KaonLT Meeting

May 21-22nd, 2026

Richard L. Trotta

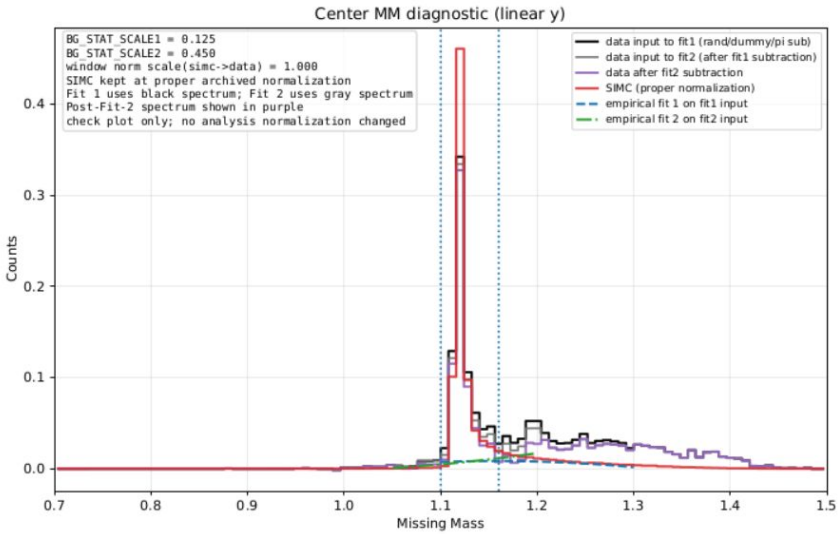
Q2=4.4, W=2.74

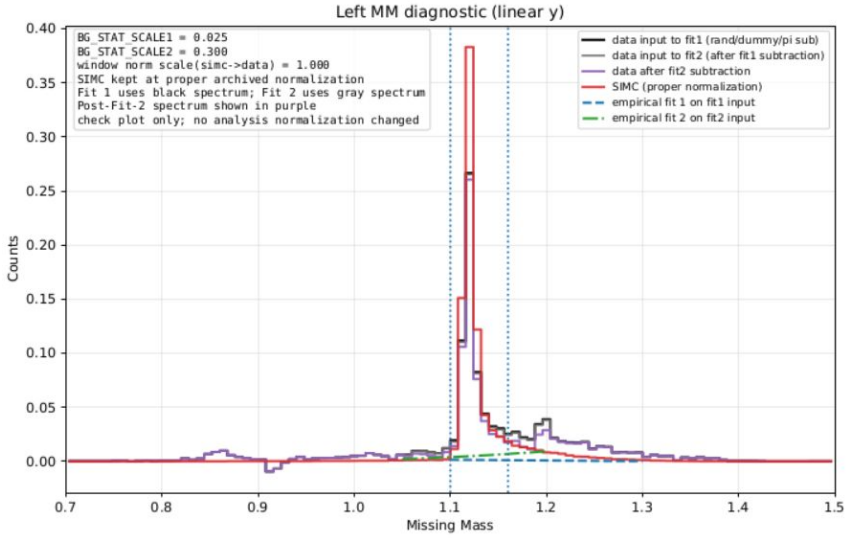
Iteration 0

```
BG_OPT_METRIC_WEIGHTS = {
    "kinematic_score": 0.5,
    "ratio_rms": 0.25,
    "ratio_mean_dev": 0.15,
    "ratio_fail_count": 0.05,
    "valid_ratio_bins": 0.05,
}
```

rank	sel	bins	fail	mean_dev	rms	kin	valid	score
1	*	3t x 9phi	13	0.2857	0.3599	0.3436	38	0.0567
2		4t x 9phi	19	0.6270	0.4004	0.3540	48	0.4044
3		3t x 8phi	15	0.2318	1.5113	0.3587	35	0.6258
4		4t x 8phi	18	0.6746	0.4665	0.3680	43	0.7340

Low ε





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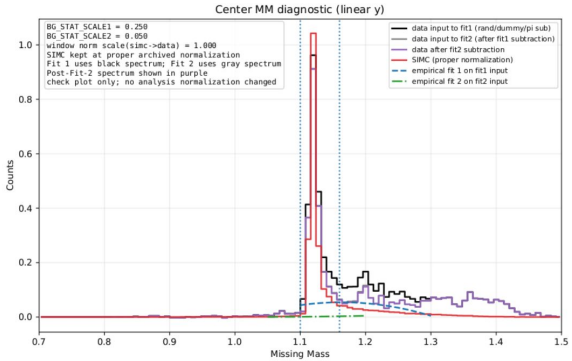

