

Closer look at misalignments

Noam Tal Hod

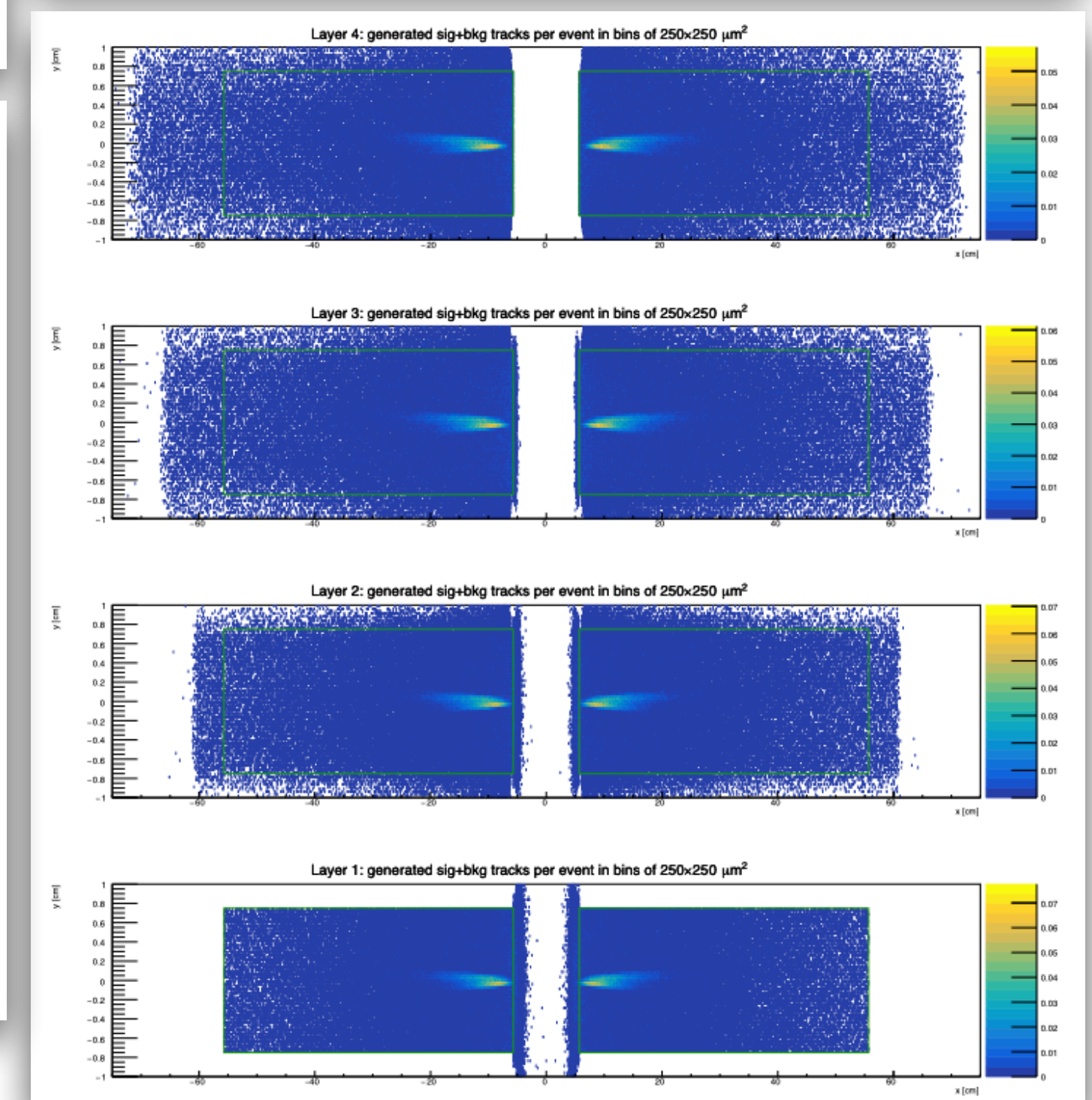
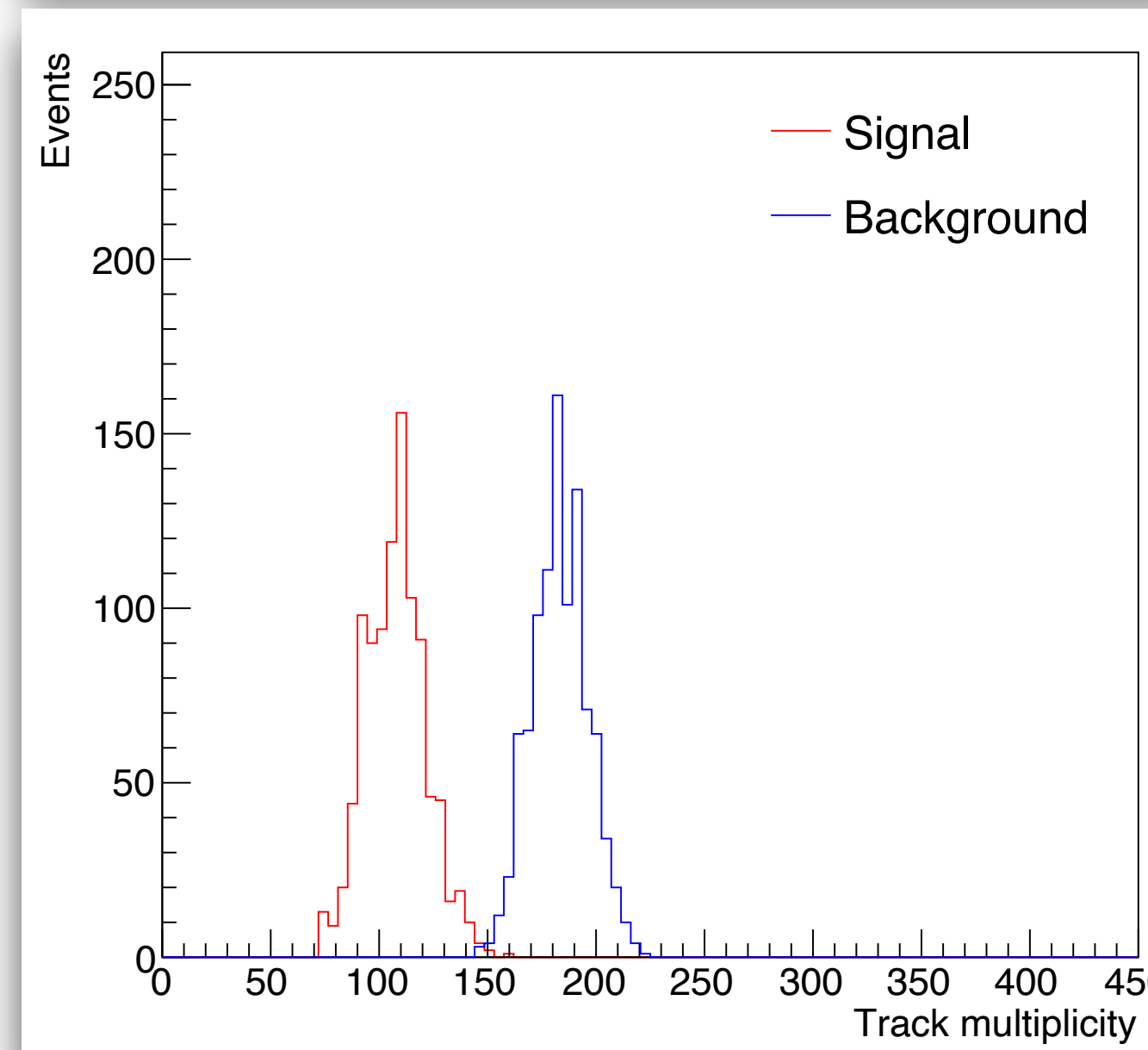
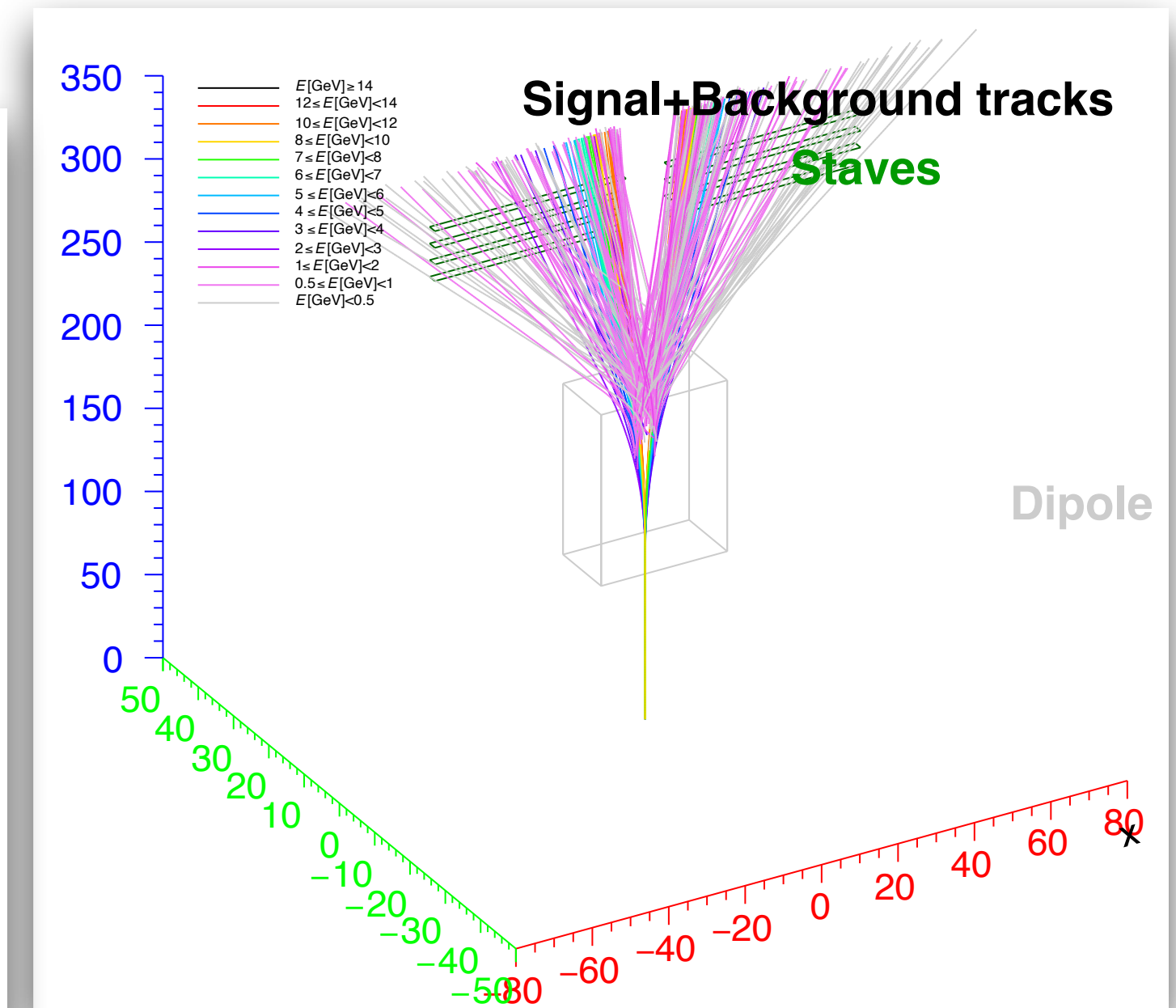
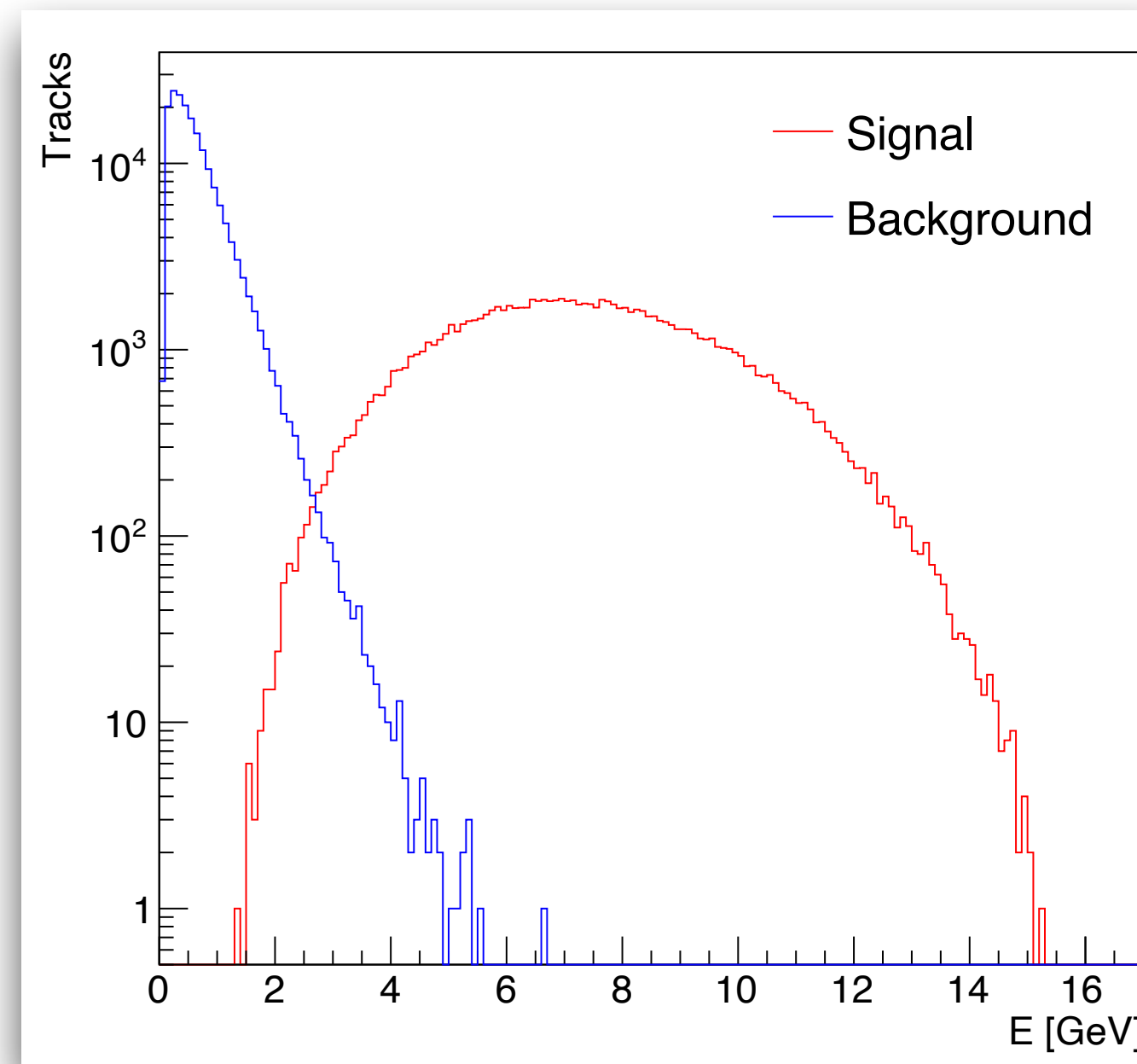
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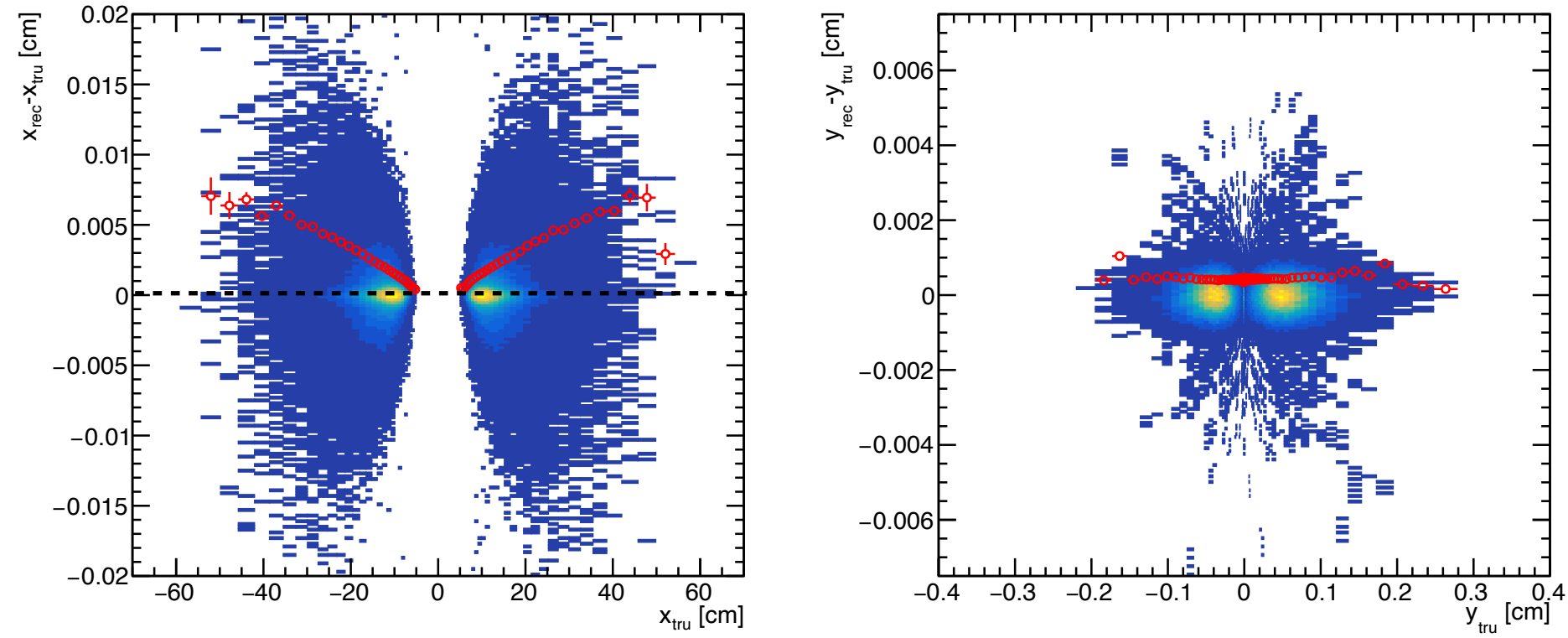
Sep 14 2020

