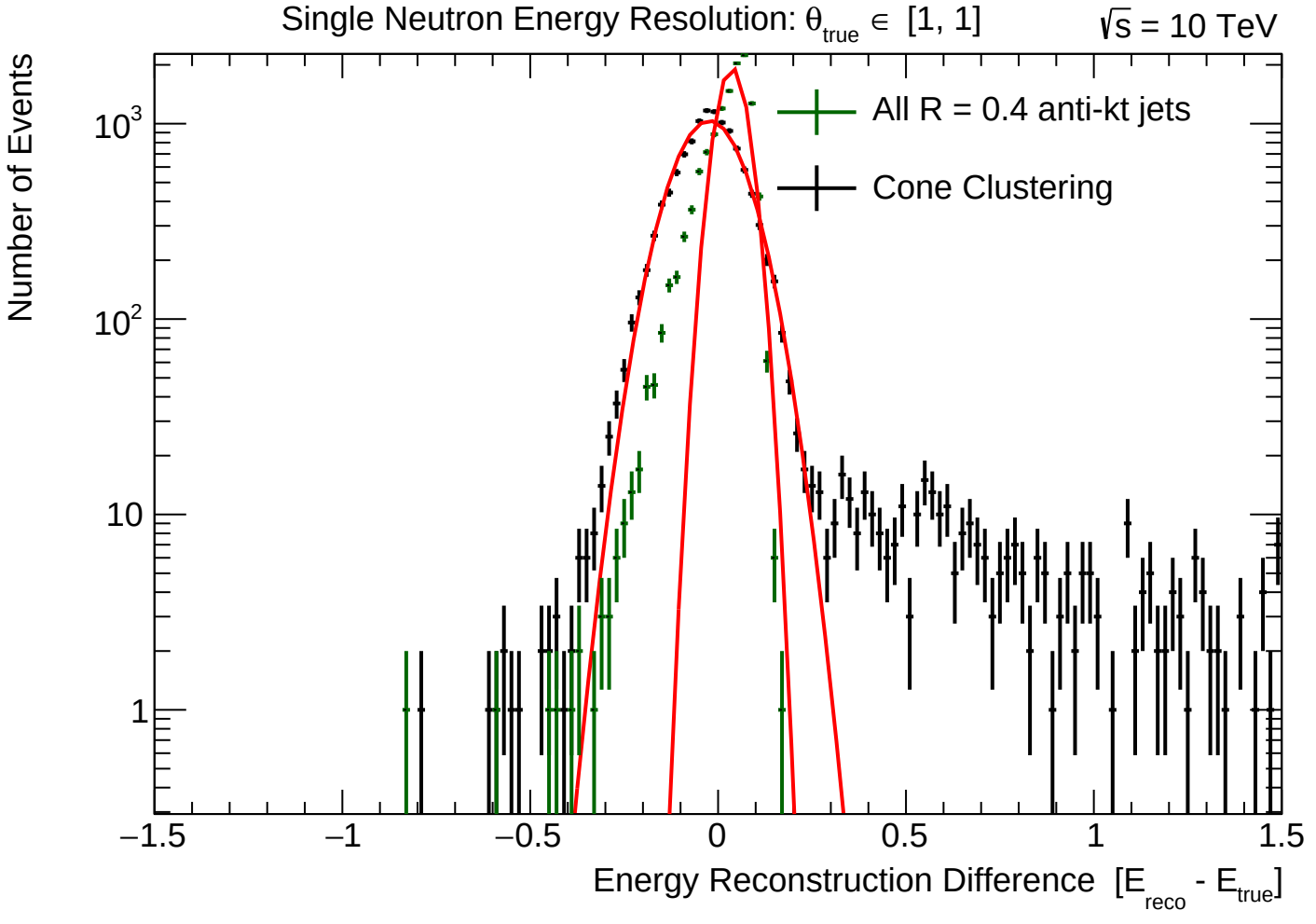
Theta Fits

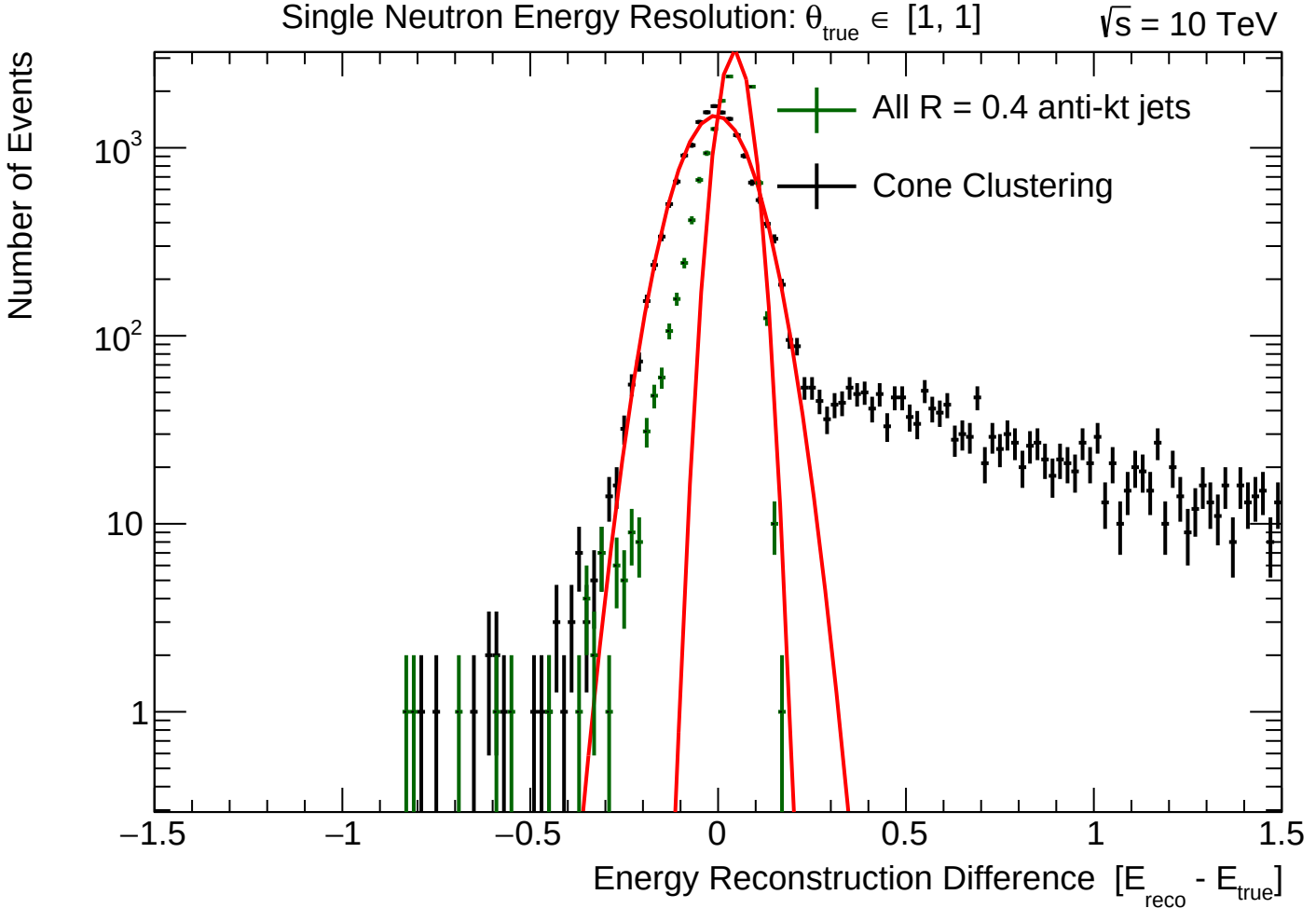