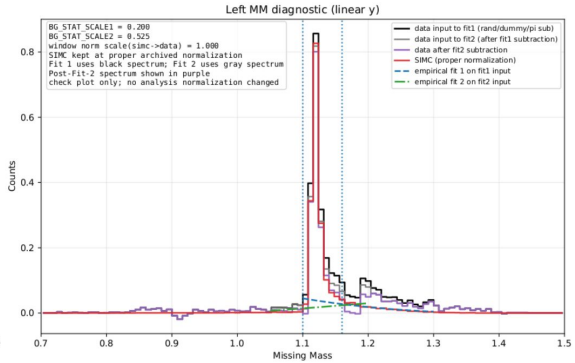

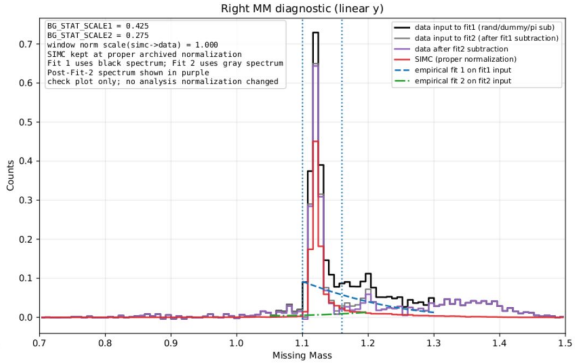

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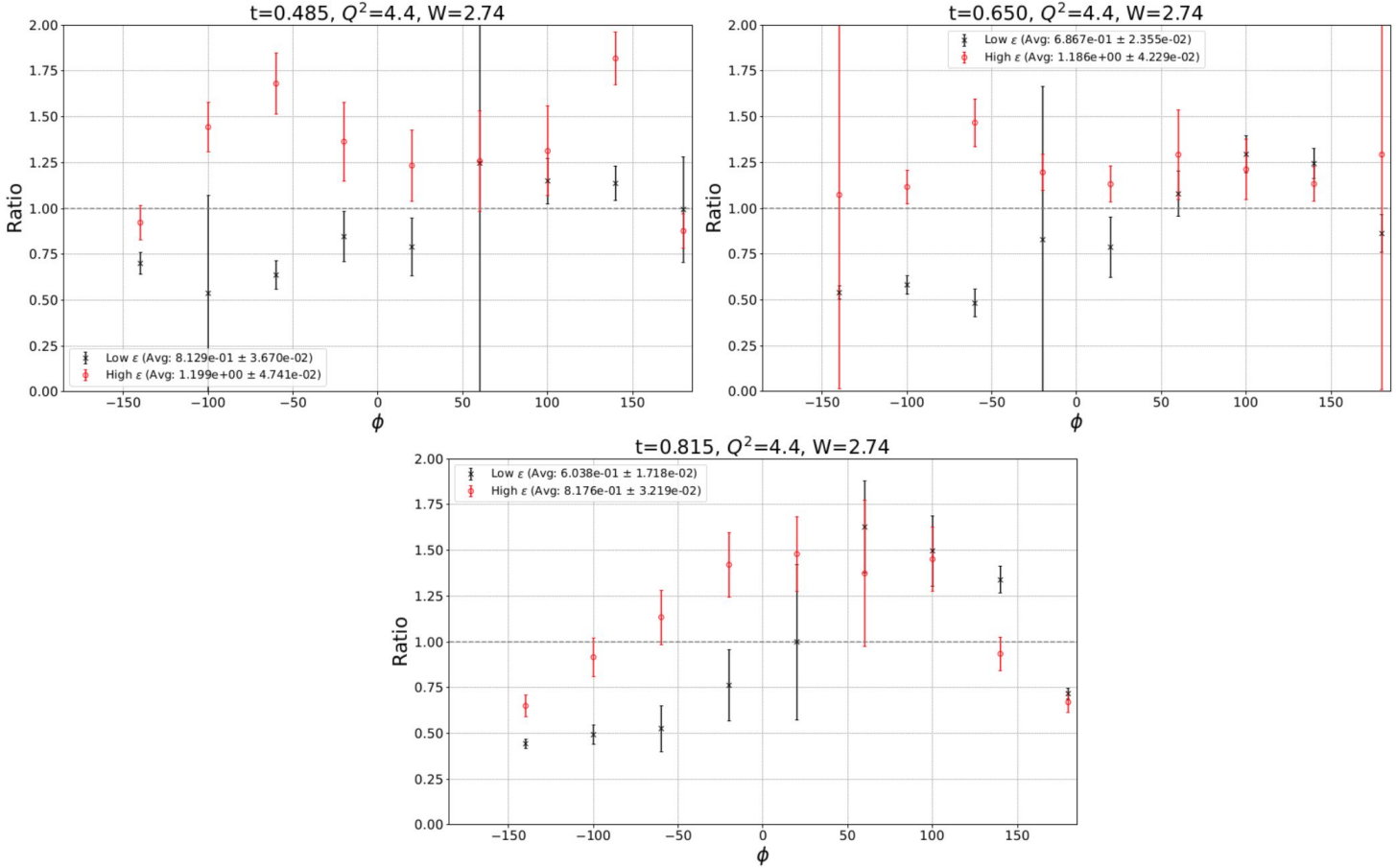