Intro

- ✿ See background slides from [May](#)
- ✿ Now: using the full stat 980 BPPP events from the previous (2019) signal campaign
- ✿ Assuming that
 - ✿ the tracker is perfectly aligned on its tray
 - ✿ can be measured to below $10\ \mu\text{m}$
- ✿ This study in practice:
 - ✿ the entire IP detector 3D position can be known to within $50\ \mu\text{m}$ (XFEL system)
 - ✿ shift all clusters by +50 and 250 μm along x and y
 - ✿ rerun reco and compare to $\Delta x = \Delta y = 0$
 - ✿ distributions, resolutions & efficiency
 - ✿ look separately on e^- and e^+

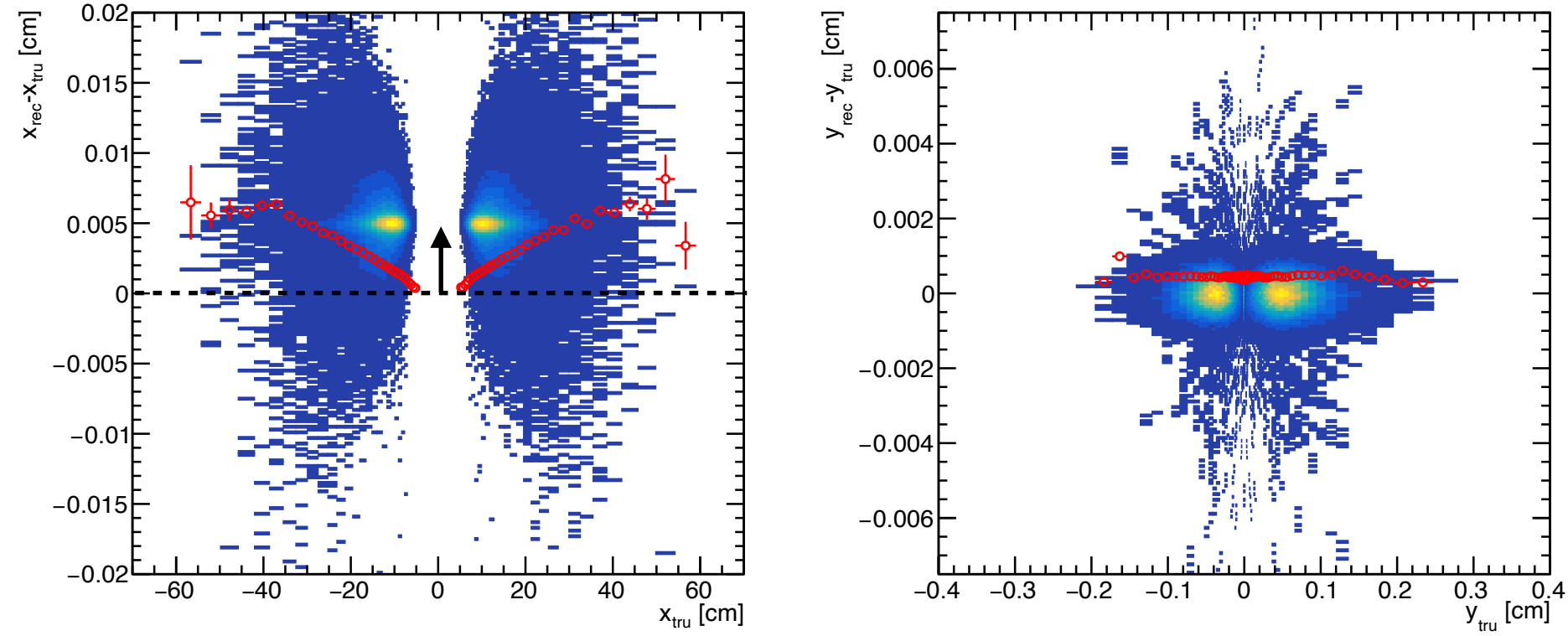
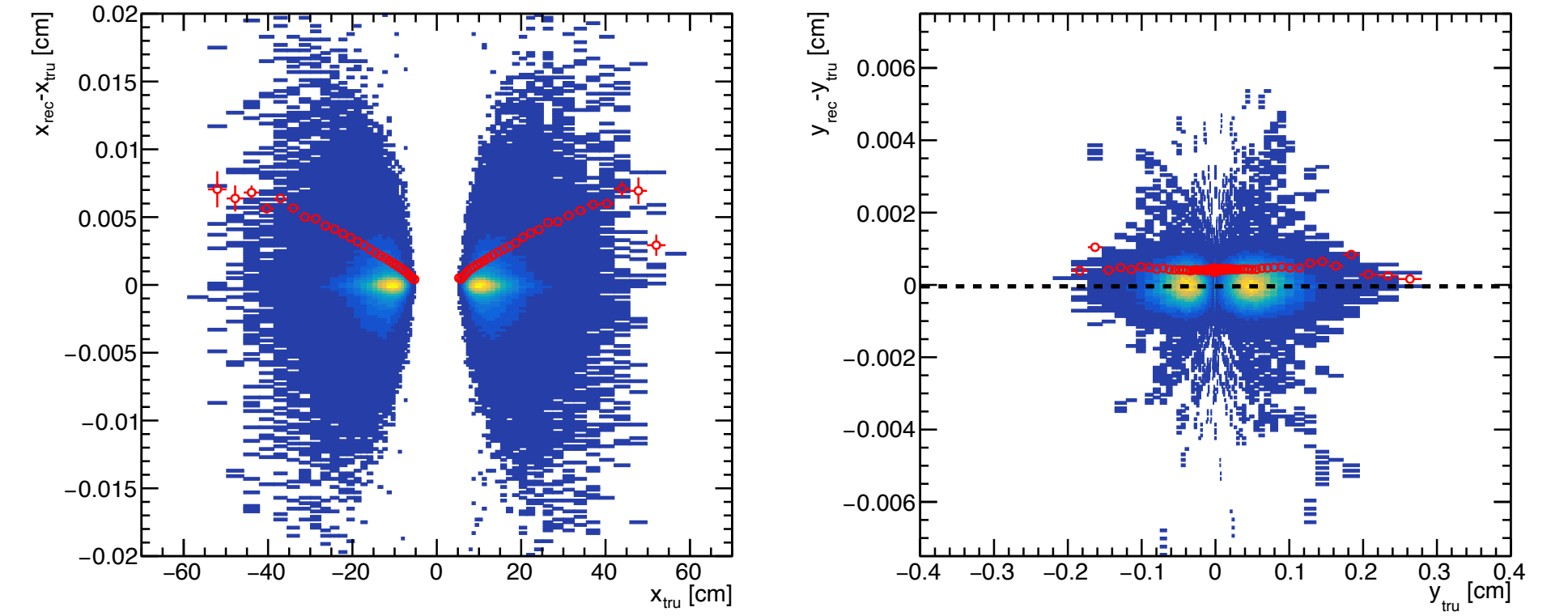


