

Run 14 P18ih

Track/Tower Matching

DAN NEMES

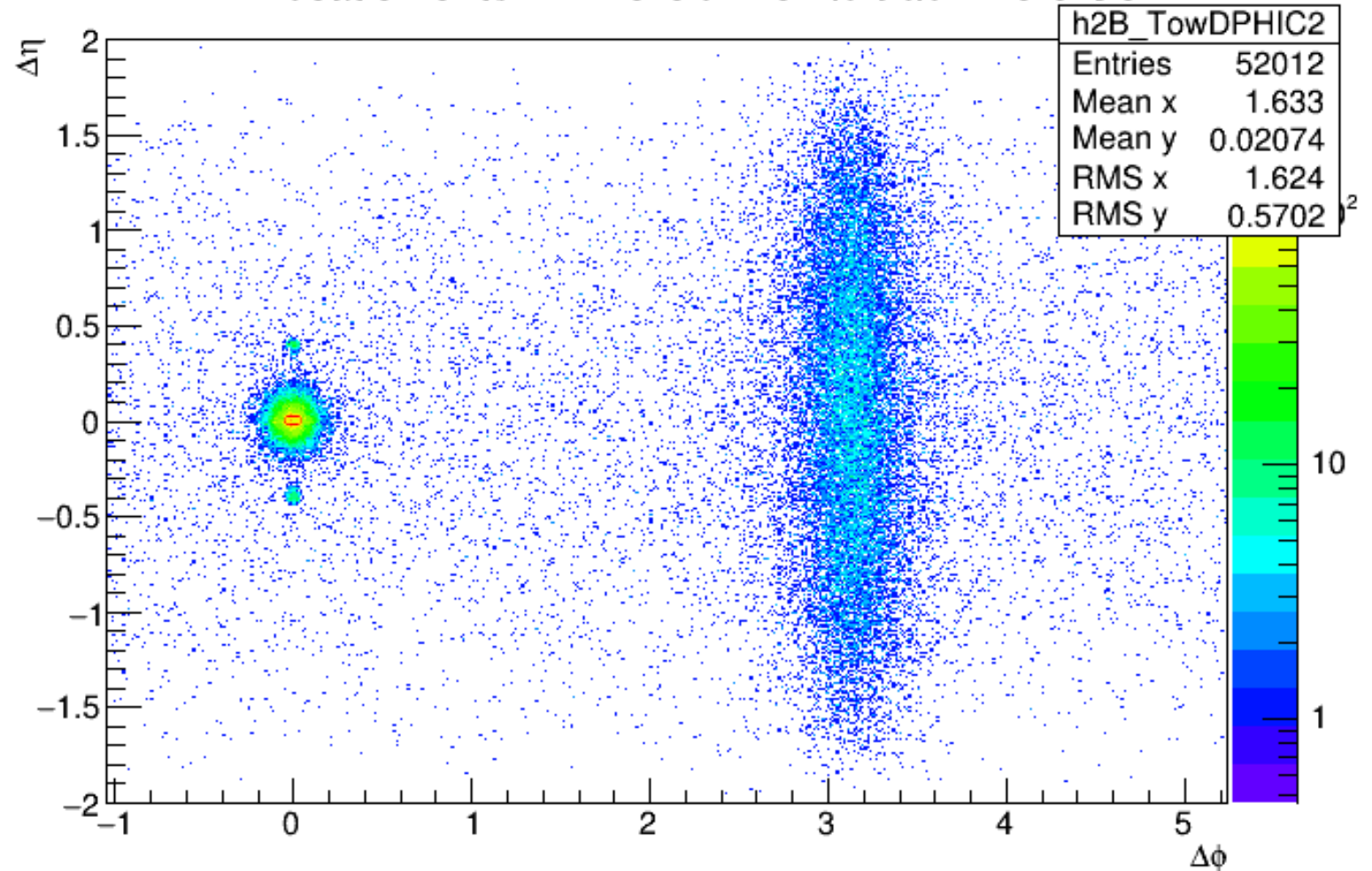
YALE UNIVERSITY

JETCORR MEETING MAY 31, 2019

Event Selection

- Run 14 P18ih PicoDsts, all four trigger setup names
 - Using Hanseul's Bad Run list
- HT2 events, 0-20% central (using uncorrected centrality definitions)
- Looking at charged + neutral particles, using 100% hadronic correction
- Looking at events with a track with $p_T > 9.0$ GeV, effectively looking at 4 different classes of events
 - A: HT2 trigger and high- p_T track are the same object
 - B: HT2 trigger and high- p_T track are different but correlated, on near side
 - C: HT2 trigger and high- p_T track are different but correlated, on far side
 - D: HT2 trigger and high- p_T track are different and uncorrelated