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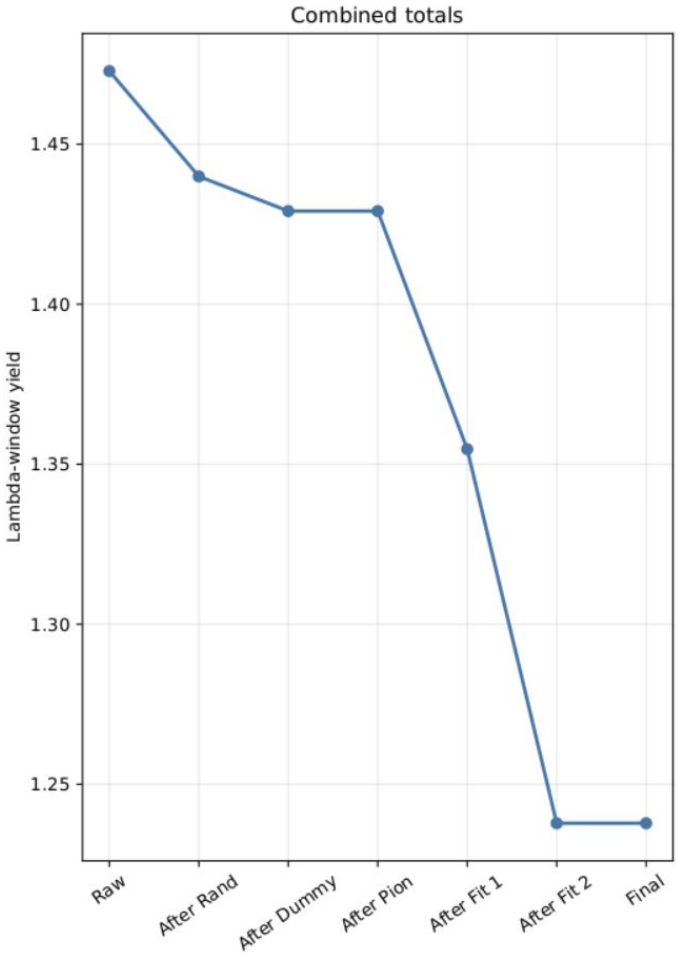