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

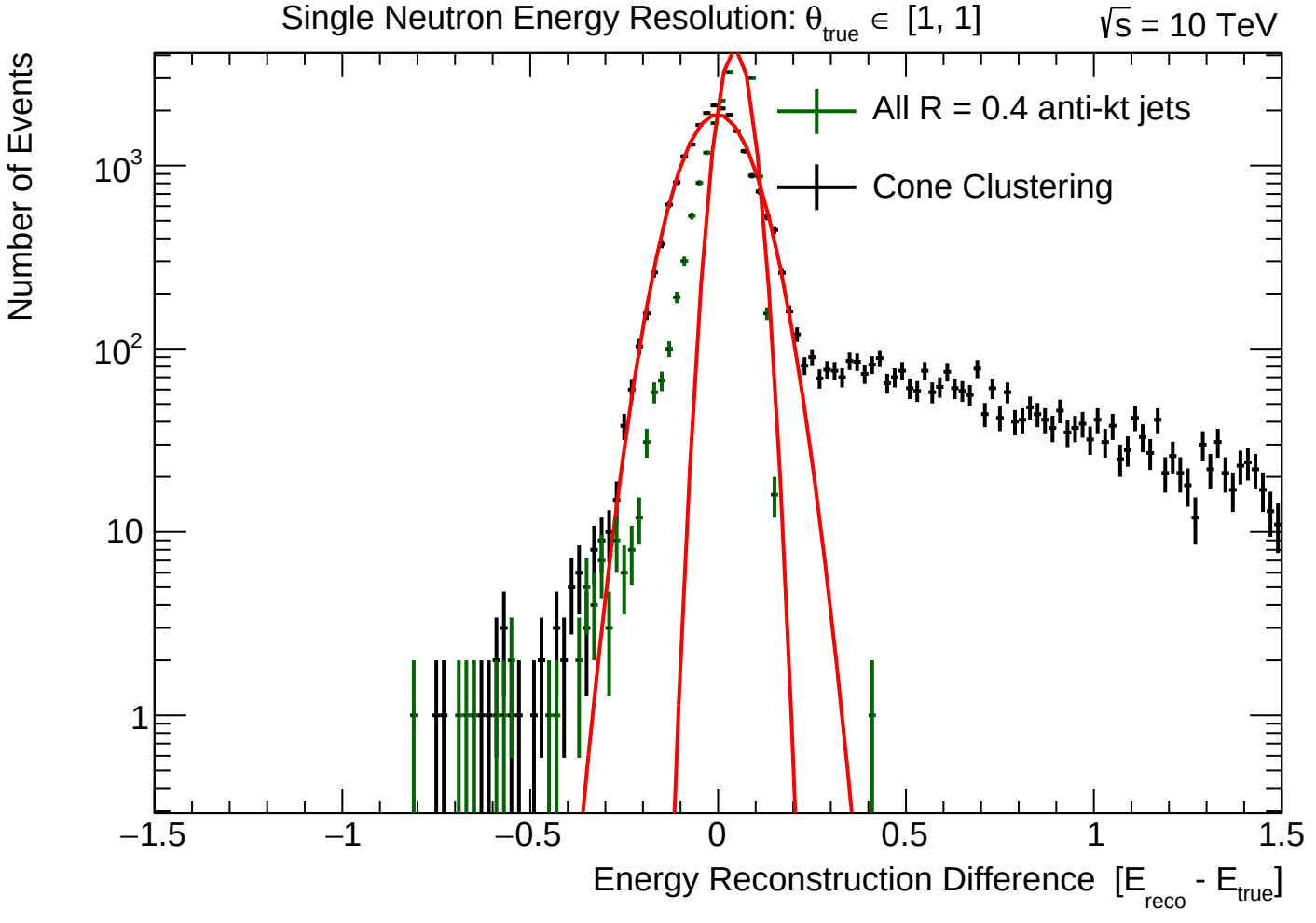