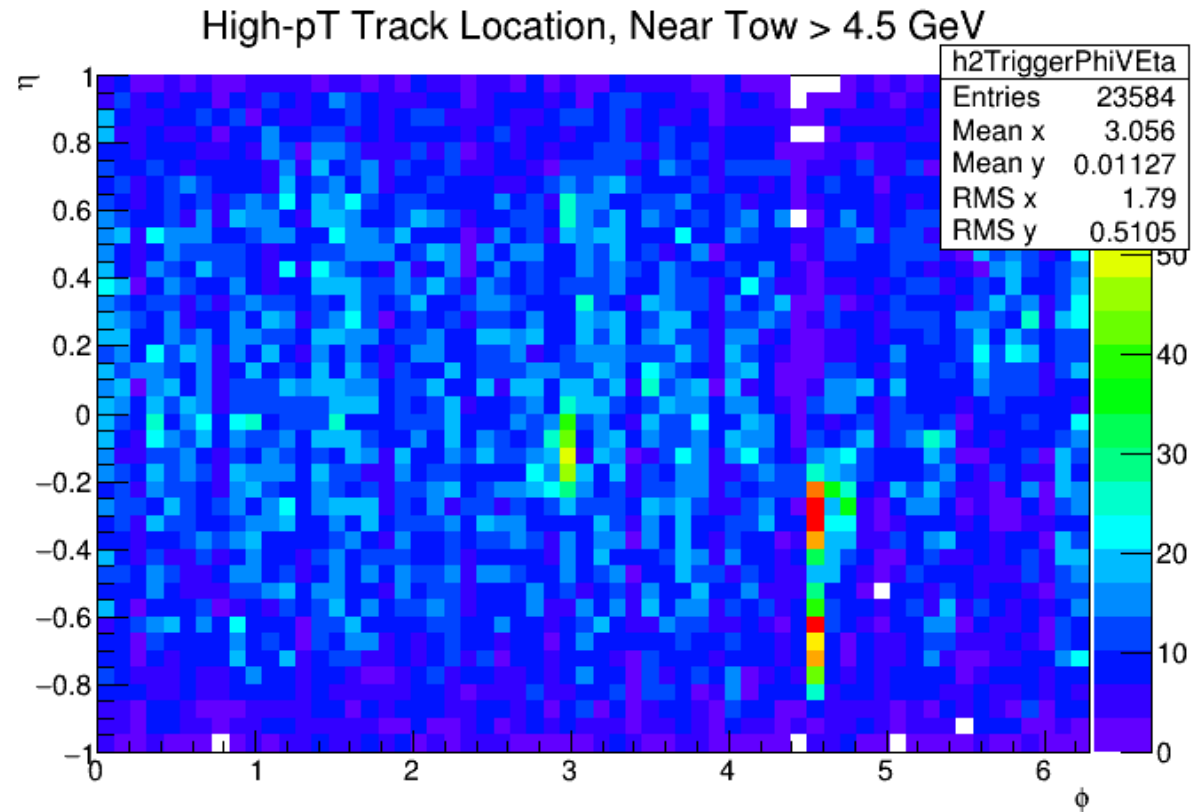
Location of tow > 4.5 GeV rel. to track > 9.0 GeV



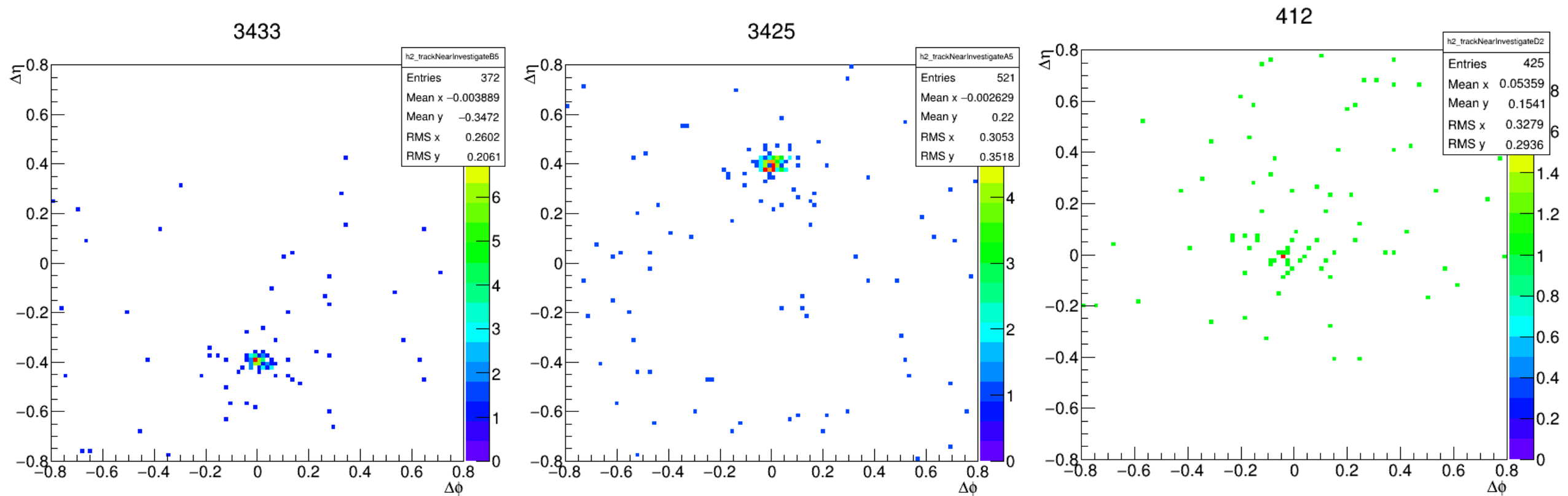
- Plotted is the location of the tower with ET > 4.5 GeV (after HC) relative to location of the track with pT > 9.0 GeV
- Two peaks at eta +/- 0.4 on near side, likely due to swapped tower IDs