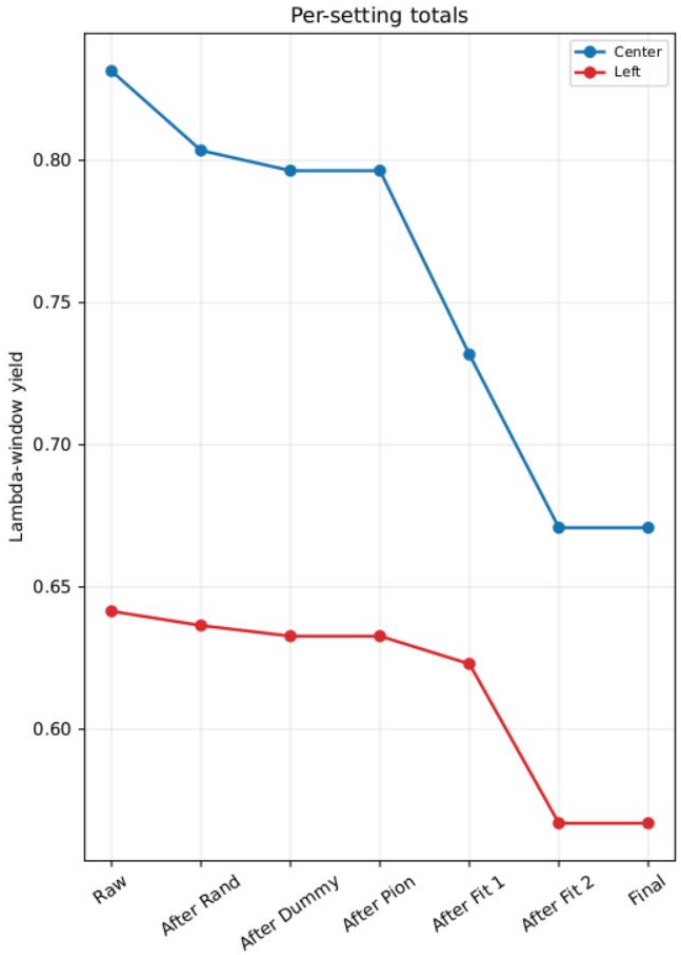

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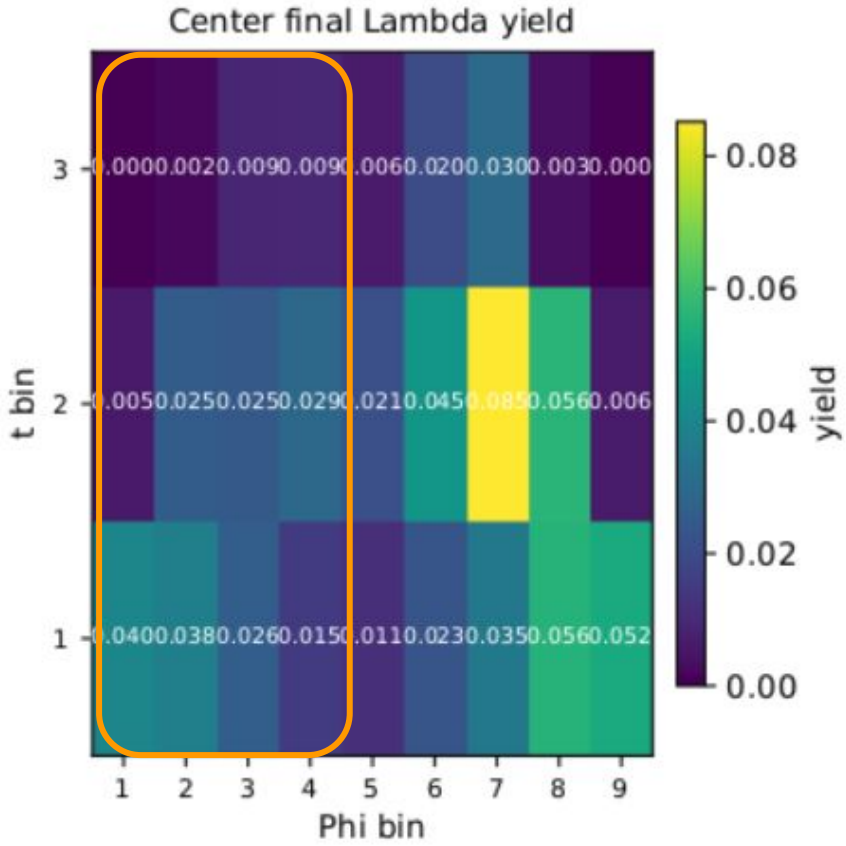