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

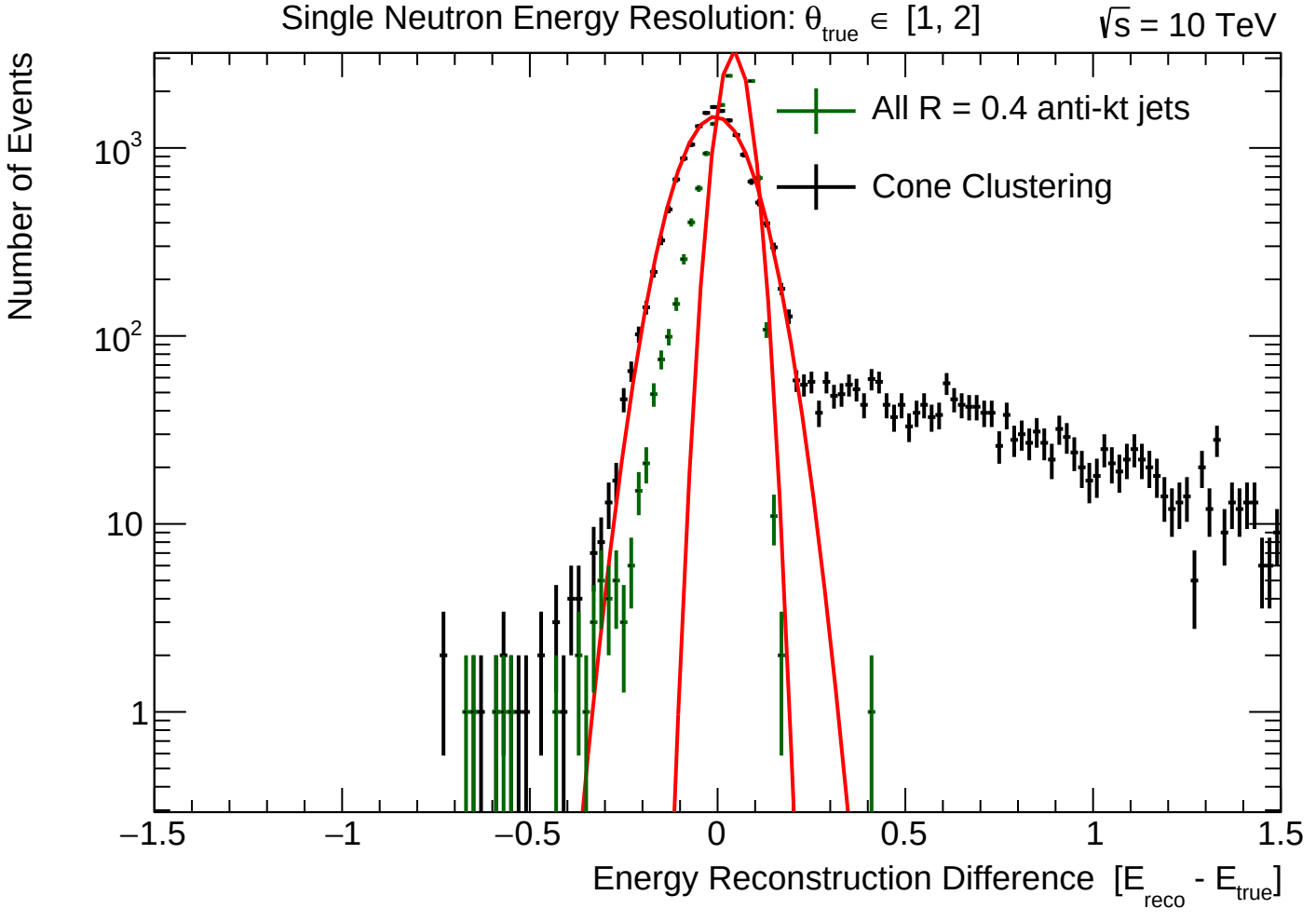

Single Neutron Energy Resolution: $\theta_{true} \in [0, 0]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