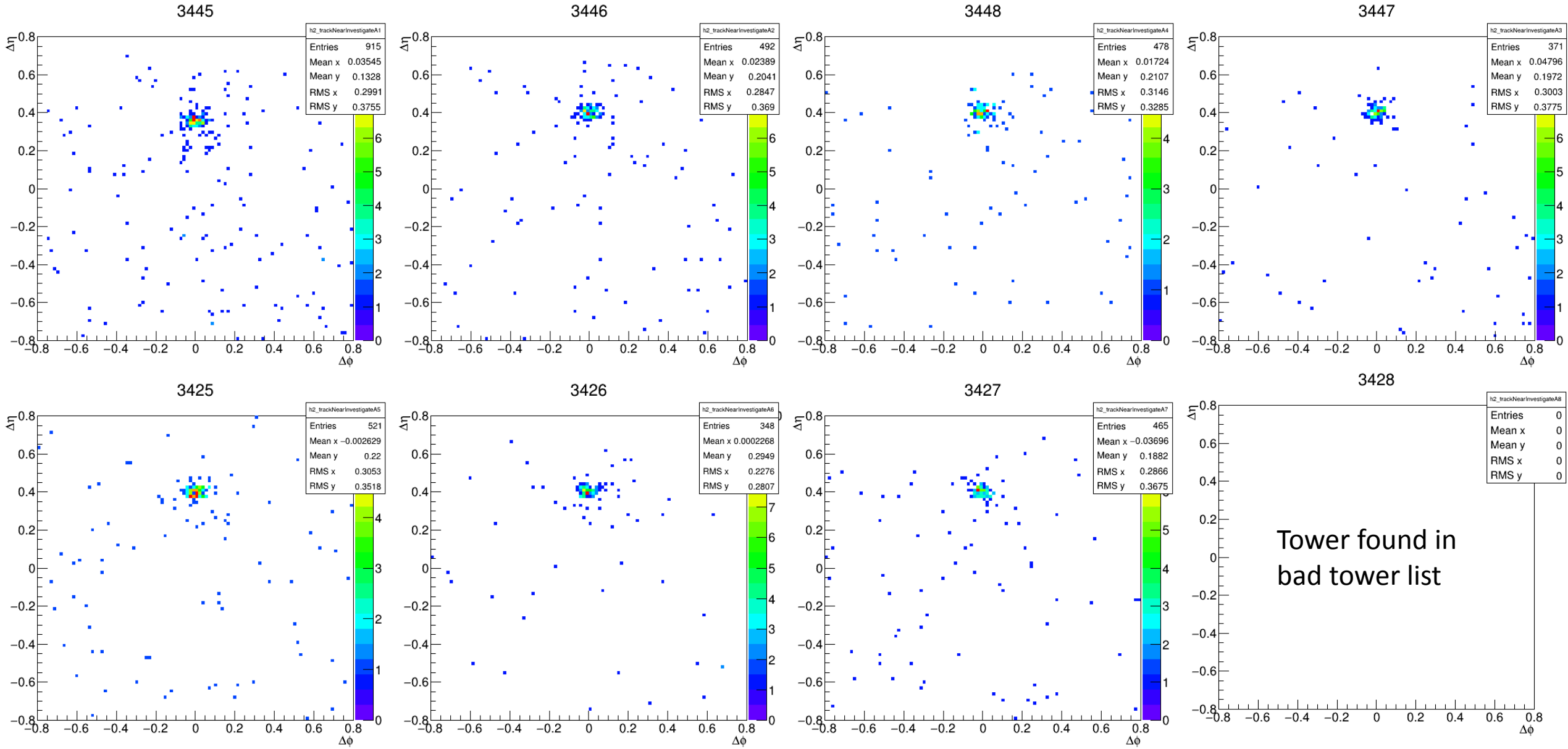
Location of Track > 9 GeV near Tow > 4.5 GeV

- Plotted is the location of tracks with p_T greater than 9 GeV, when $\Delta\phi$ to tower greater than 4.5 GeV is less than 45 degrees away
- Two hotspots can be seen, right hotspot corresponds to the enhancement at $\eta \sim 0.4$