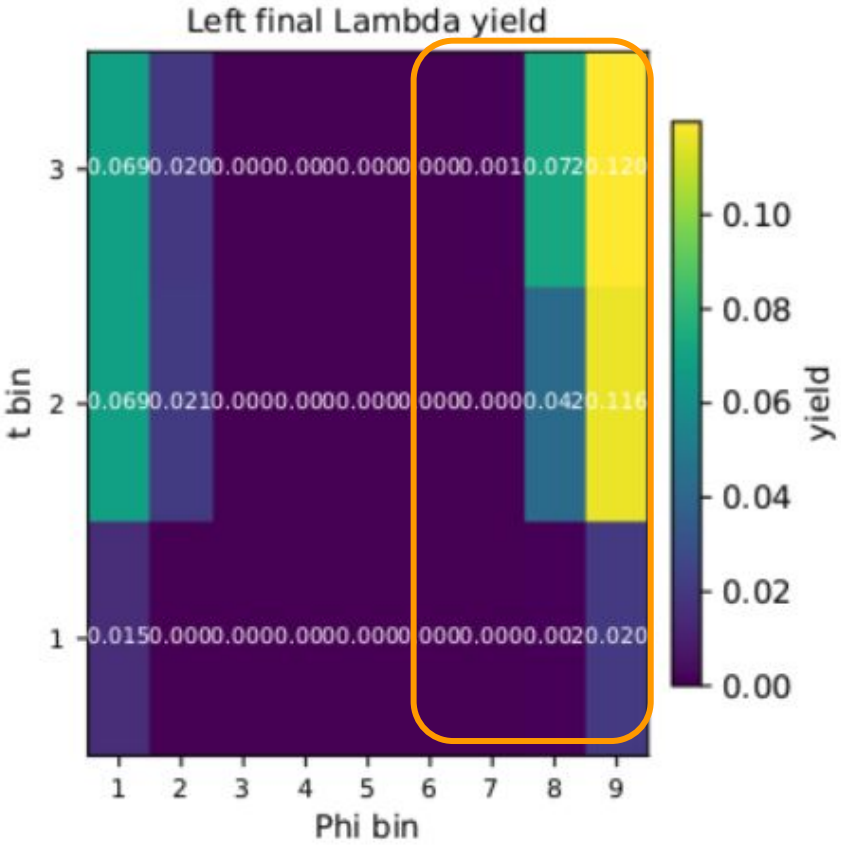

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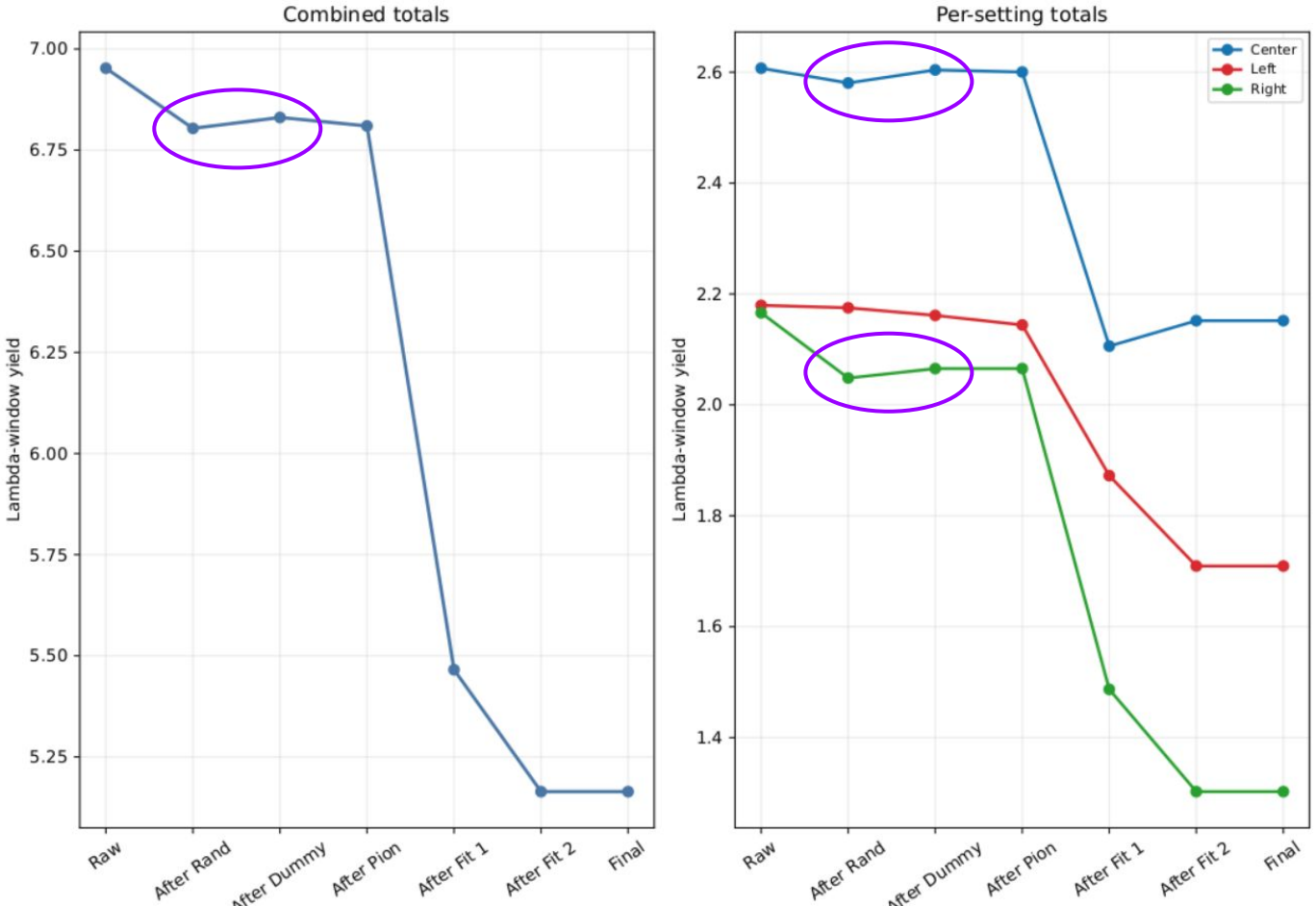