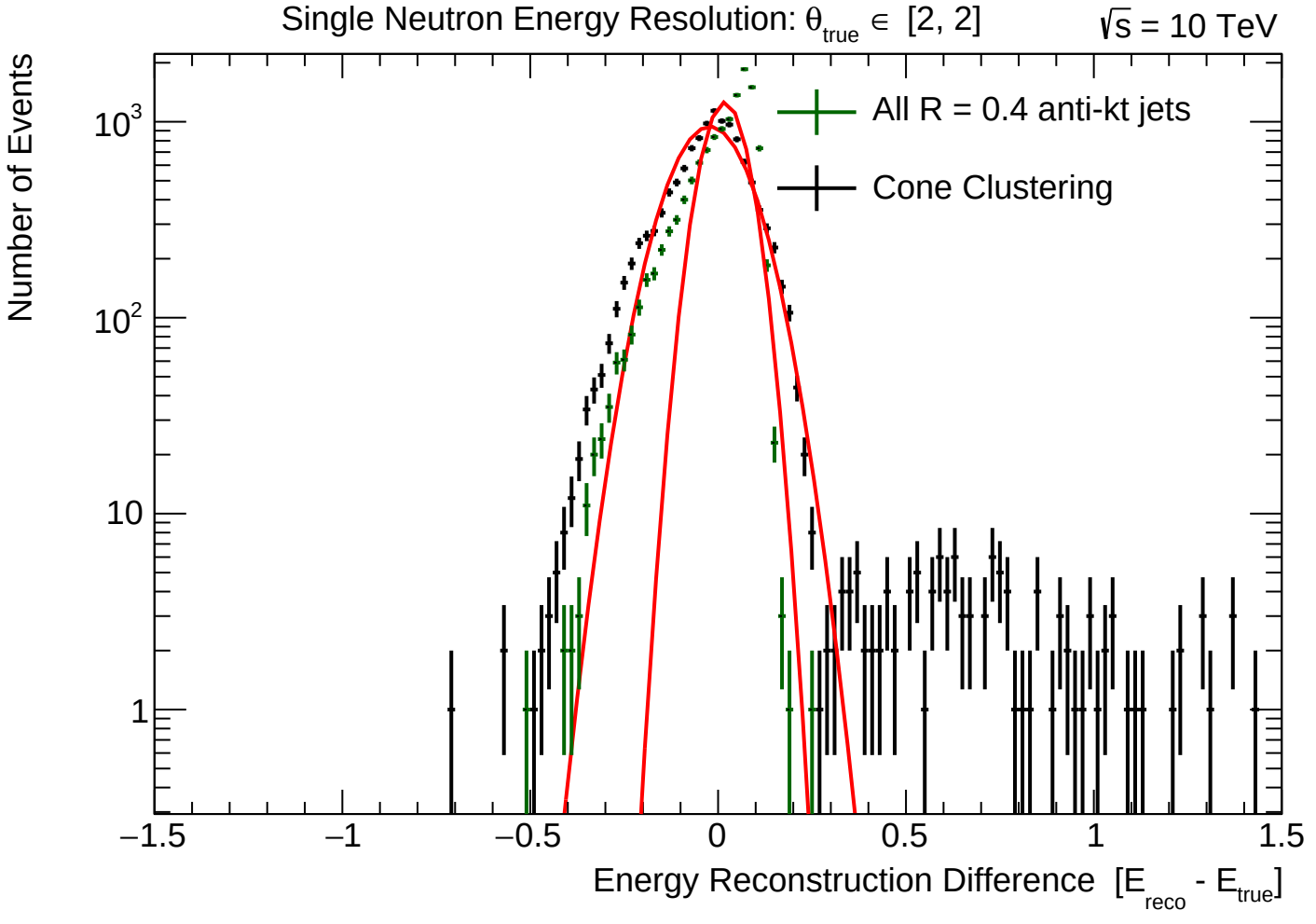

Single Neutron Energy Resolution: $\theta_{true} \in [0, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