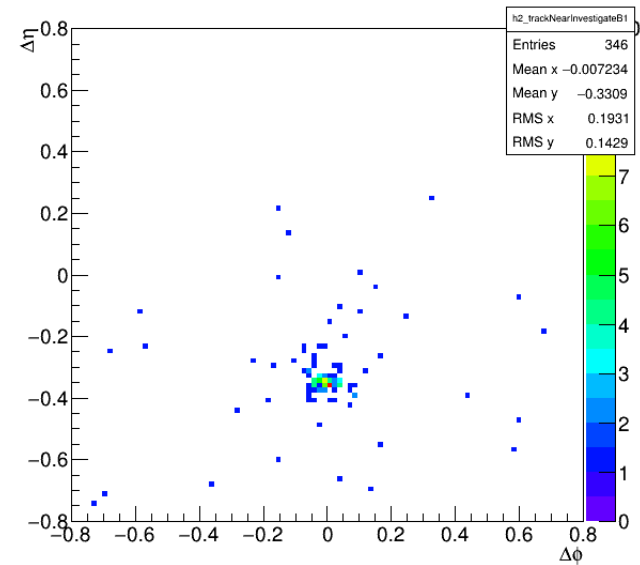


Location of Tracks > 3 GeV Relative to Selected Tower with > 2 GeV, after HC

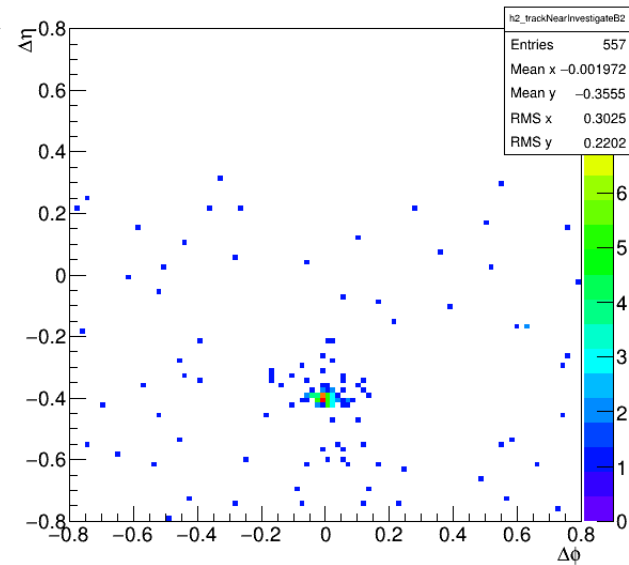




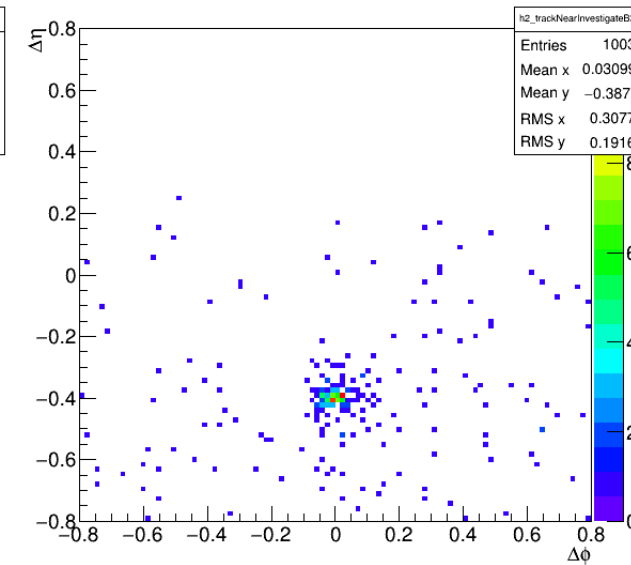
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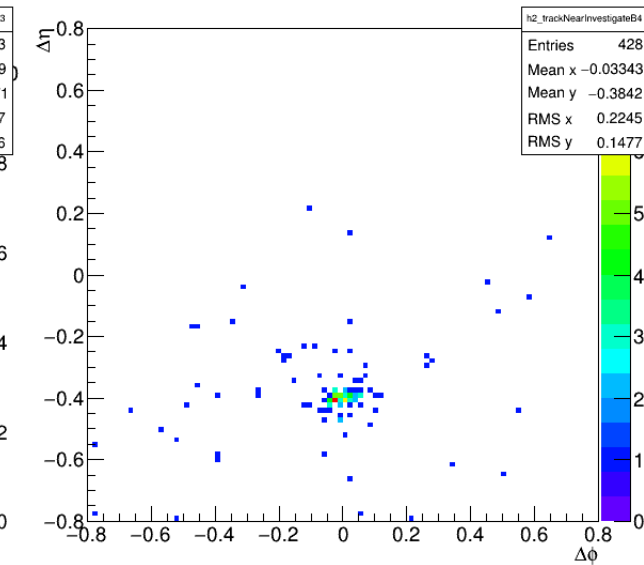