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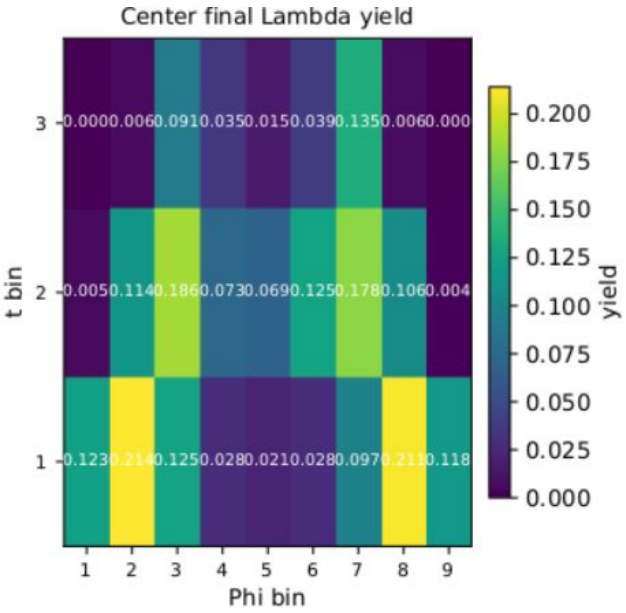
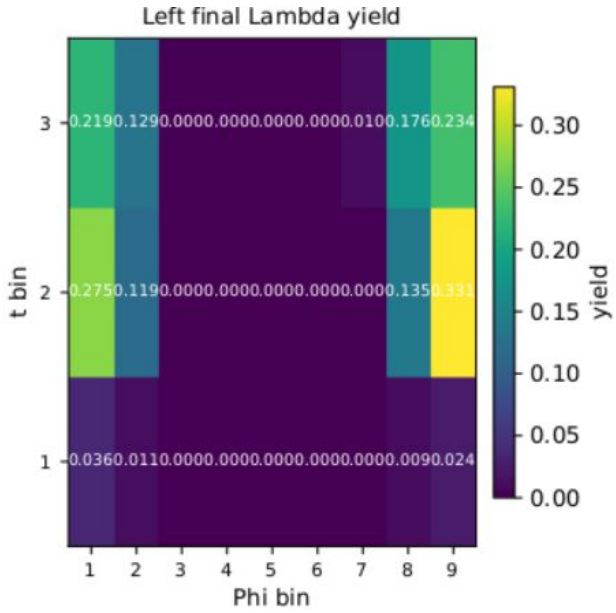
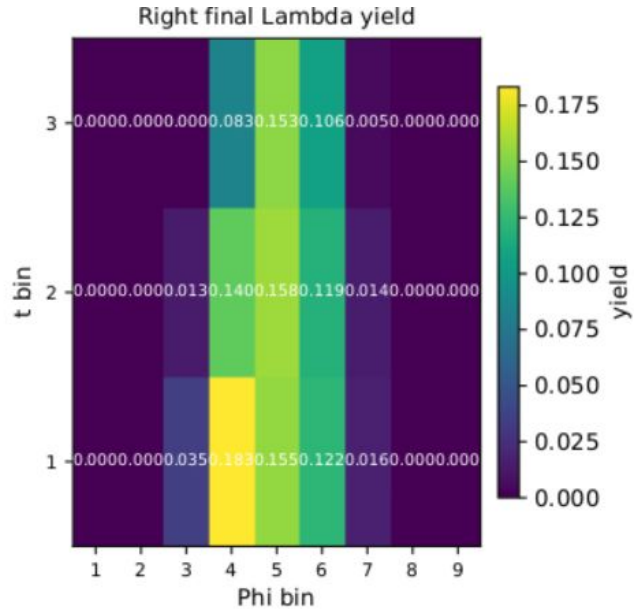






Systematic Quantification

- Net empirical residual-background correction fraction (total or given t-phi bin)

$$f^{(1)}_{\text{fractional correction}} = \frac{\text{after\_pion} - \text{after\_fit1}}{\text{after\_pion}}$$

$$f^{(2)}_{\text{fractional correction}} = \frac{\text{after\_fit1} - \text{final}}{\text{after\_fit1}}$$

$$f_{\text{empirical,total}} = \frac{\text{after\_pion} - \text{final}}{\text{after\_pion}}$$