vary all clusters' x position

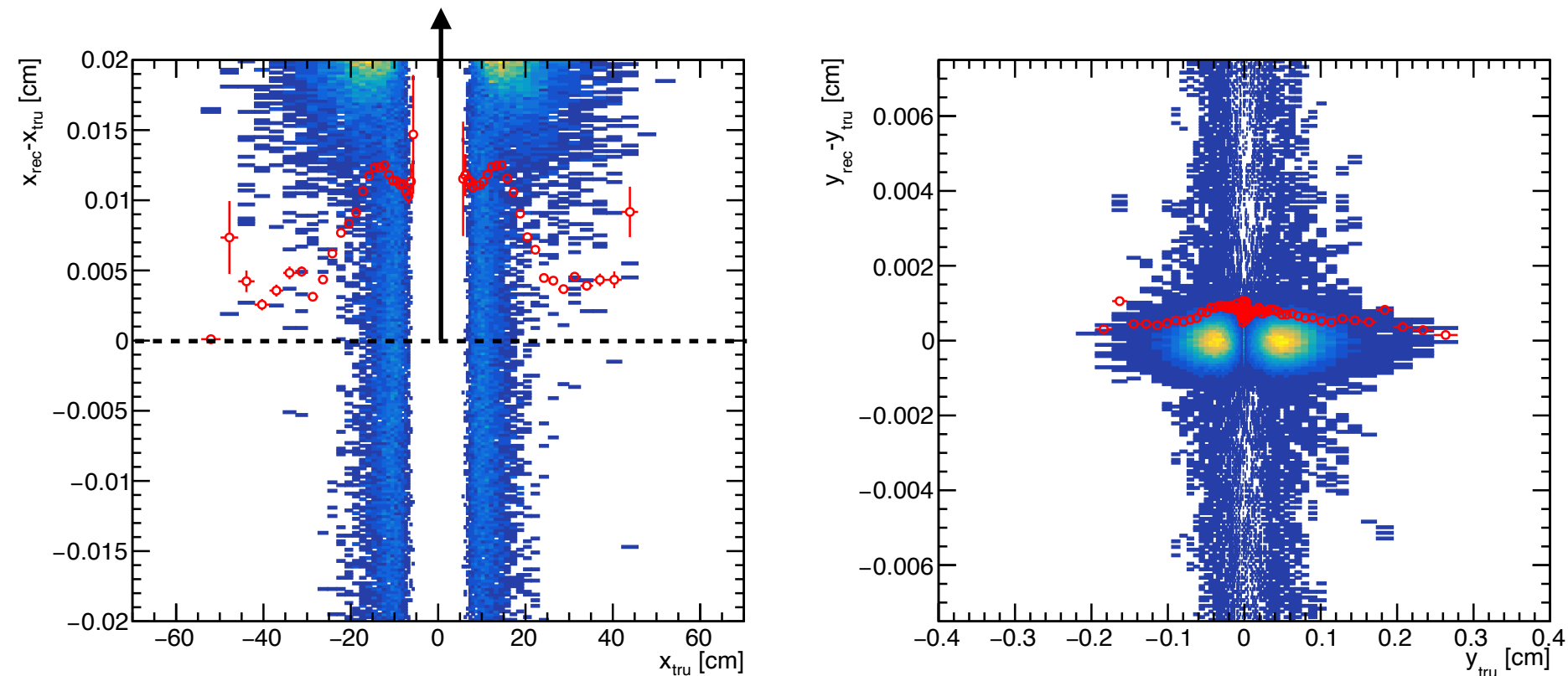
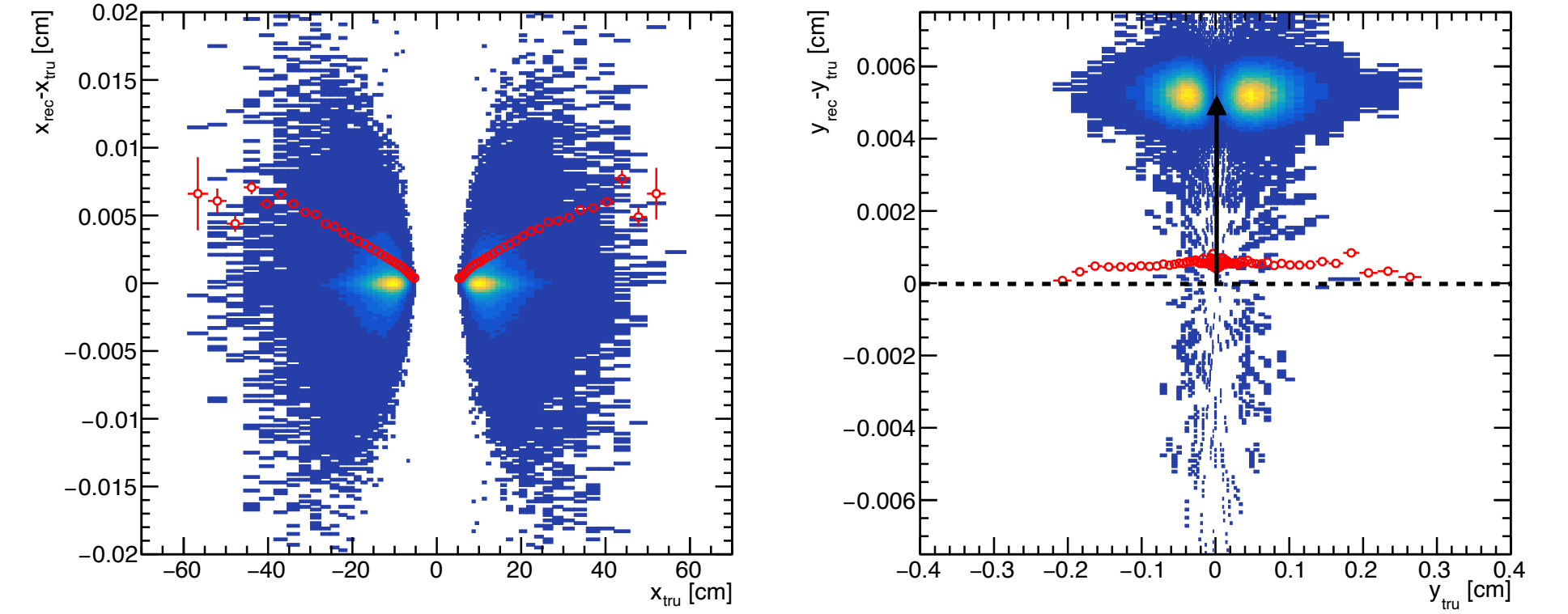