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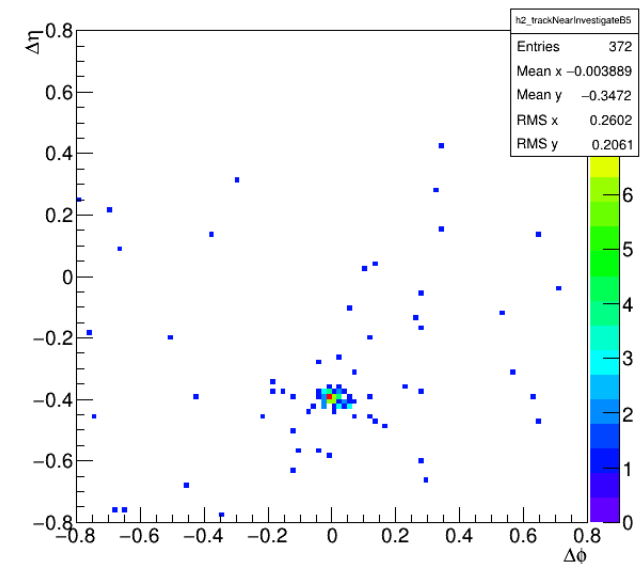
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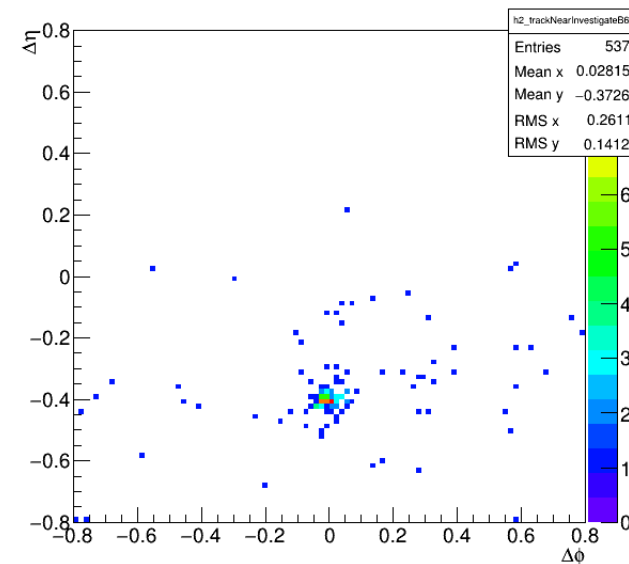
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