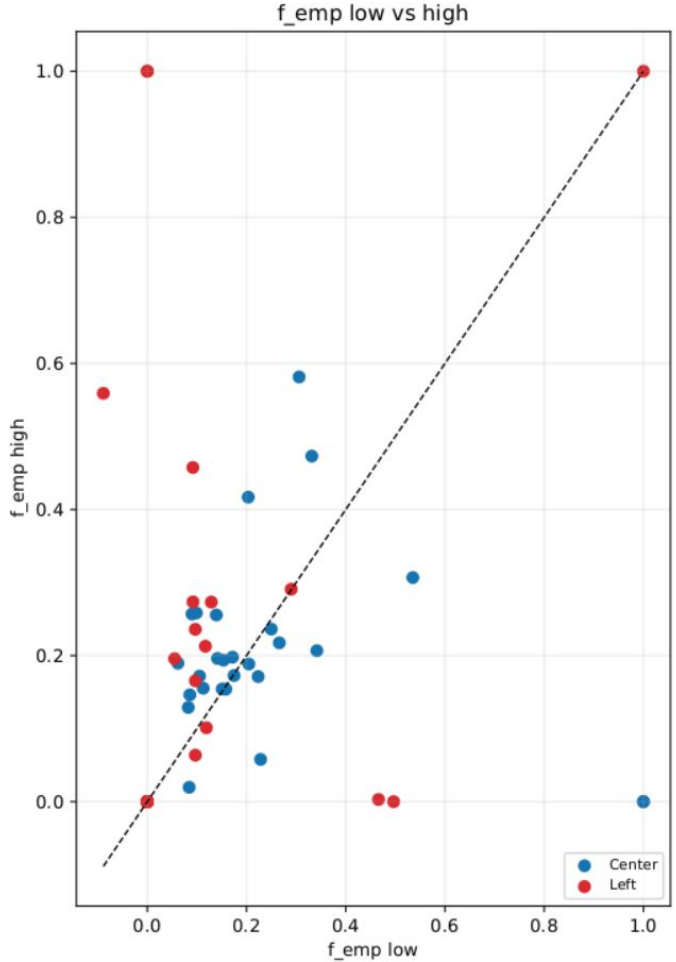
$$f_{\text{emp}} = \frac{\text{yield\_after\_pion\_subtraction} - \text{final\_yield}}{\text{yield\_after\_pion\_subtraction}}$$

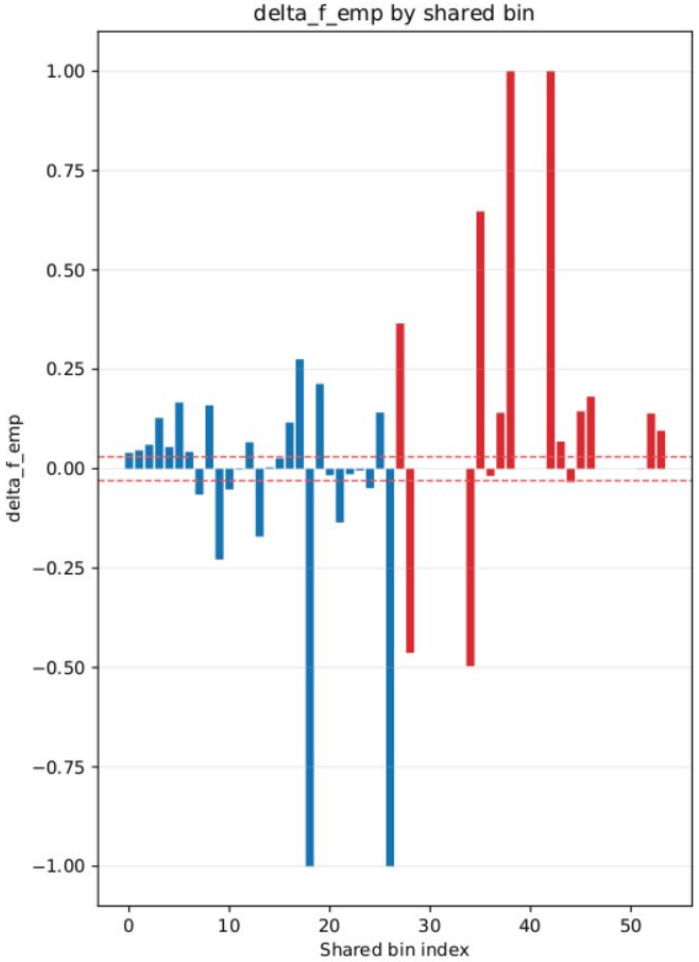
- 0.00 means the empirical correction removed nothing.
- 0.05 means it removed 5% of the post-pion Lambda-window yield.
- 0.20 means it removed 20%, which is fairly large and worth scrutiny.
- If Δf_{emp} is large, the empirical background treatment is changing the two epsilon settings differently, which can bias the separation

$$\Delta f_{\text{emp}} = f^{\text{high}}_{\text{emp}} - f^{\text{low}}_{\text{emp}}$$