←Nominal→

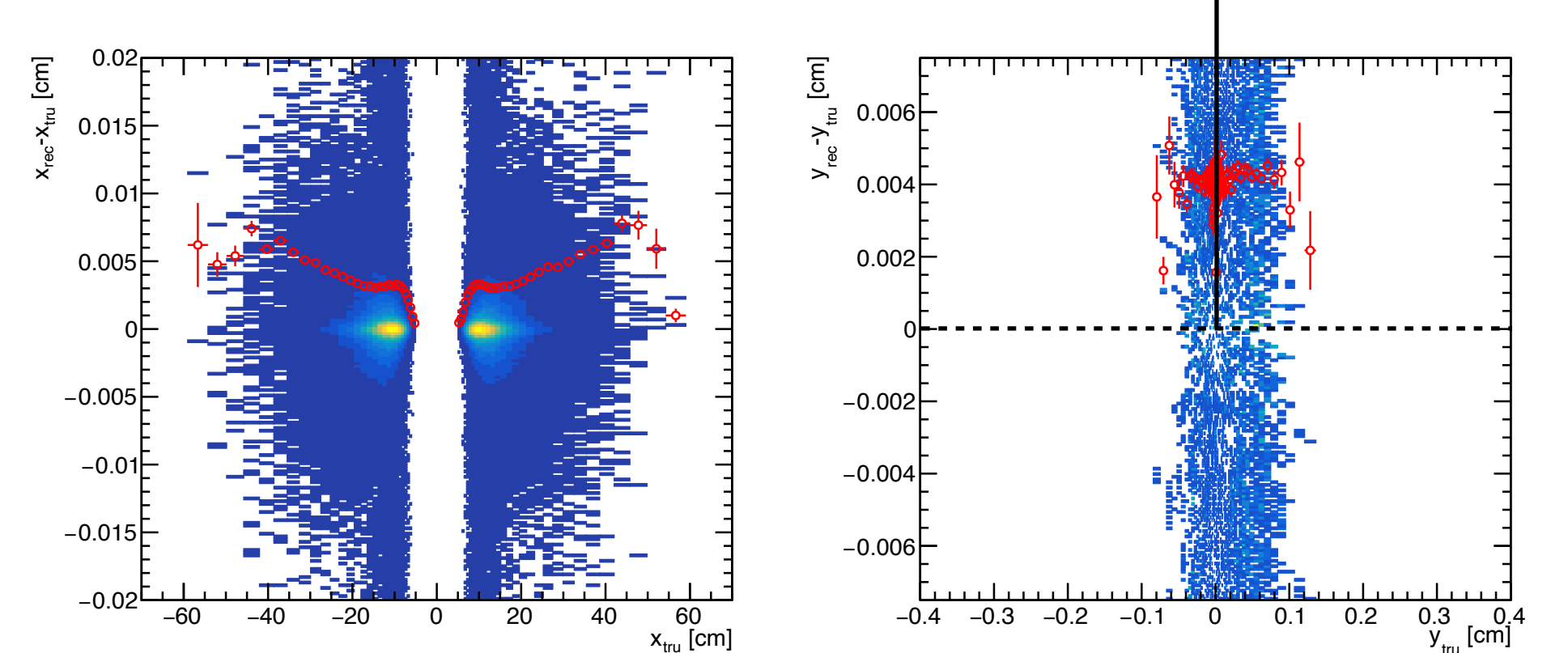
vary all clusters' y position

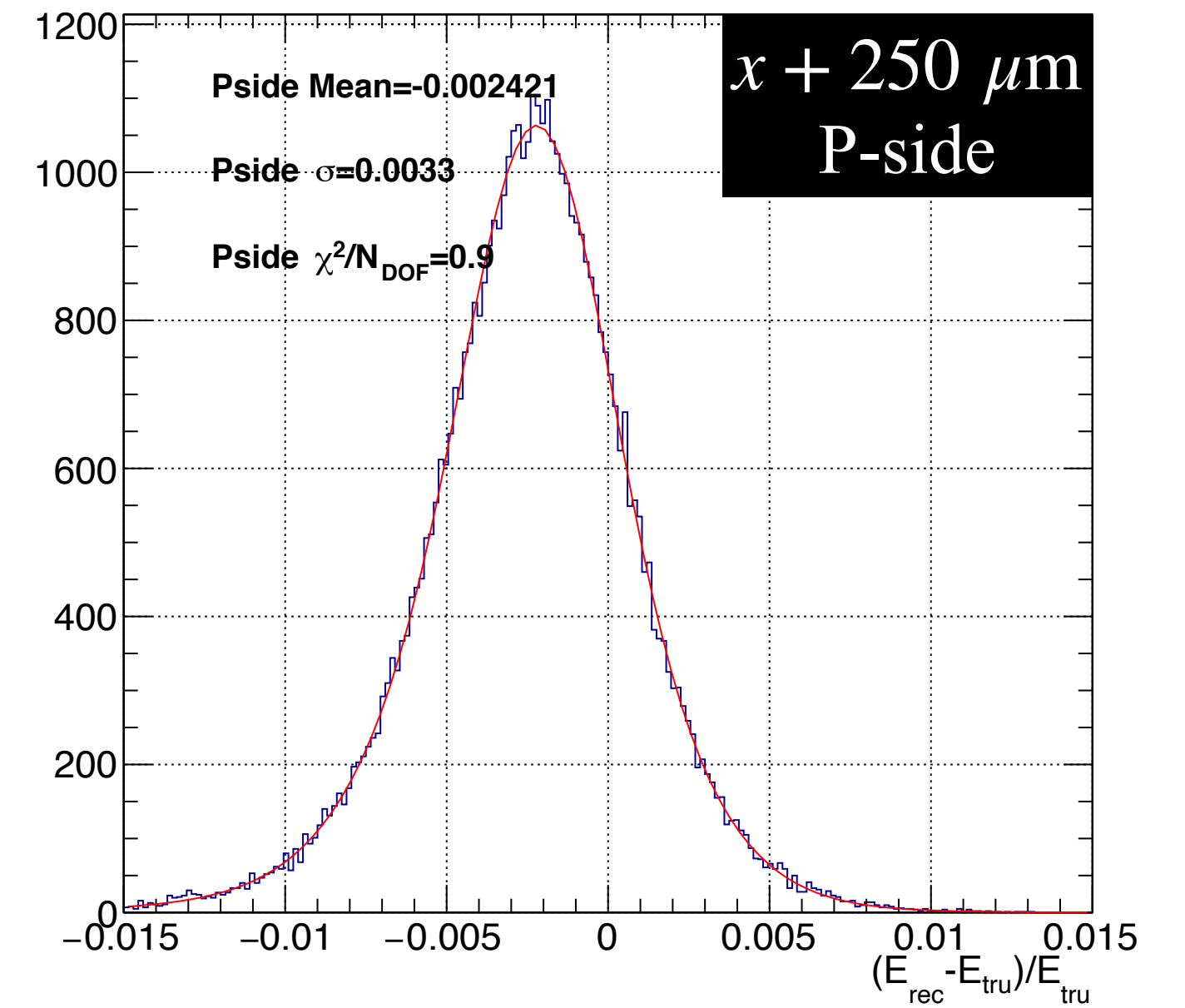
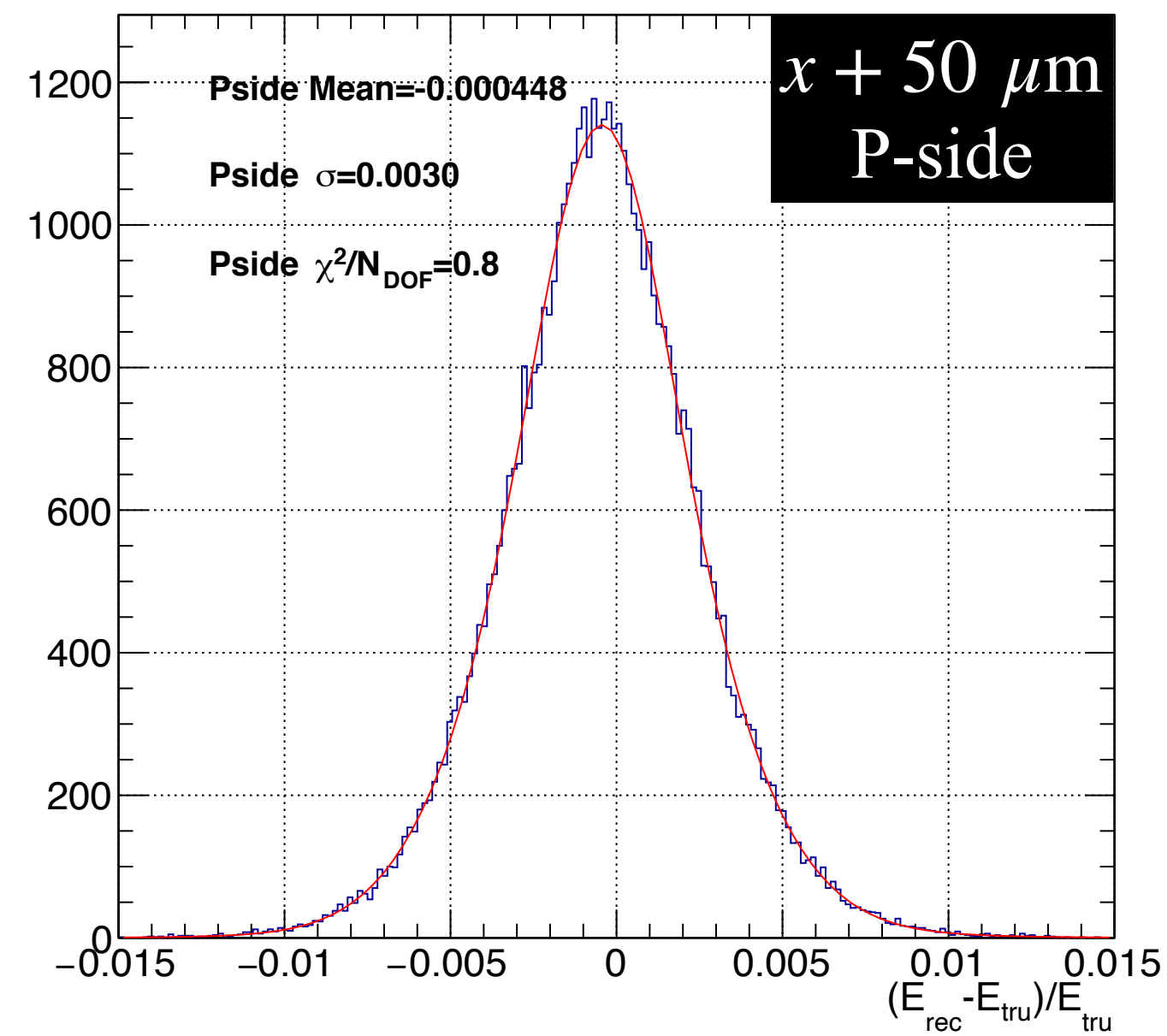