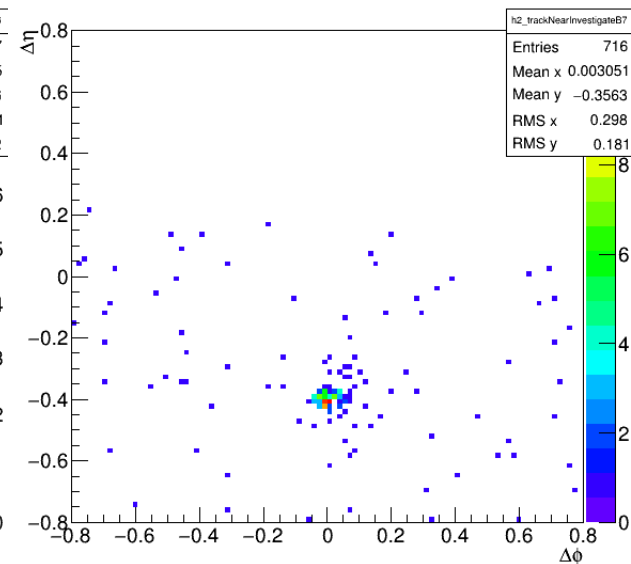
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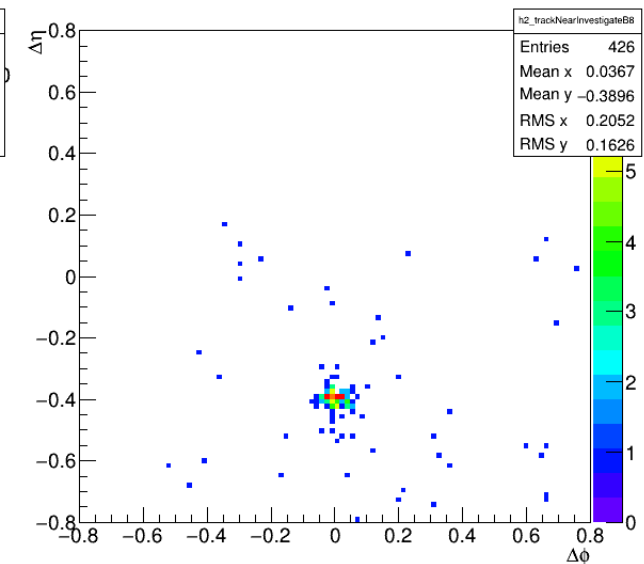
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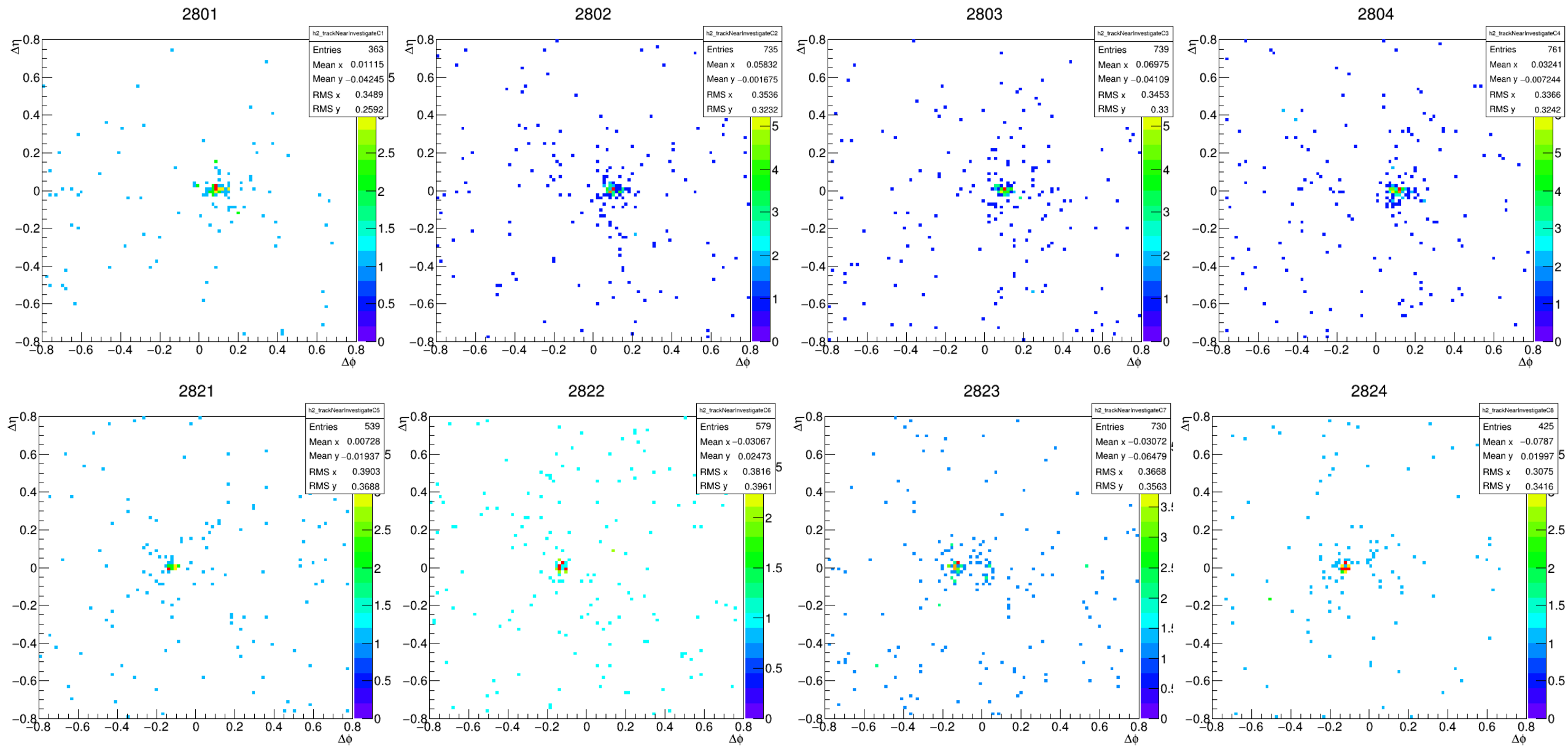
First Batch of Suspicious Towers