Systematic Quantification

$$f_{\text{emp}} = \frac{\text{yield\_after\_pion\_subtraction} - \text{final\_yield}}{\text{yield\_after\_pion\_subtraction}}$$





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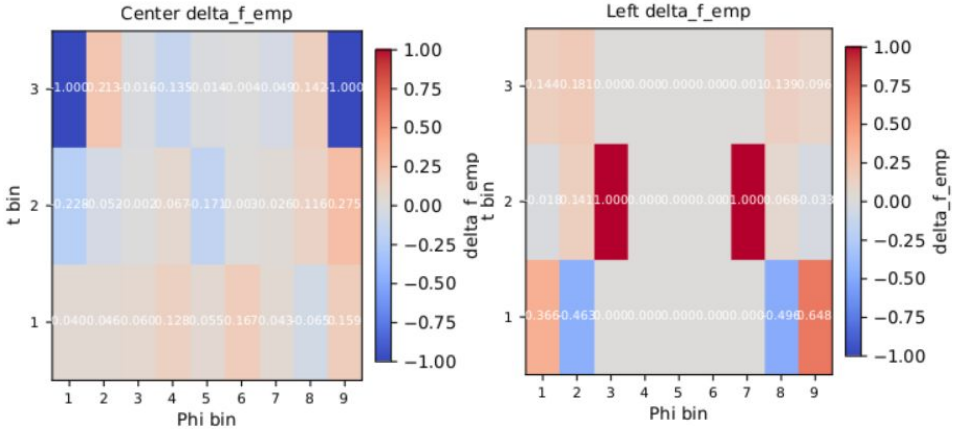
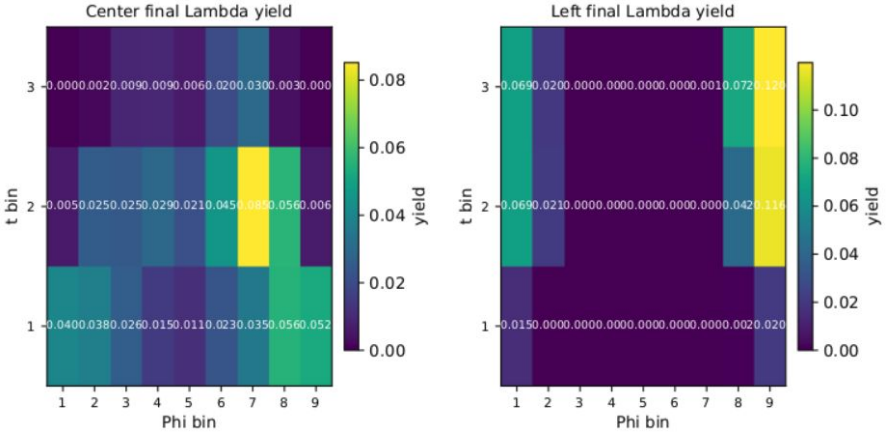


$$\Delta f_{\text{emp}} = f_{\text{emp}}^{\text{high}} - f_{\text{emp}}^{\text{low}}$$

Low ε



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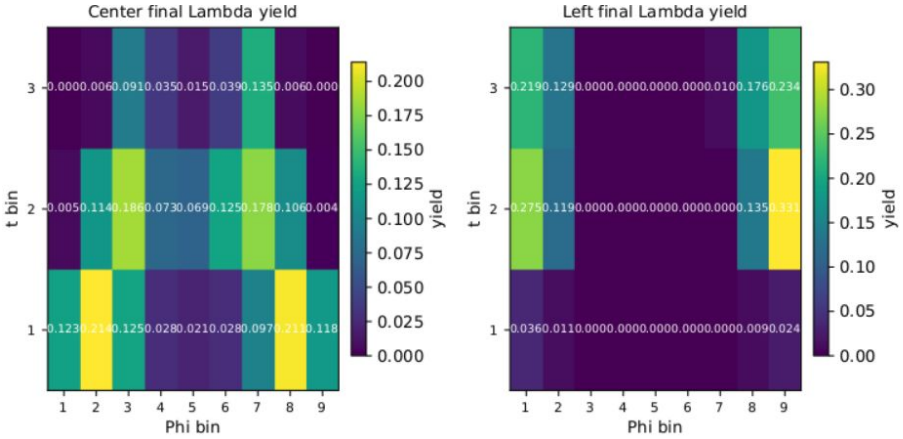

EXTRA