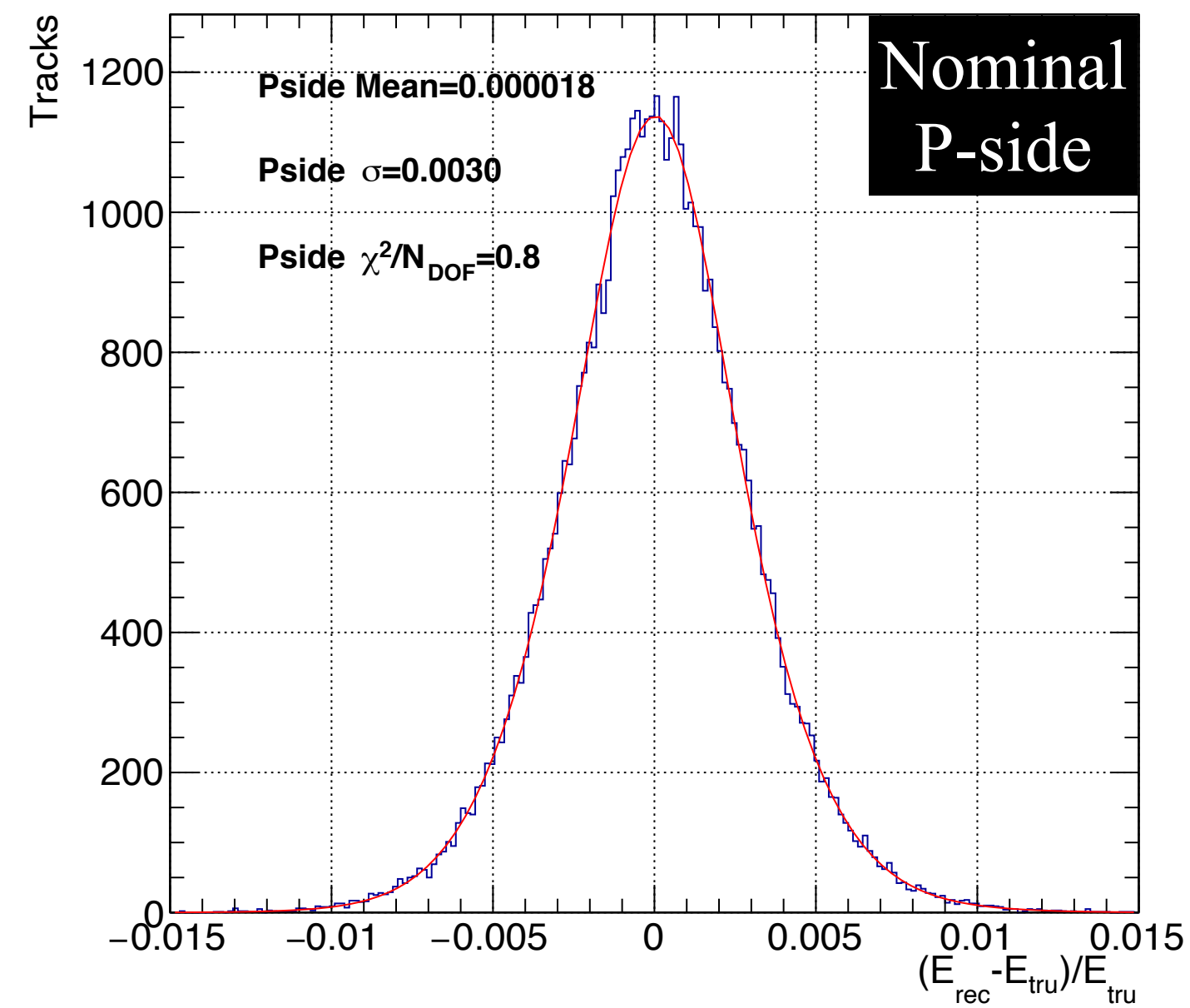
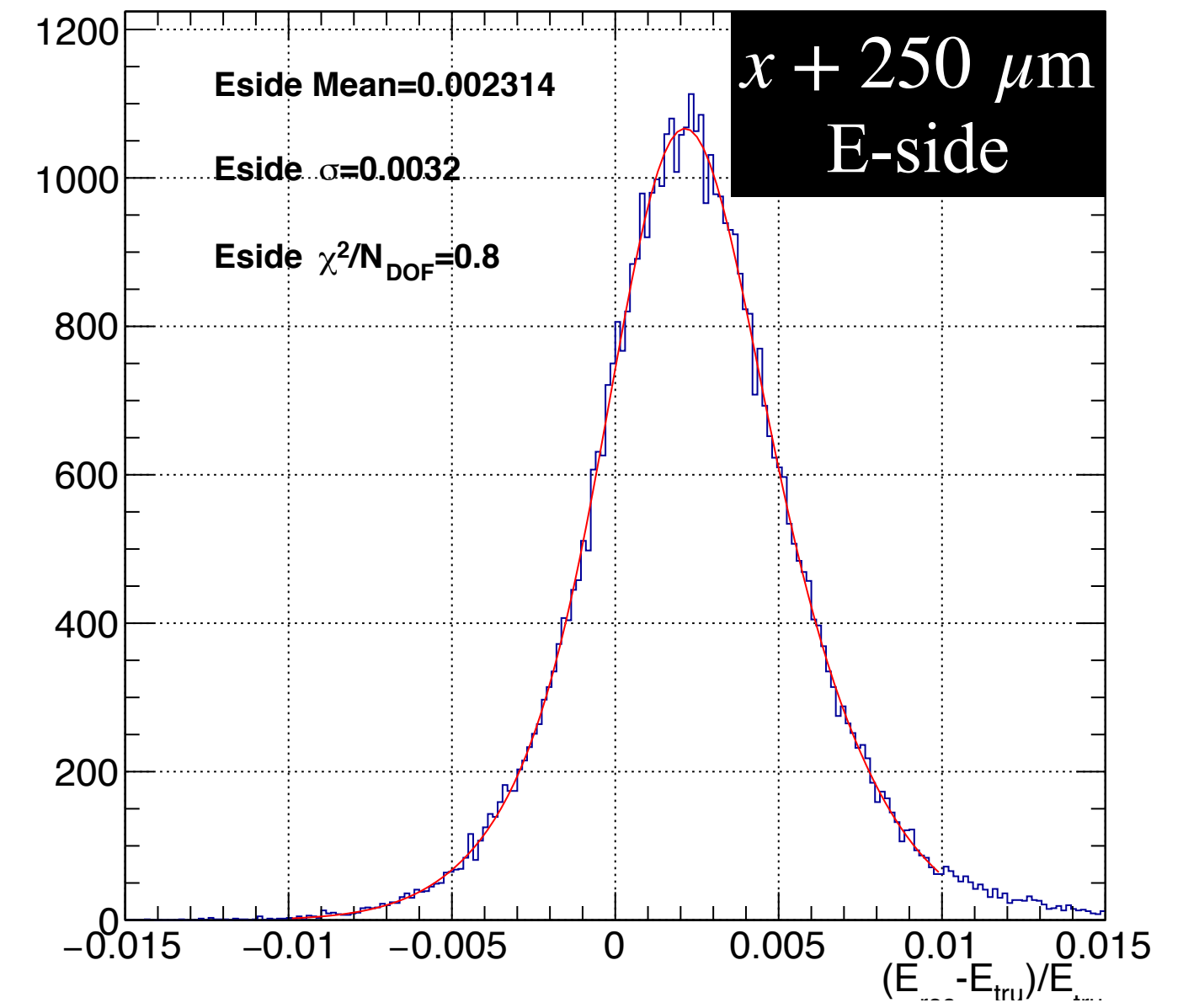
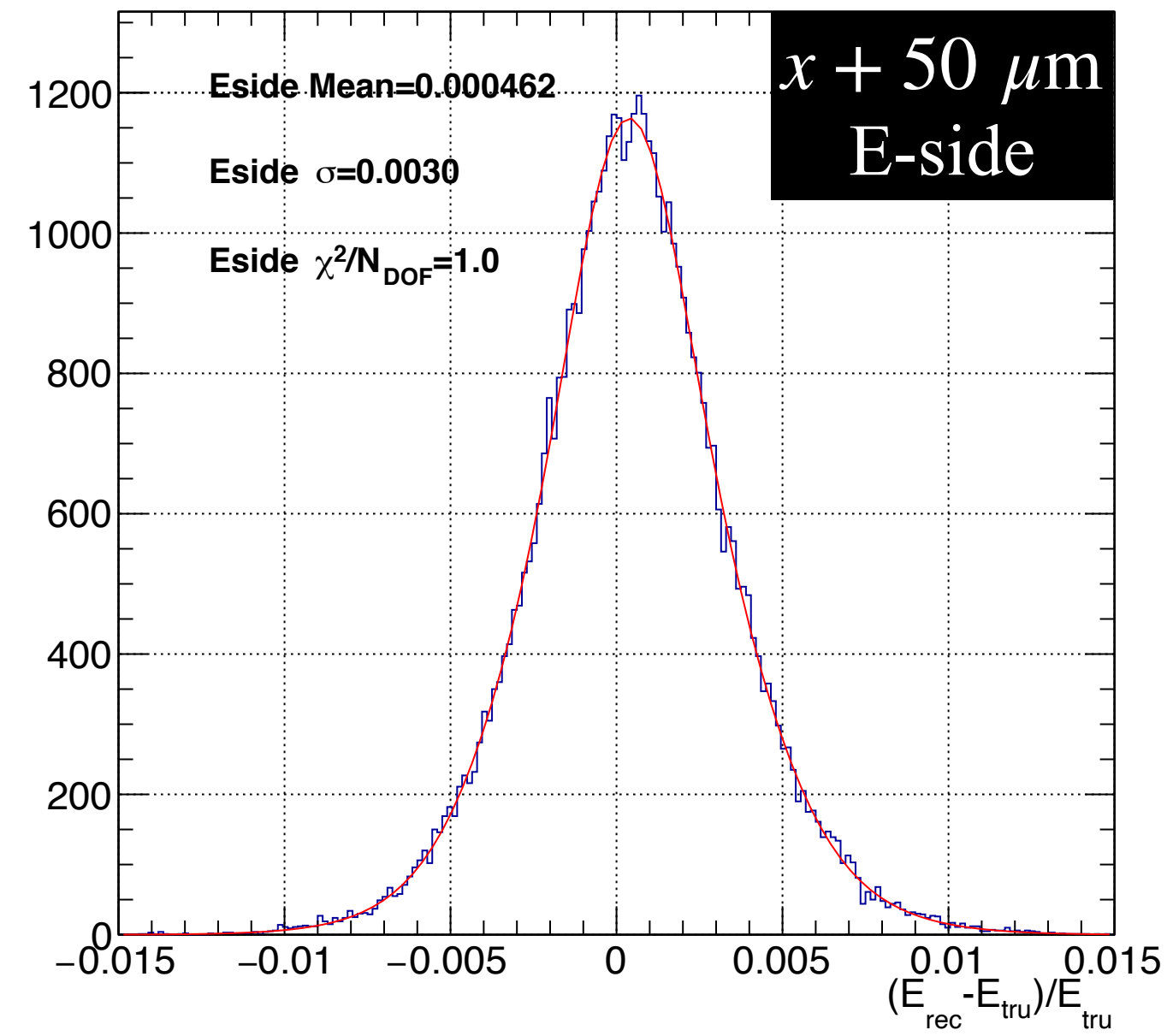
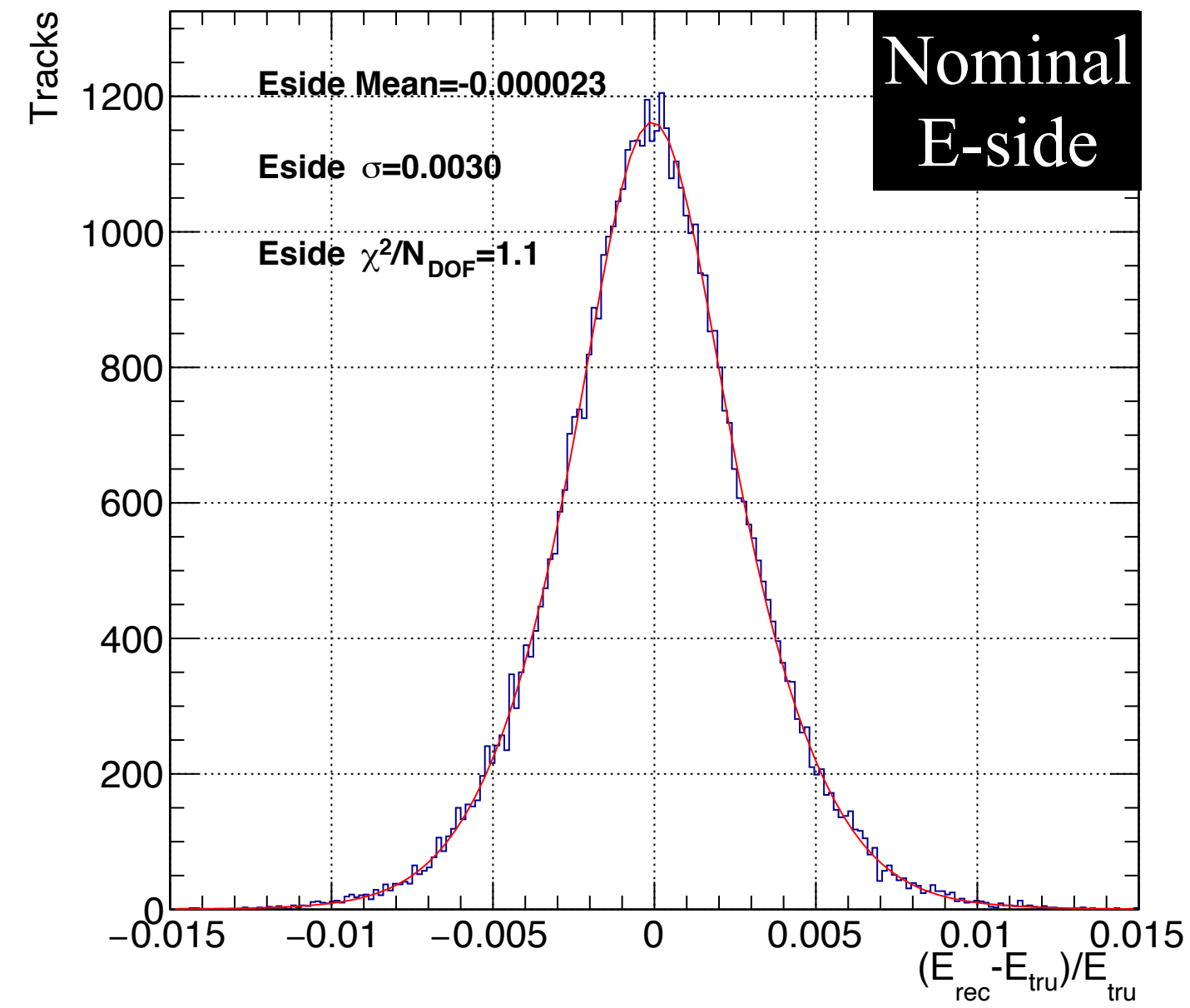