- Towers highlighted in pink are the 16 towers found in the previous two slides, which I believed to be swapped
- In BEMC mapping for Run14, tower 3453 is known to have been swapped with 3452, which were both originally highlighted orange
- Full mapping can be found at <https://drupal.star.bnl.gov/STAR/subsys/bemc/mapping>

<φ-direction>

3525	3526	3527	3528	3529	3530	3531	3532	3533	3534	3535	3536
3505	3506	3507	3508	3509	3510	3511	3512	3513	3514	3515	3516
3485	3486	3487	3488	3489	3490	3491	3492	3493	3494	3495	3496
3465	3466	3467	3468	3469	3470	3471	3472	3473	3474	3475	3476
3445	3446	3447	3448	3449	3450	3451	3453	3452	3454	3455	3456
3425	3426	3427	3428	3429	3430	3431	3432	3433	3434	3435	3436
3405	3406	3407	3408	3409	3410	3411	3412	3413	3414	3415	3416
3385	3386	3387	3388	3389	3390	3391	3392	3393	3394	3395	3396

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Second Batch of Suspicious Towers

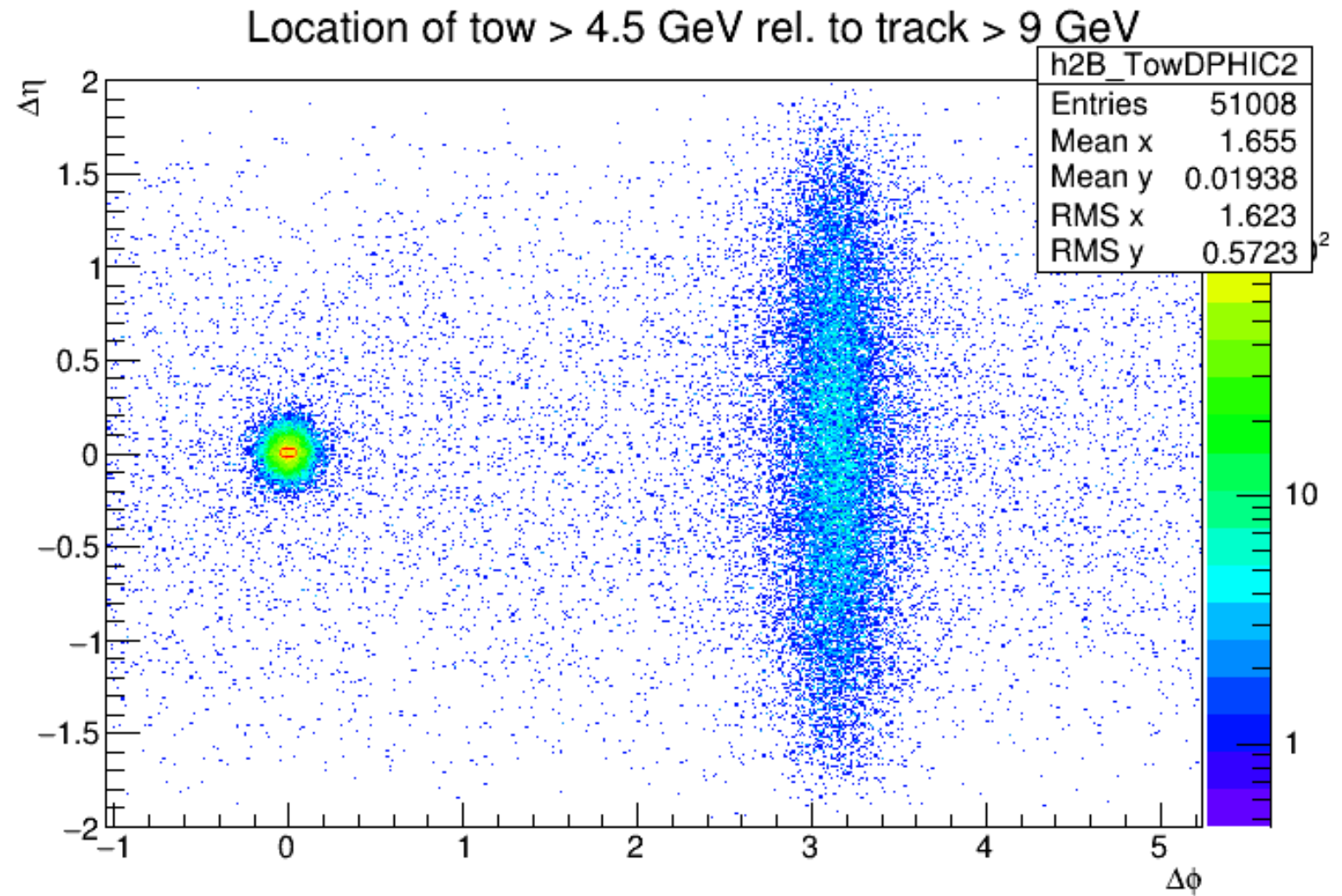
- These 4 pairs of towers I believe are swapped are adjacent in phi
- Such a swap seems to be more common based on the already swapped towerIDs found in the bemc map
- Full mapping can be found at <https://drupal.star.bnl.gov/STAR/subsys/bemc/mapping>

	2881	2882	2883	2884	2885	2886	2887	2888
	2861	2862	2863	2864	2865	2866	2867	2868
	2841	2842	2843	2844	2845	2846	2847	2848
	2821	2822	2823	2824	2825	2826	2827	2828
	2801	2802	2803	2804	2805	2806	2807	2808
	2781	2782	2783	2784	2785	2786	2787	2788
	2761	2762	2763	2764	2765	2766	2767	2768
	2741	2742	2743	2744	2745	2746	2747	2748