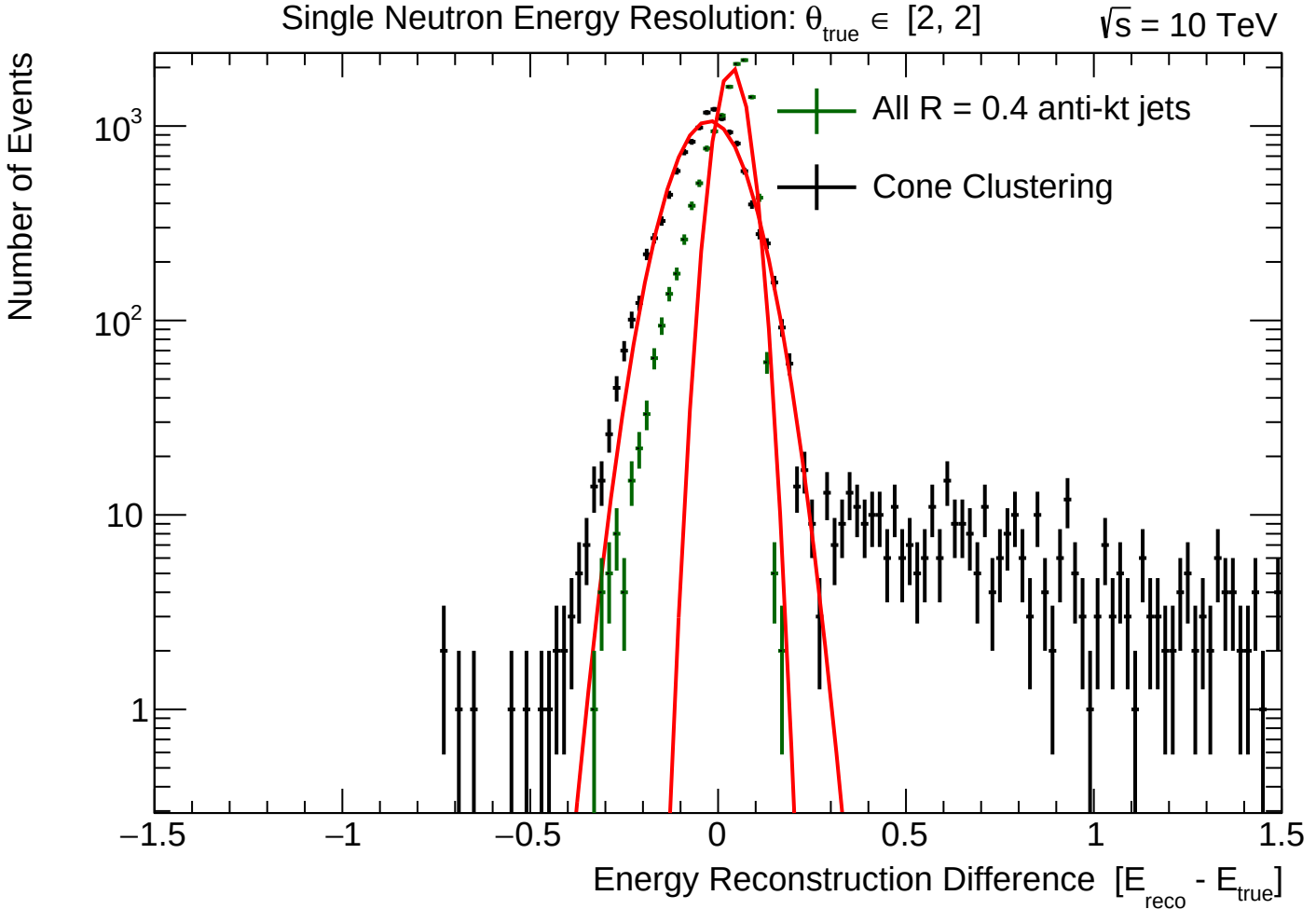

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

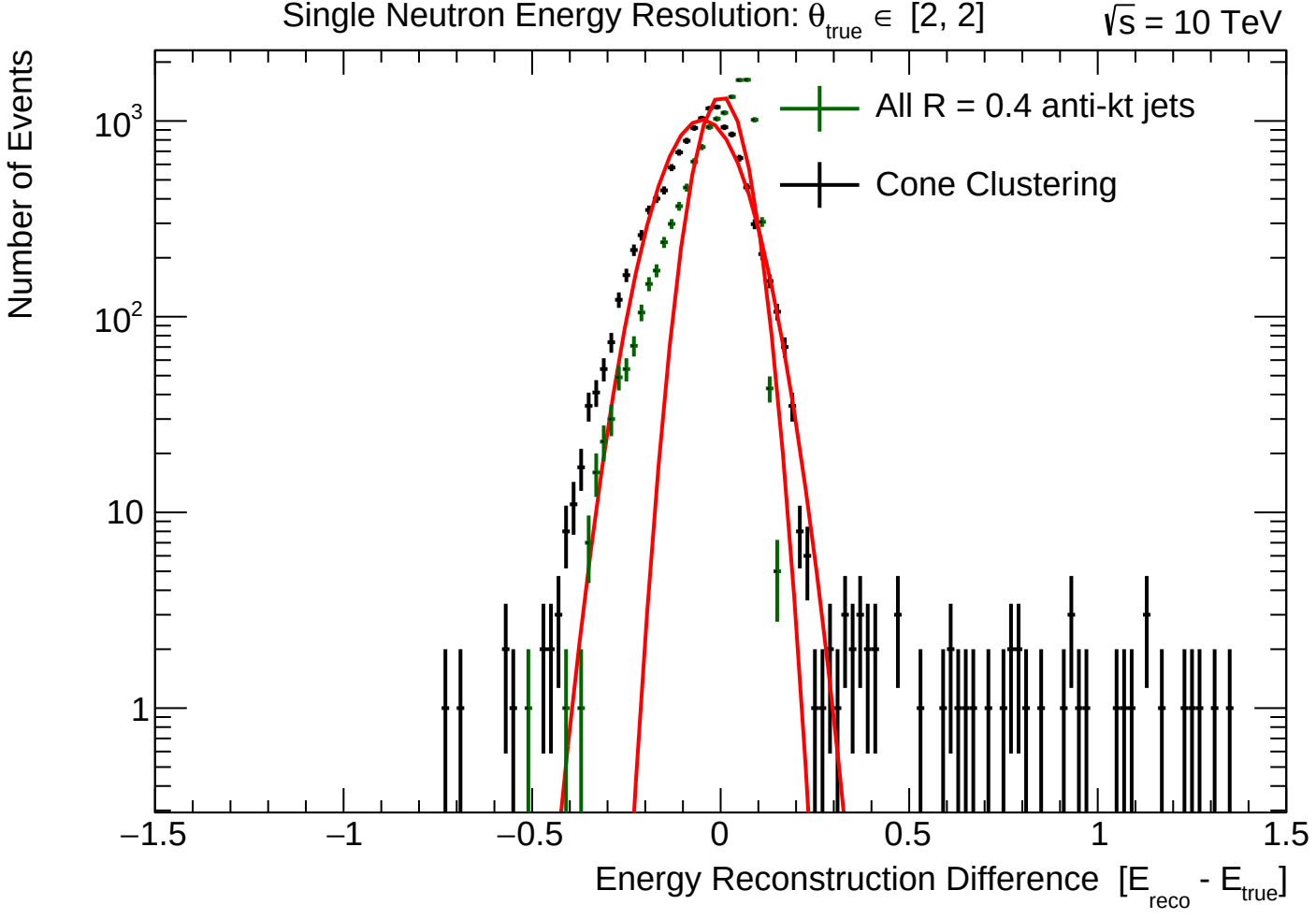

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$

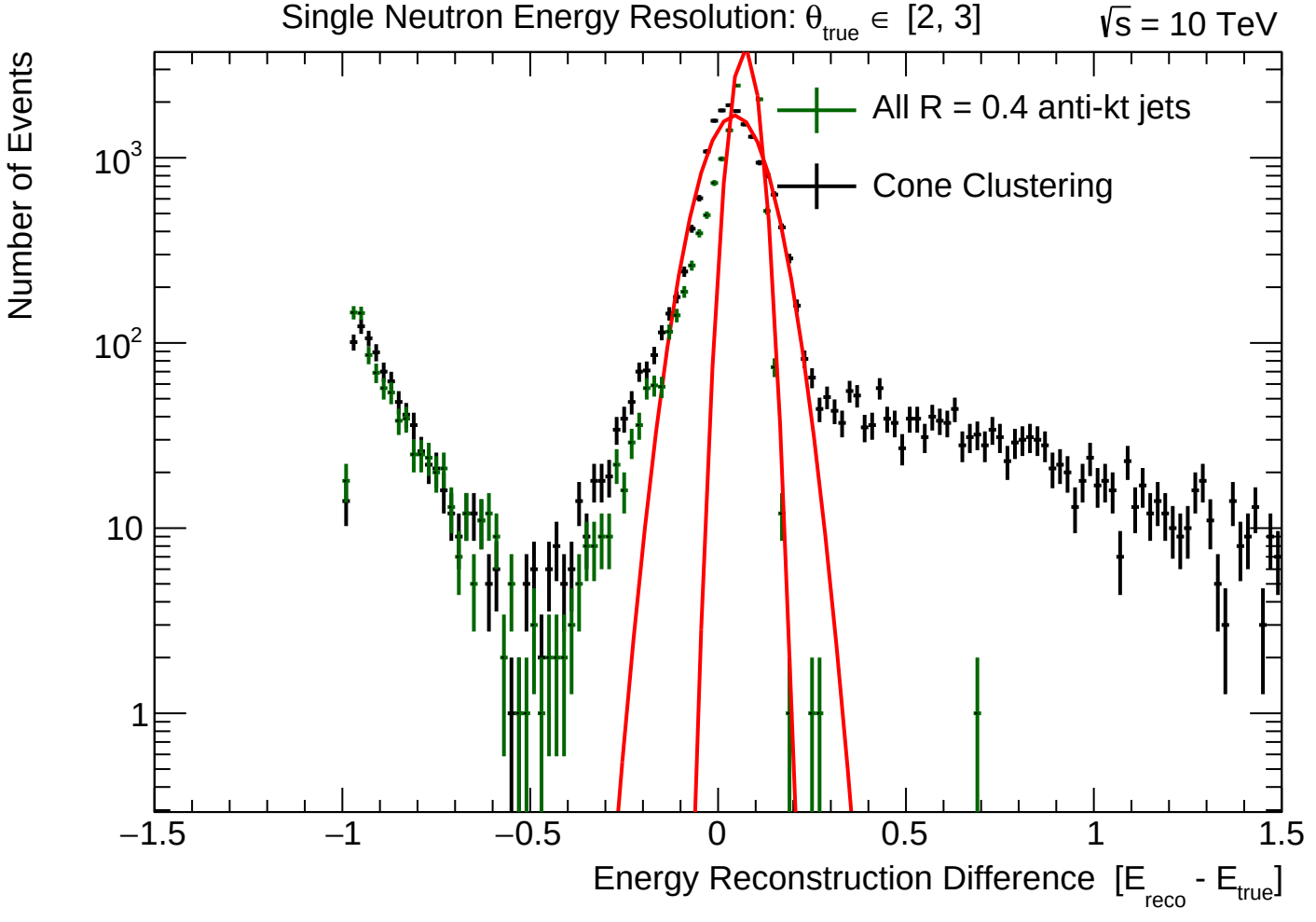

Single Neutron Energy Resolution: $\theta_{true} \in [1, 1]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [1, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [2, 2]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$


Single Neutron Energy Resolution: $\theta_{true} \in [2, 3]$
$\sqrt{s}$ = 10 TeV
All R = 0.4 anti-kt jets
Cone Clustering
Number of Events
10^3
10^2
10
1
−1.5
−1
−0.5
0
0.5
1
1.5
Energy Reconstruction Difference $[E_{reco} - E_{true}]$