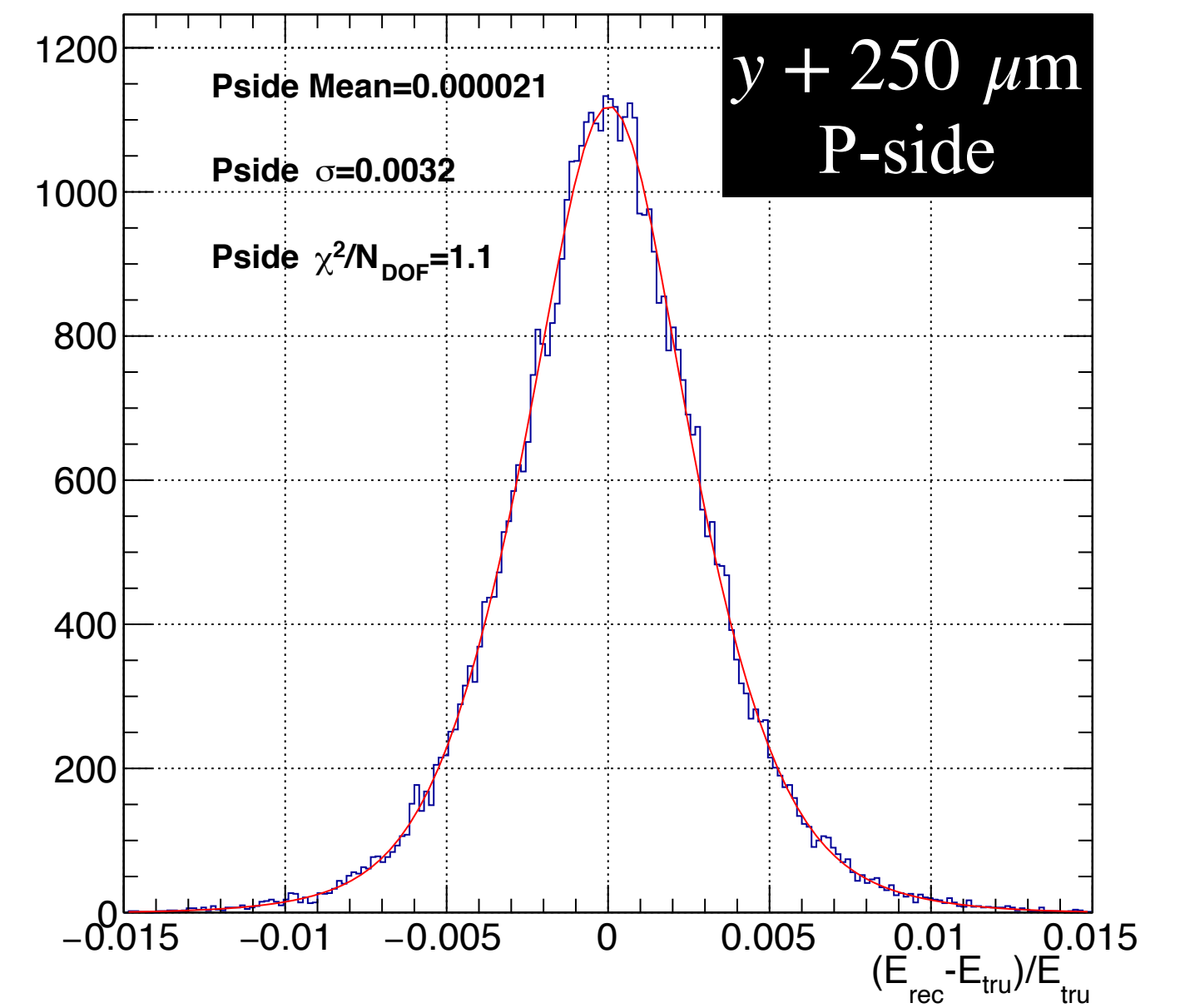
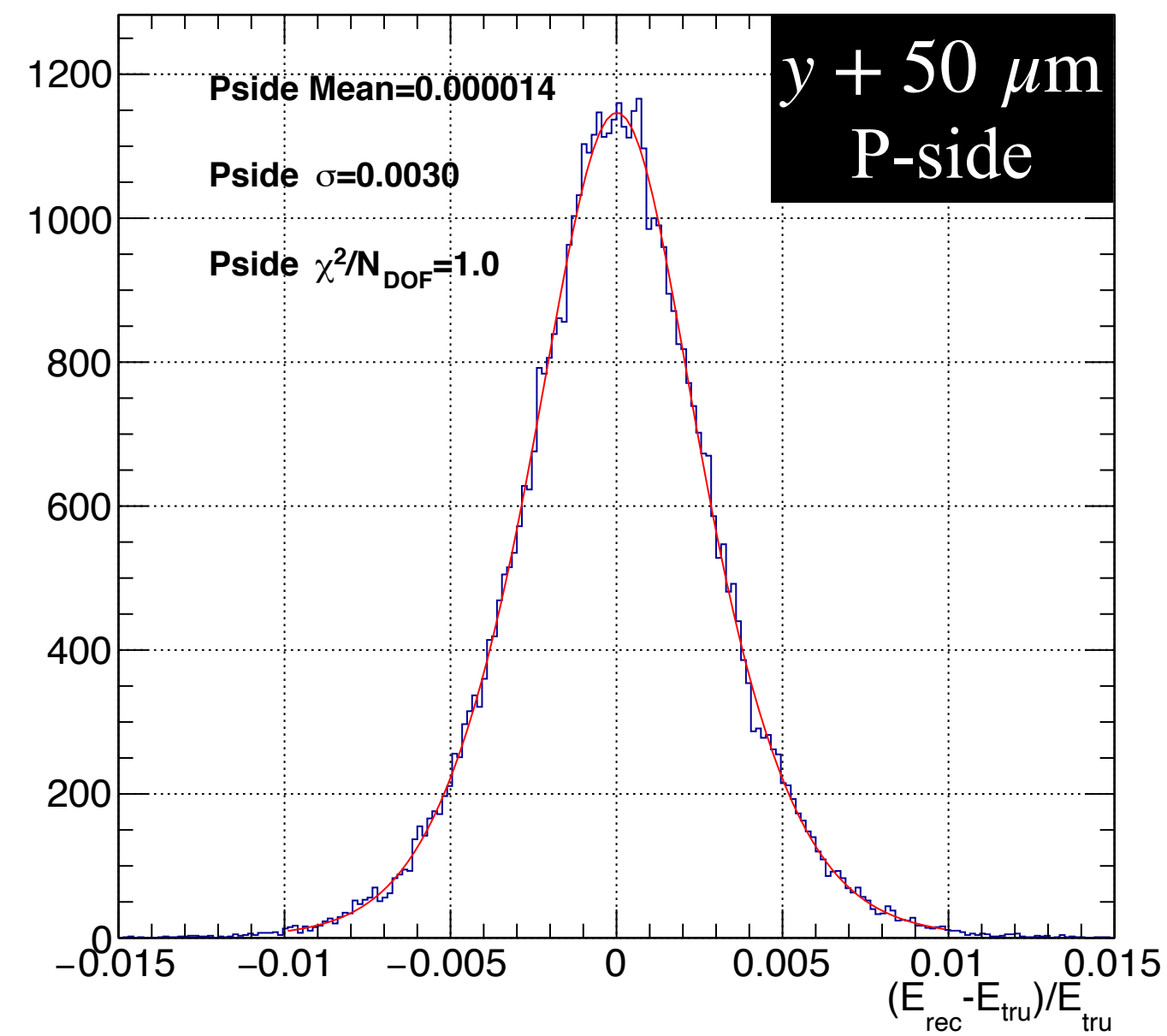
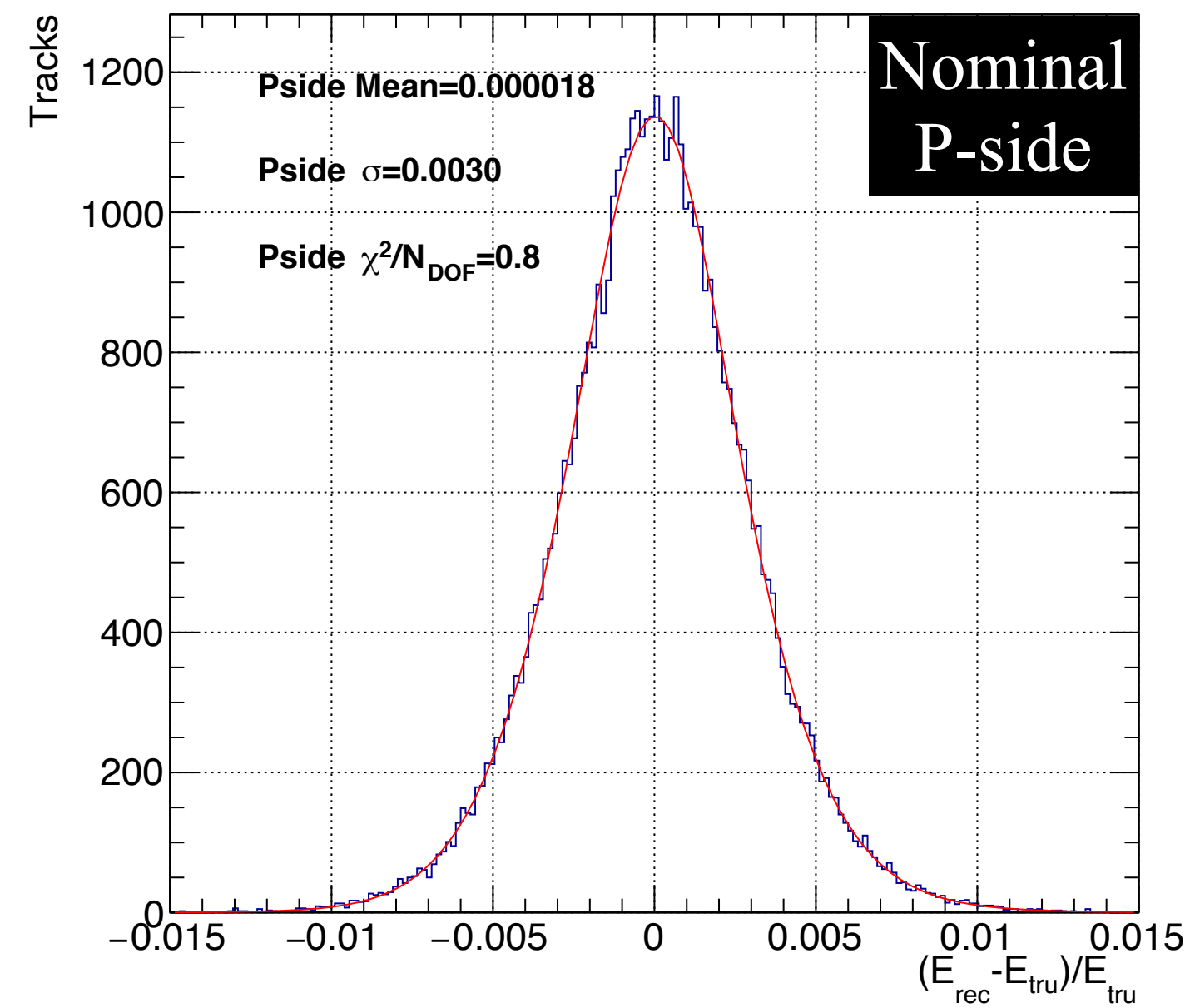
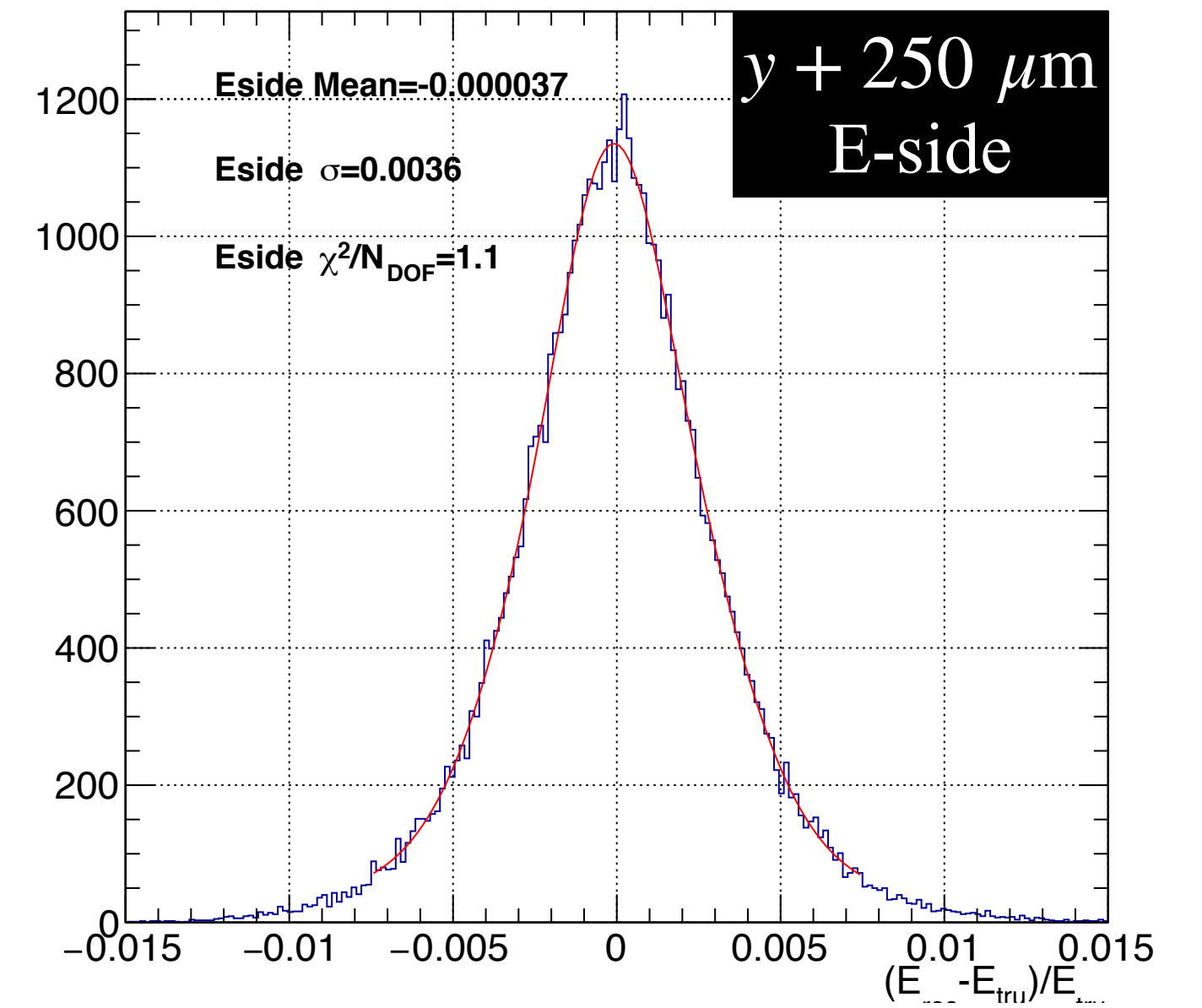
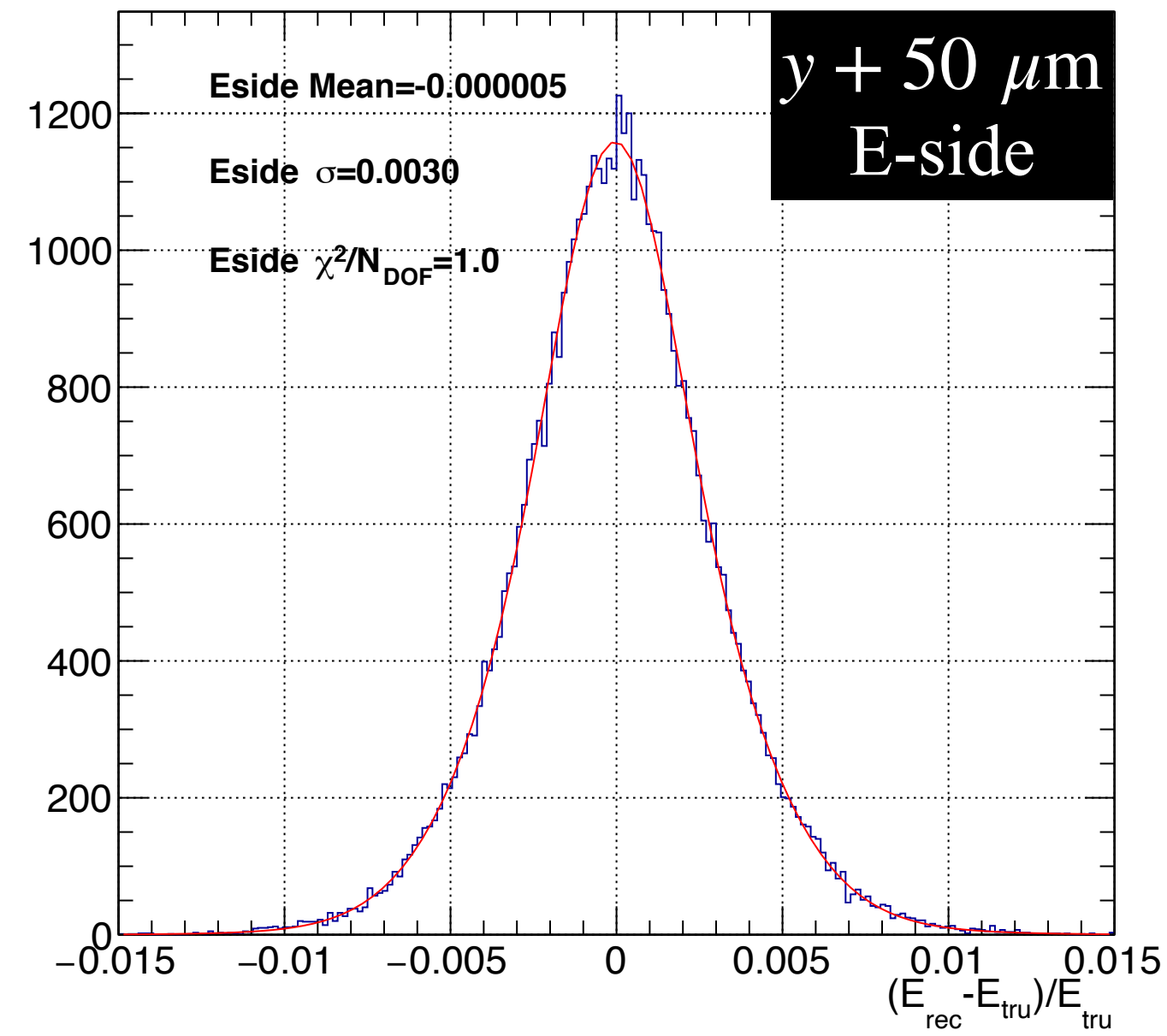
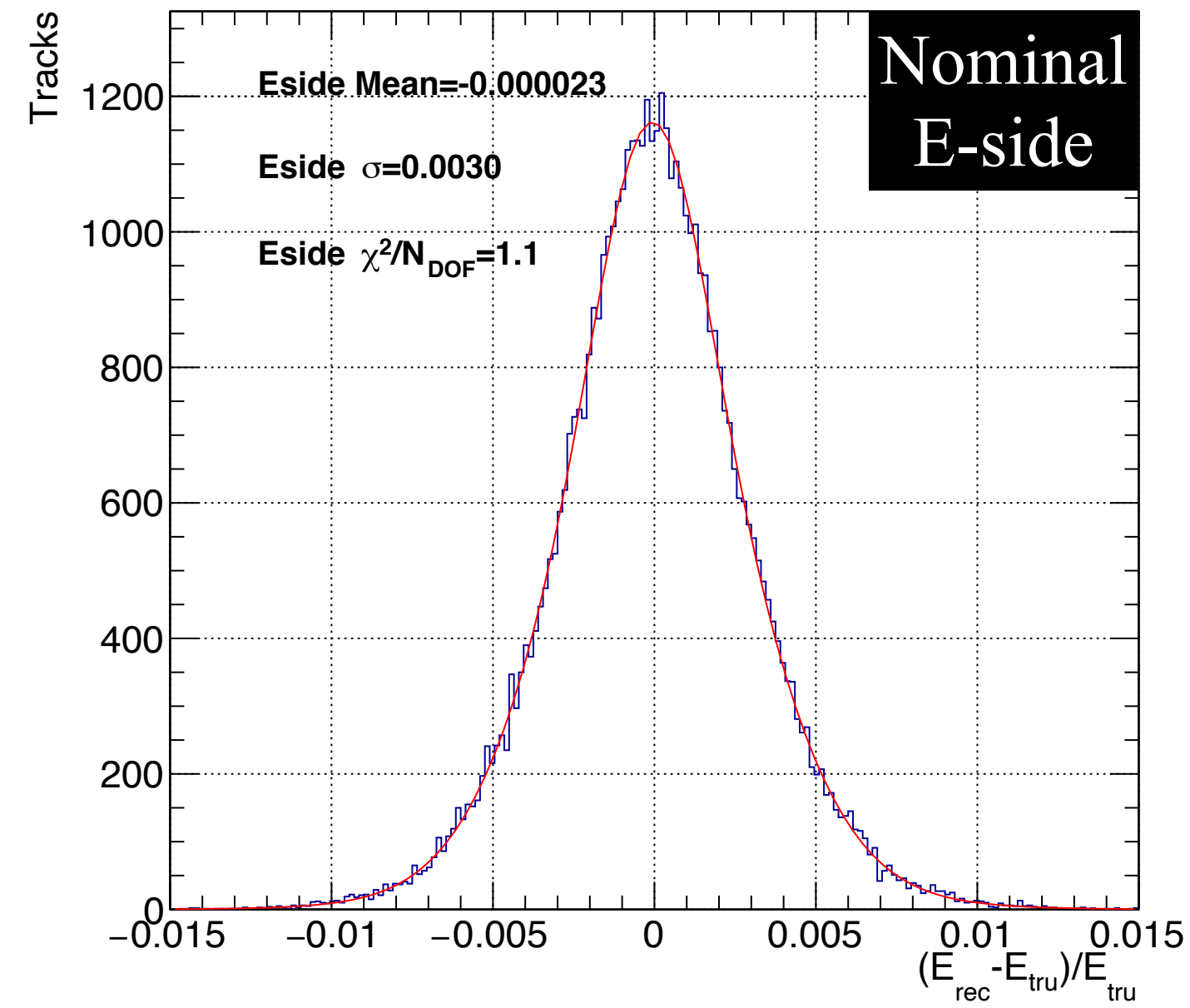
←50 μm →