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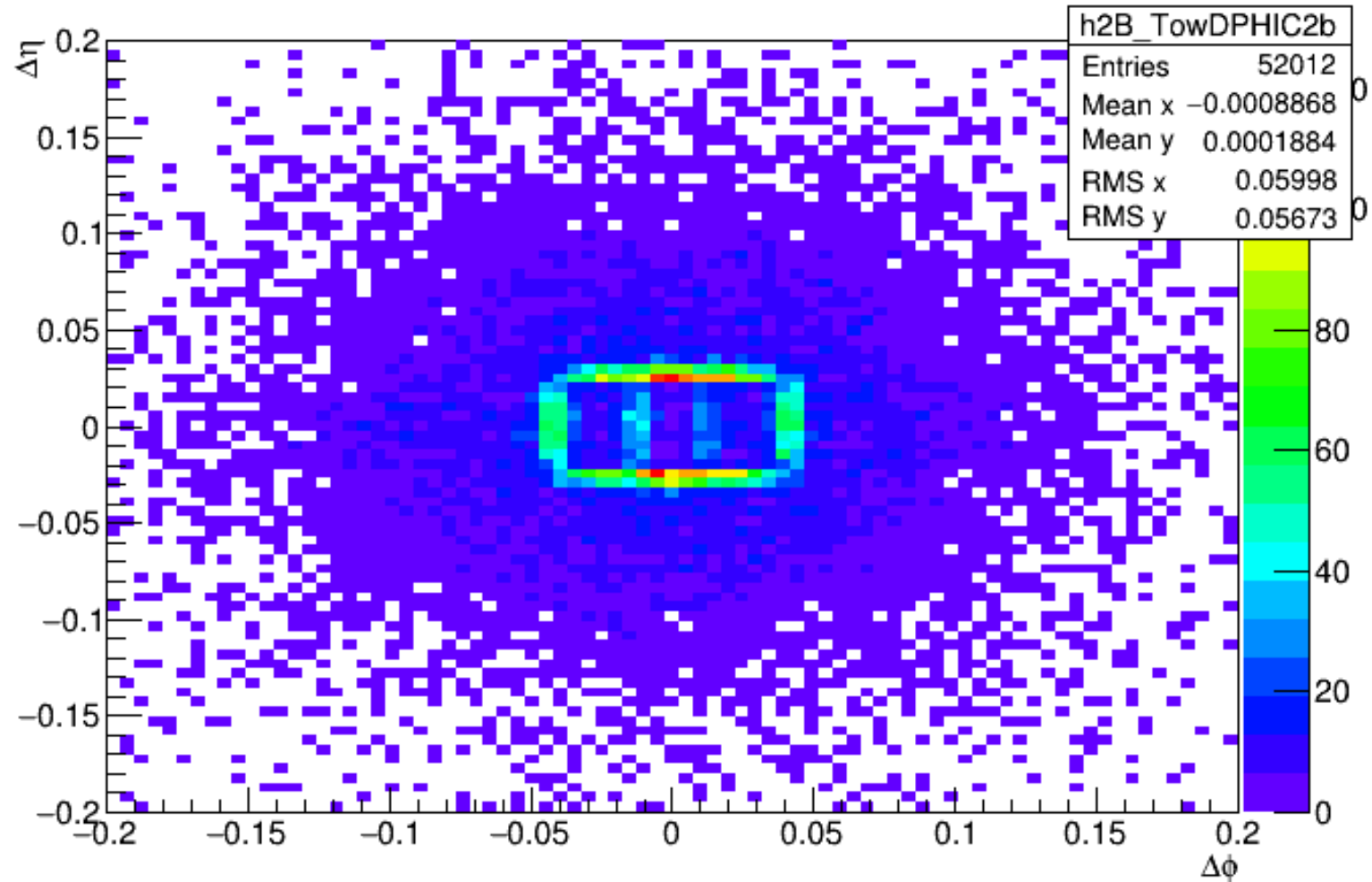
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- After temporarily adding the suspicious towers to my bad tower list, enhancements at eta +/- 0.4 disappear
- However, there still seems to be structure about (0,0)



Location of tow > 4.5 rel. to track > 9.0 GeV

- Same histogram as before except zoomed in and not log scale
- Although after HC, can see the outline of the tower implying that my HC is not fully subtracting off the energy deposited by these high-pT tracks
- For tower/track matching, I am using StPicoBEmcPidTraits
- Effective size of tower is extended in phi due to the bending of positive and negatively charged tracks



Summary

- I believe I found 8+4 pairs of swapped towers in Run14, which are not yet corrected
- For these high-pT tracks I am looking at, there seems to be energy deposited into towers which are not matched to the tracks (at least not found in StPicoBEmcPidTraits)
 - Possibly the high-pT tracks are being matched to a different tower? Still investigating...

Backup

- BEFORE HC
- Location of highest E tower within $\Delta R < 0.15$ relative to track with $p_T > 9.0$ GeV
- Effective size of tower is extended in phi due to the bending of positive and negatively charged tracks