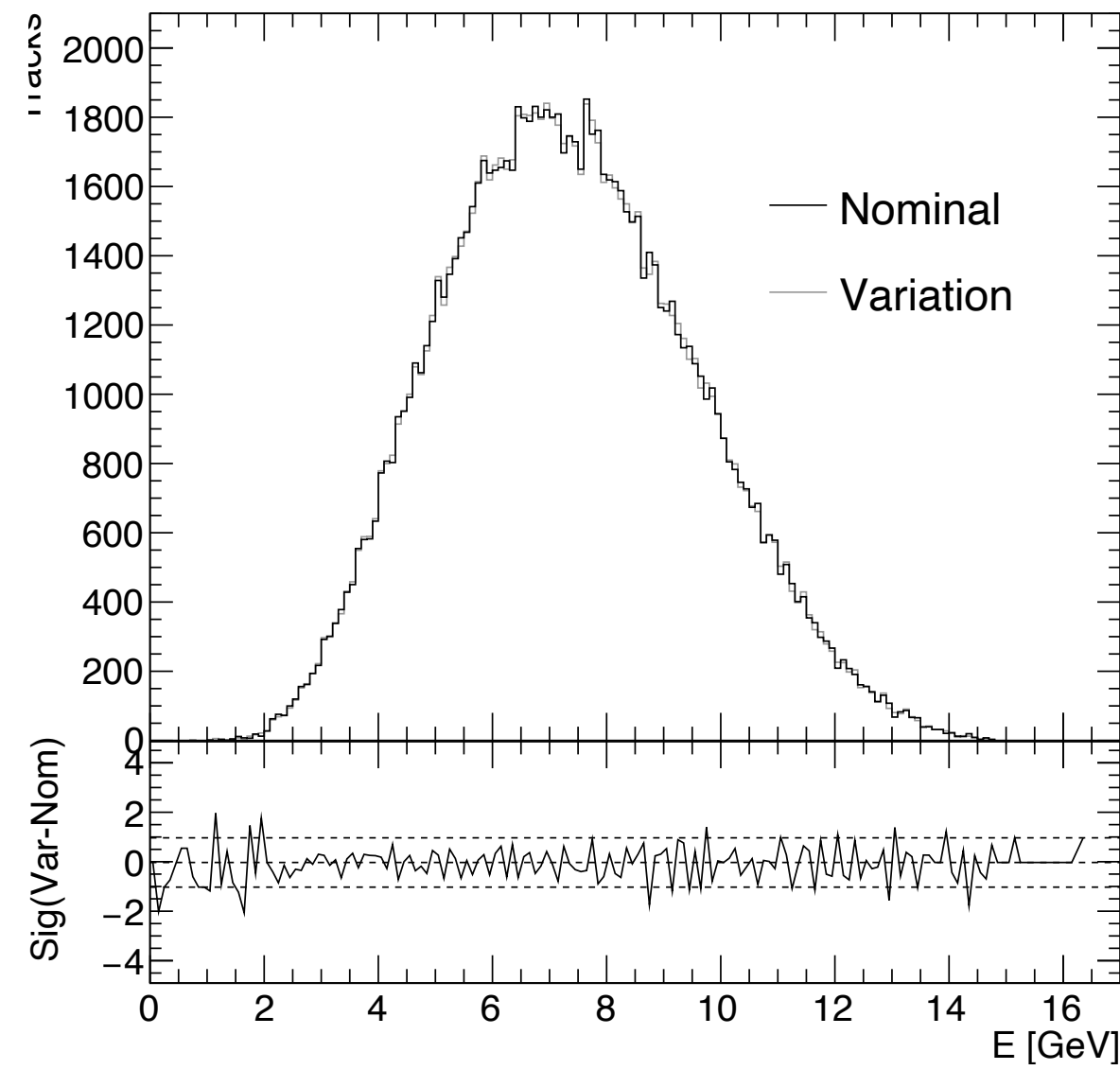
←250 μm →



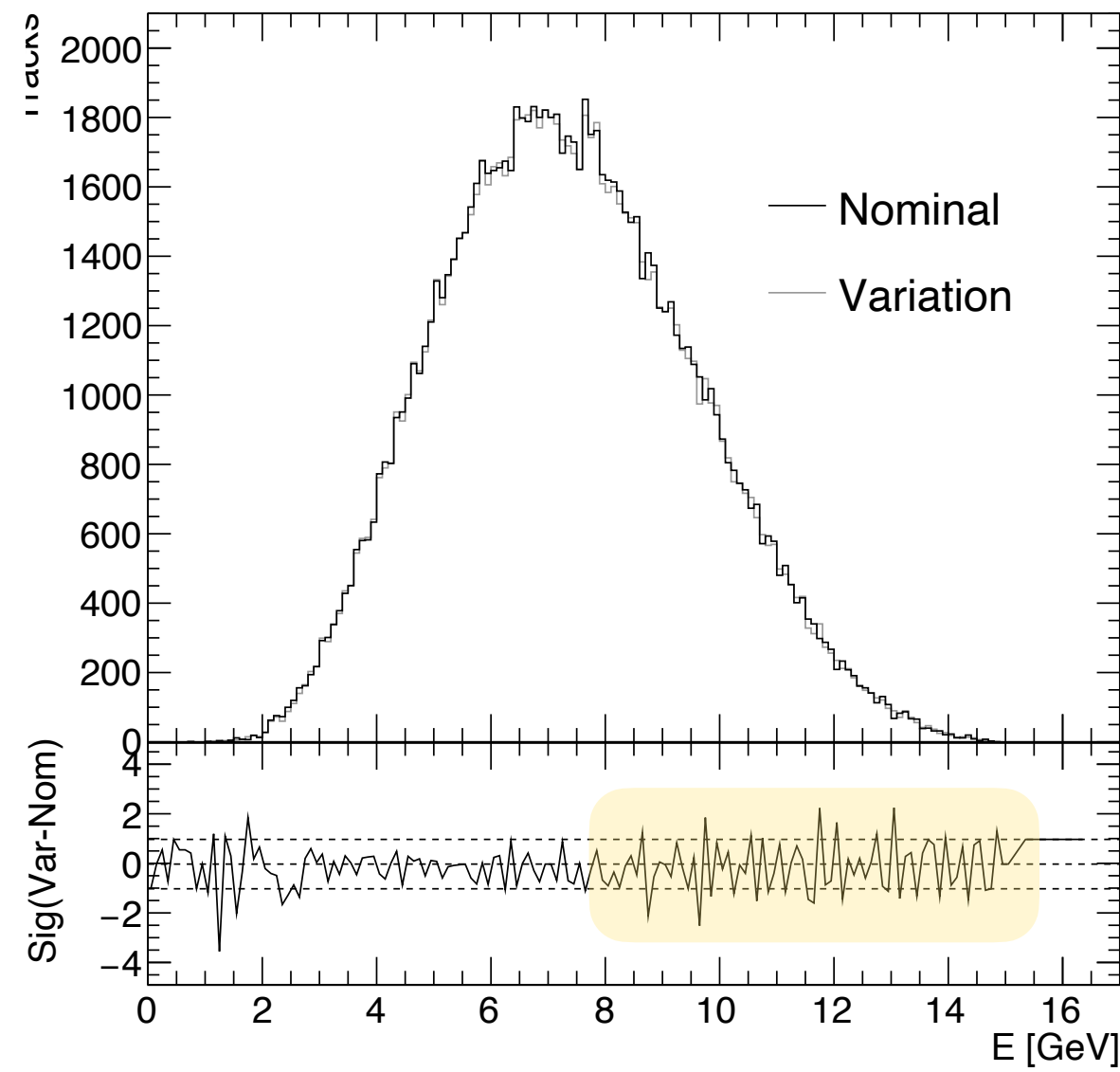




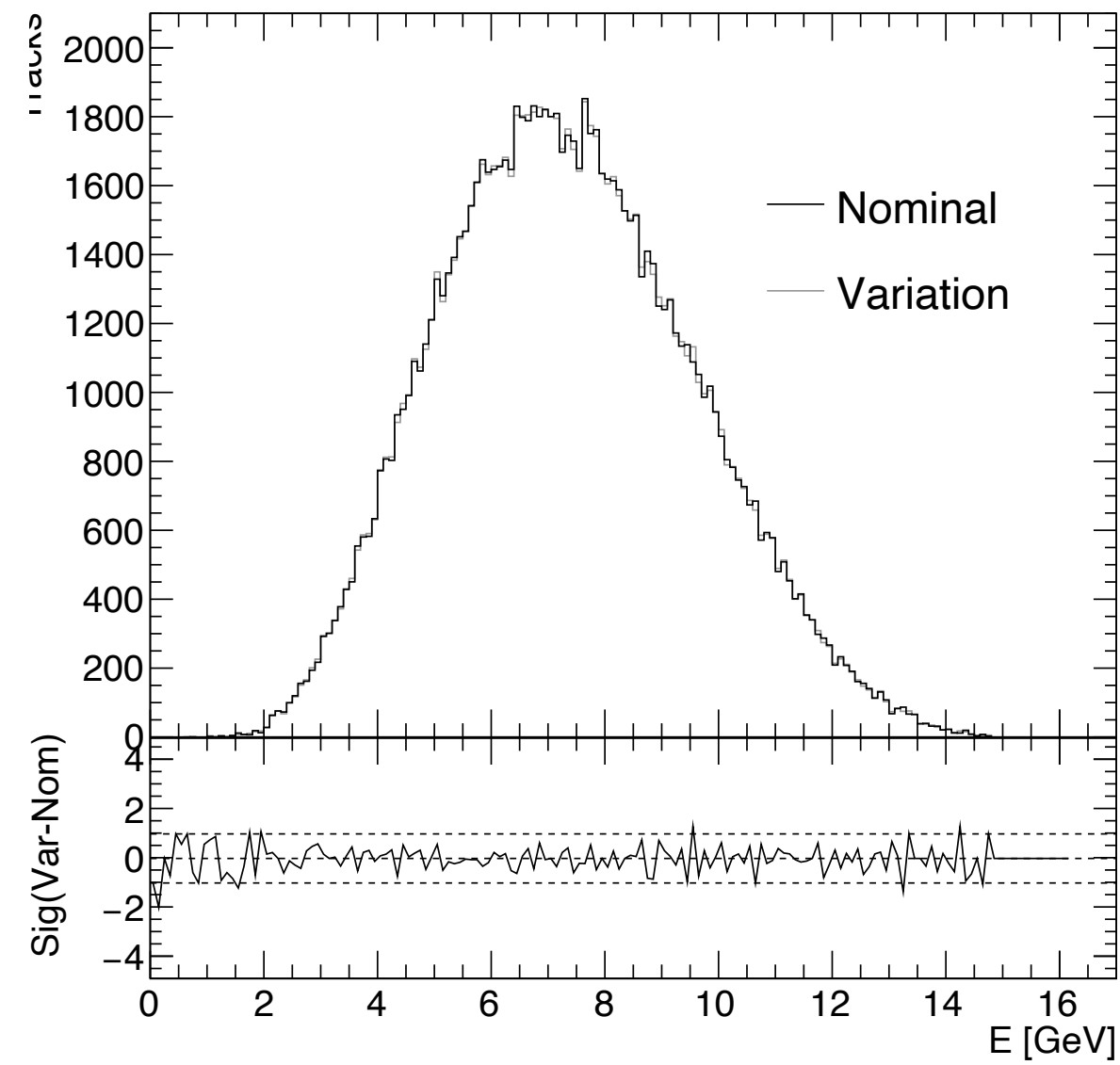
$x + 50 \mu\text{m}$



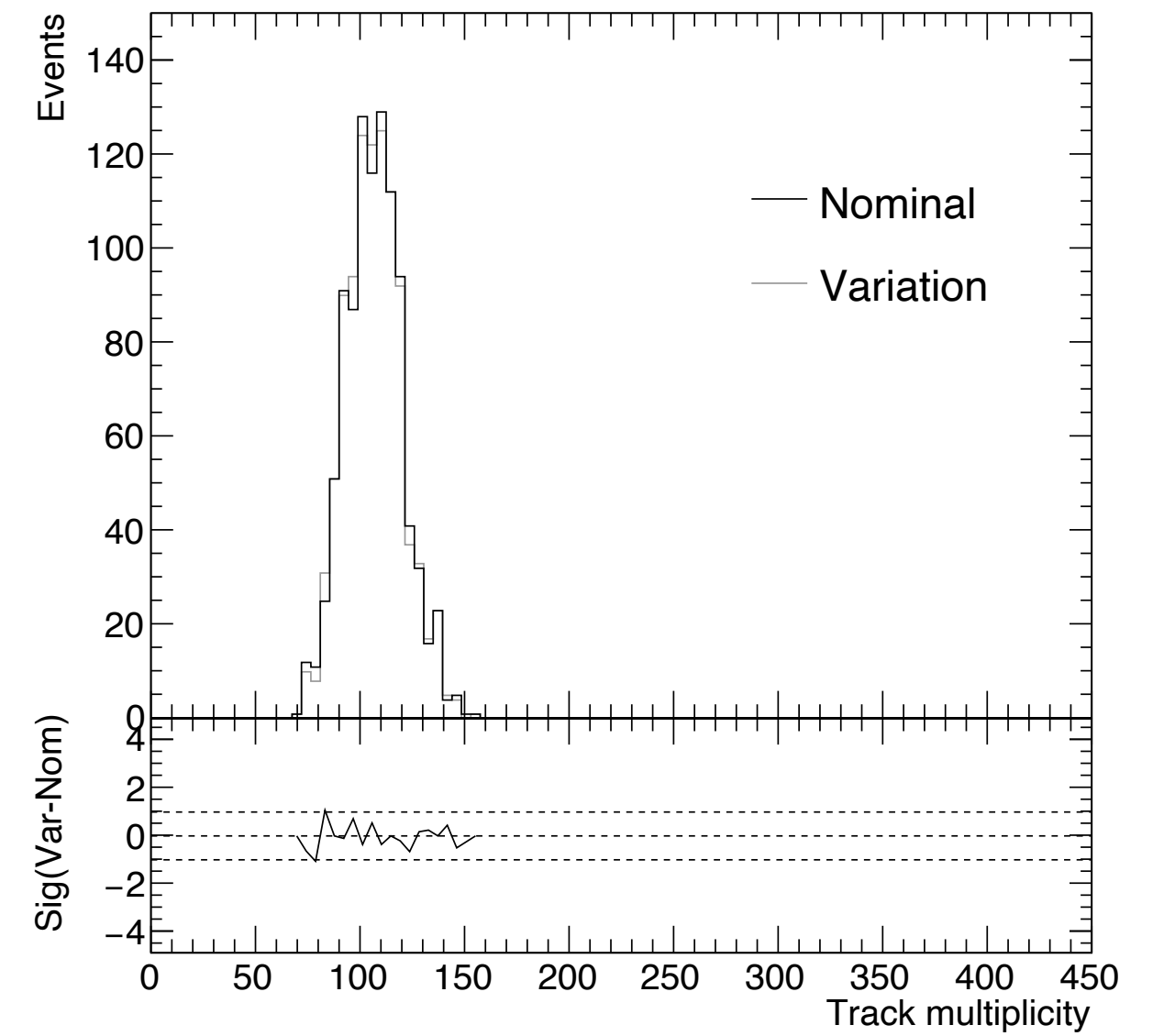
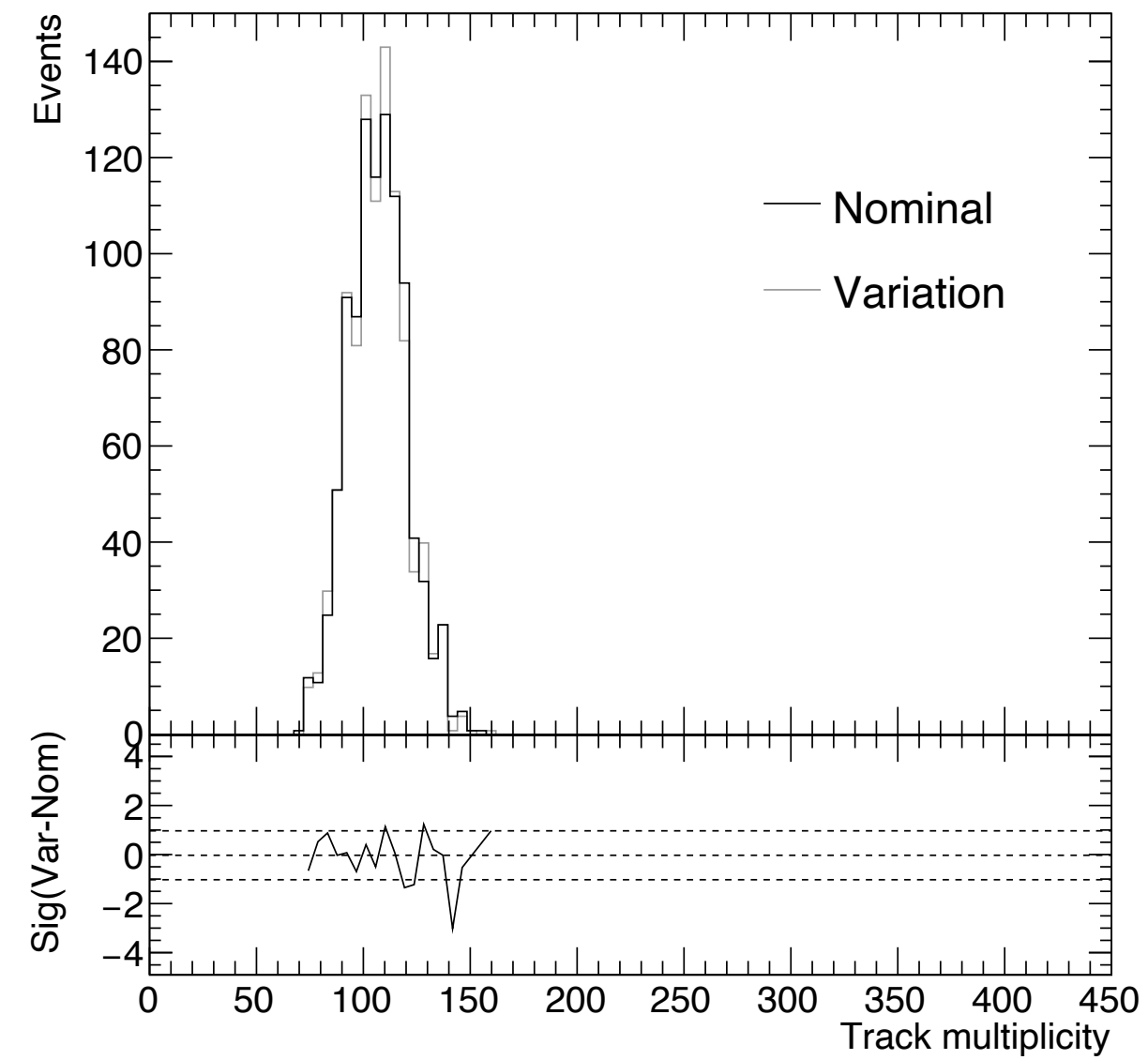
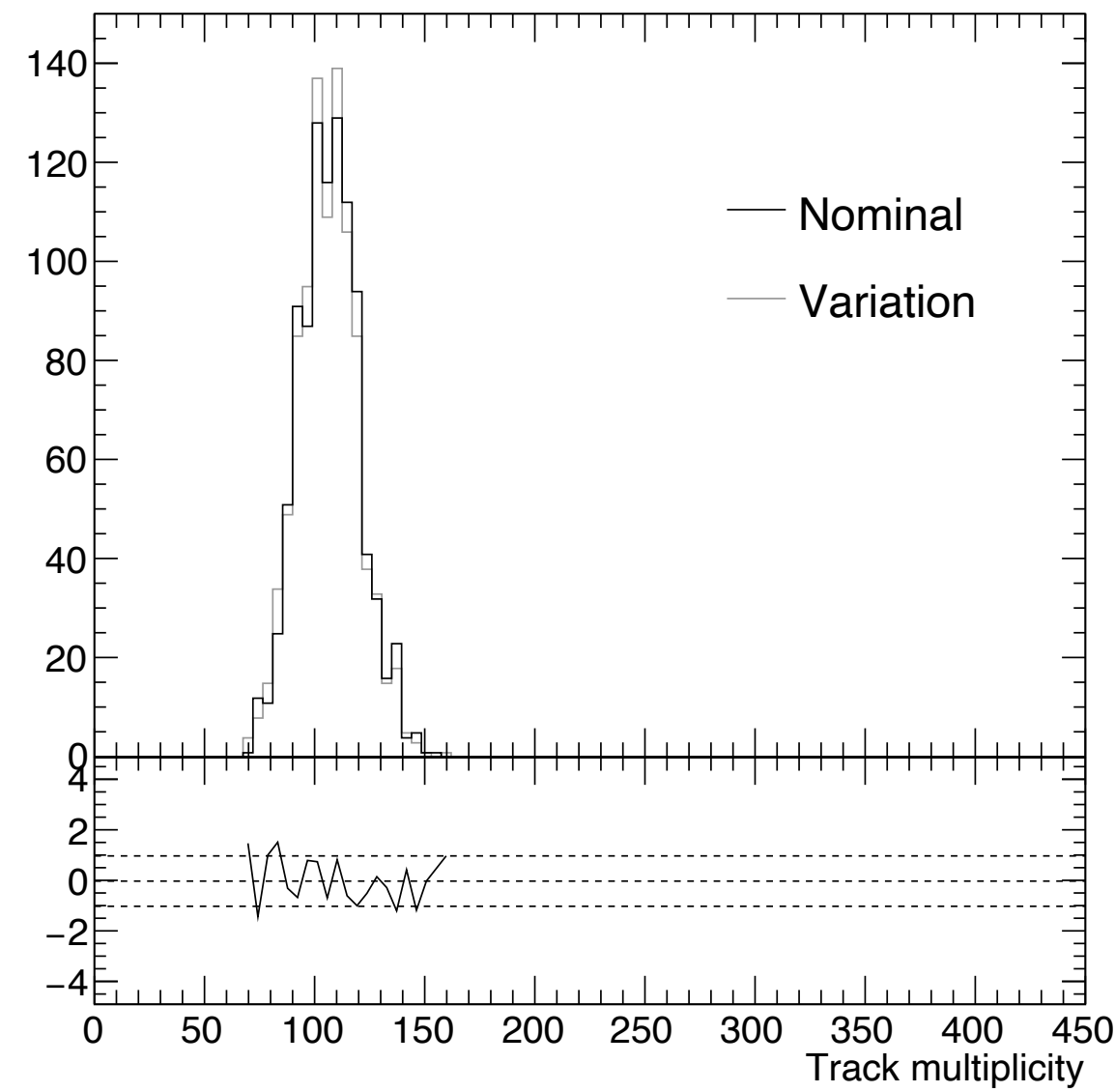
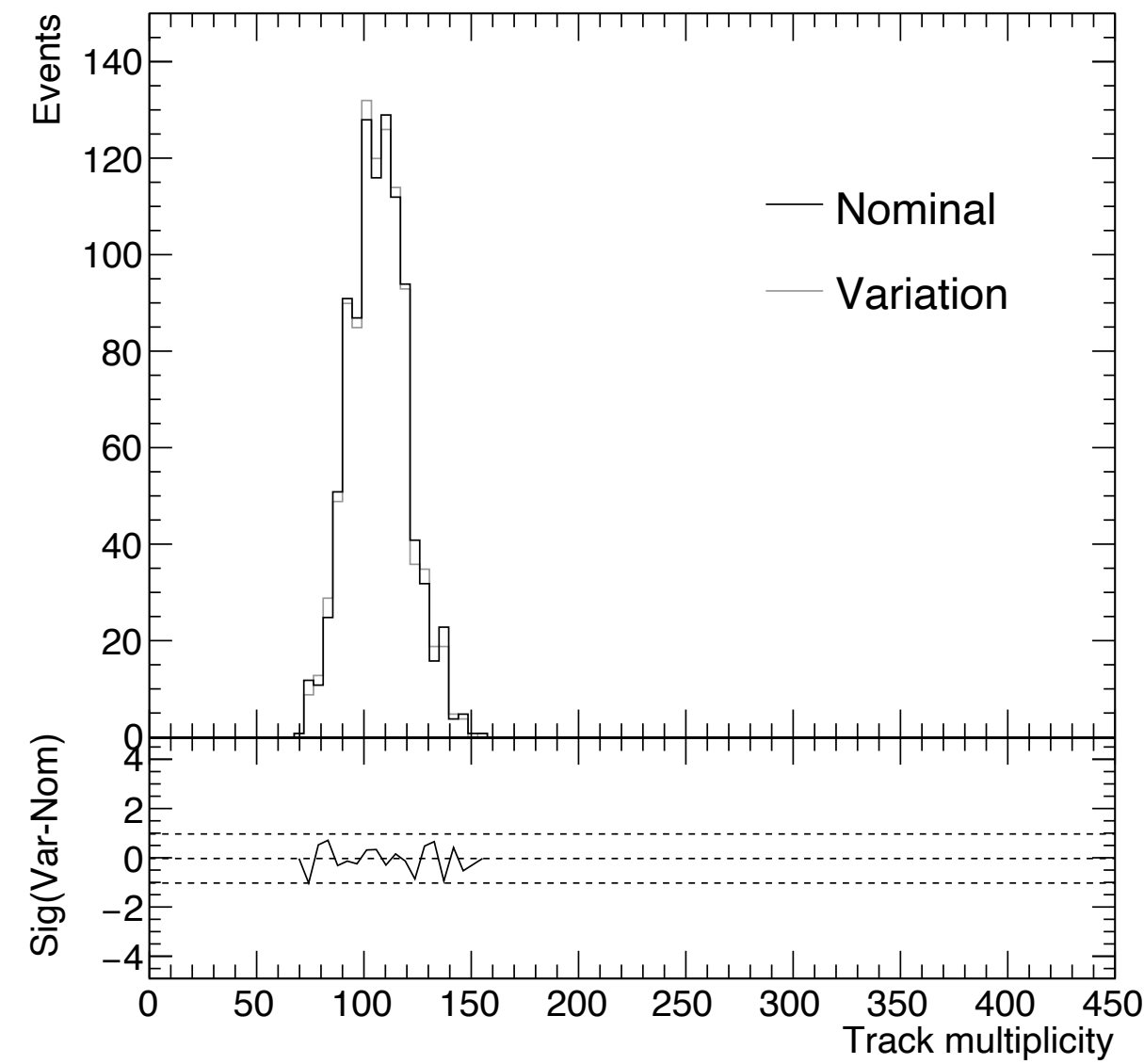
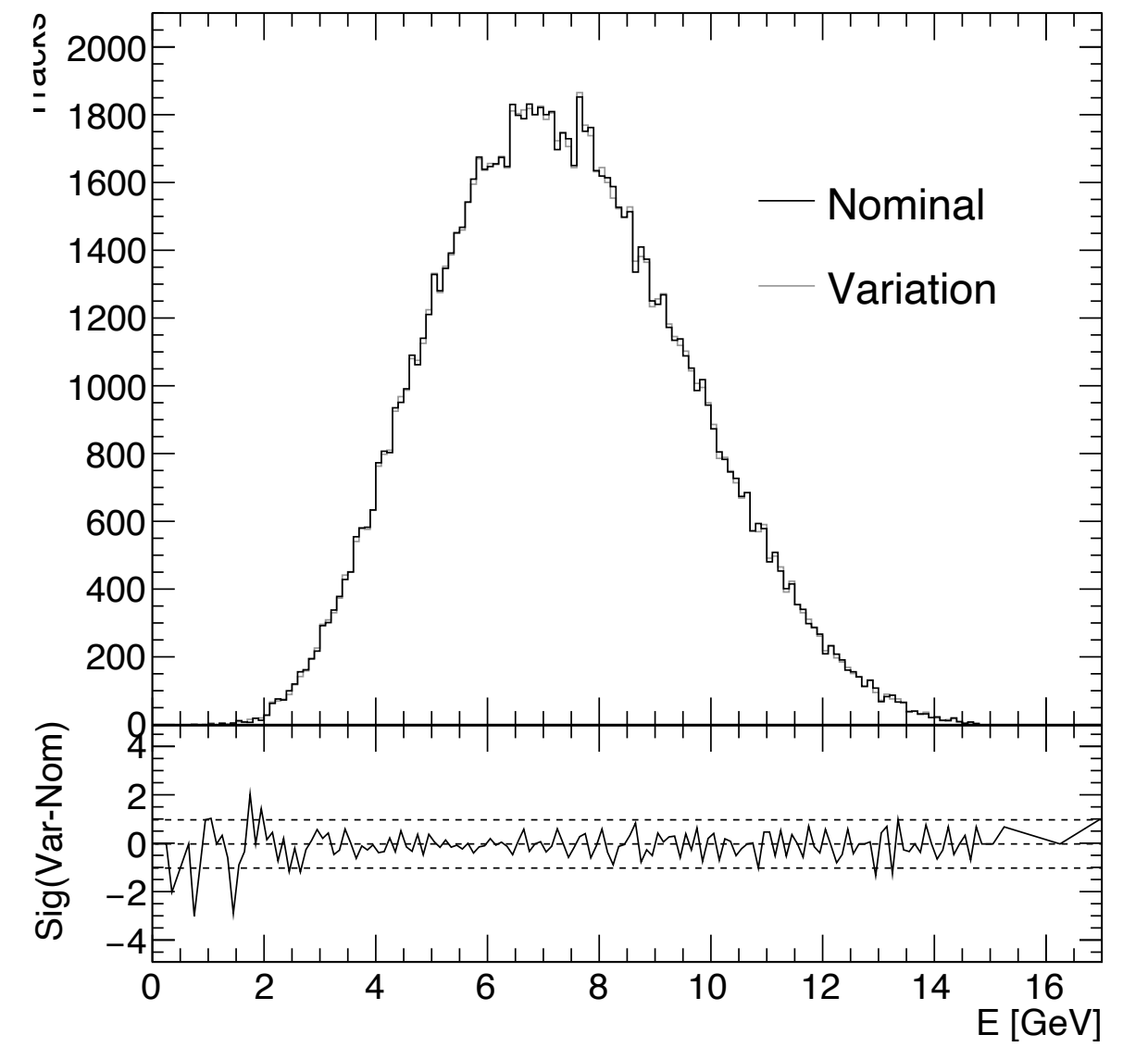
$x + 250 \mu\text{m}$



$y + 50 \mu\text{m}$



$y + 250 \mu\text{m}$



Summary

✱ In each cell for μ : $\frac{\mu_{\text{var}} - \mu_{\text{nom}}}{\sqrt{\sigma_{\text{var}}^2 + \sigma_{\text{nom}}^2}} \times 100$

✱ In each cell for σ : $\frac{\sigma_{\text{var}} - \sigma_{\text{nom}}}{\sigma_{\text{nom}}} \times 100$

Misalignment		Electron-side from nominal [%]	Positron-side from nominal [%]
x+50 μm	μ	1.14	-1.10
	σ	0.00	0.00
x+250 μm	μ	5.33	-5.47
	σ	6.67	10.00
y+50 μm	μ	0.04	-0.01
	σ	0.00	0.00
y+250 μm	μ	-0.03	0.01
	σ	20.00	6.67

