

## CDC $dE/dx$ problems, Aug 2017

- 1 Occasional  $dE < 0$  (when a hit occurs before the baseline has recovered from an earlier hit)
- 2 Space-charge effect (first cluster to reach the wire depletes the gas of e-s in that region, affects perpendicular tracks most)

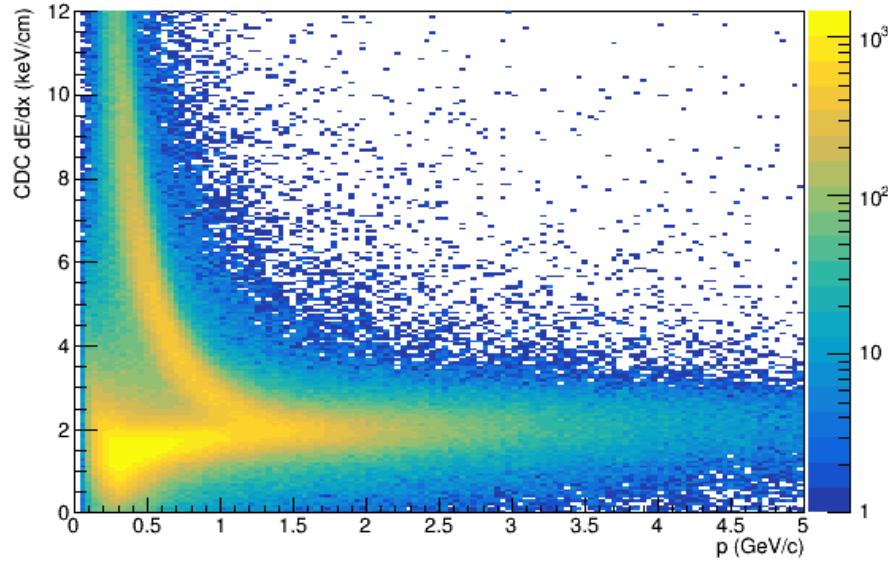
Expect #1 to become more prevalent with increased count rate.

### Solutions

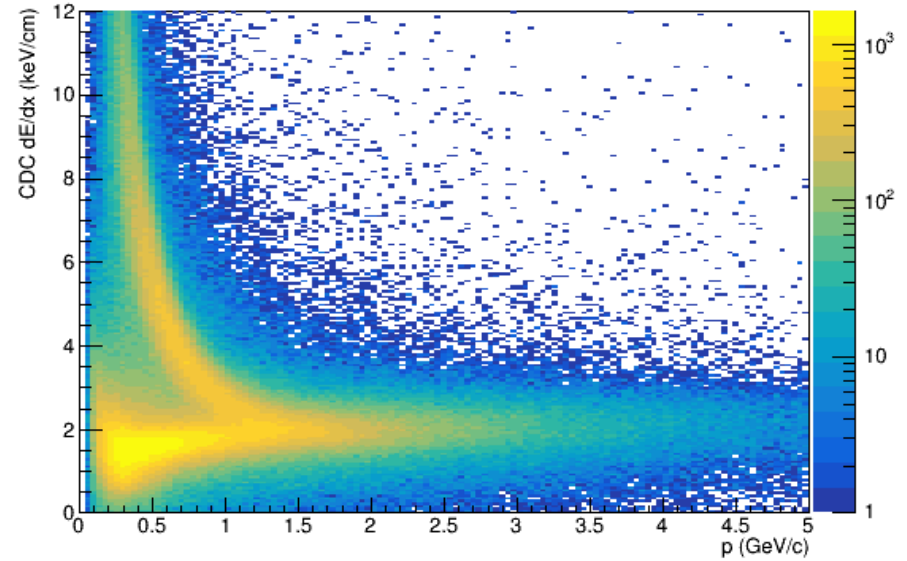
- A. Ignore hits with  $dE \leq 0$  in tracking code – partially fixes #1
- B. Use pulse height instead of integral – fixes #1 and maybe #2

A: Ignore hits with  $dE \leq 0$ , monitoring\_hists, 011366 file 001

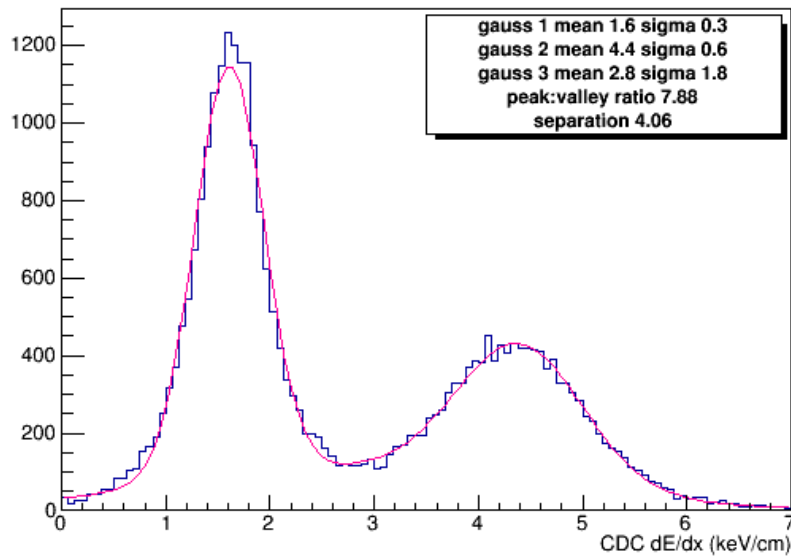
q<sup>+</sup> Original dE/dx code



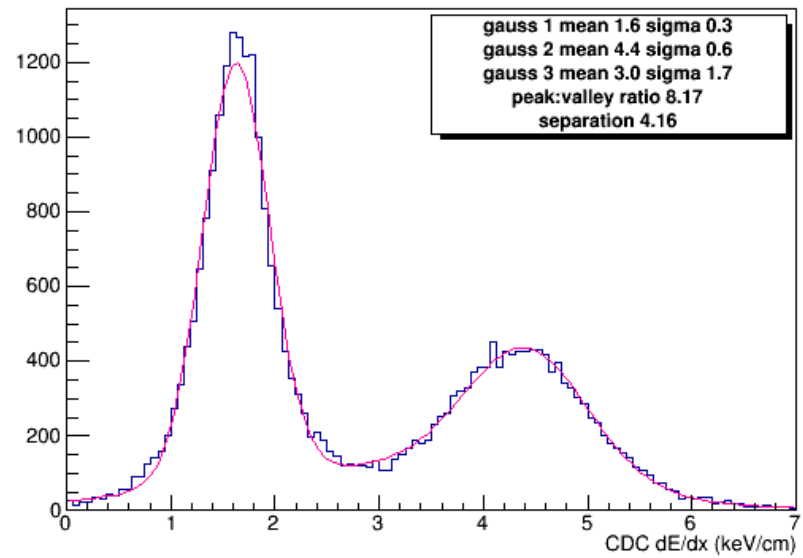
q<sup>+</sup> dE/dx ignoring CDC hits with  $dE \leq 0$



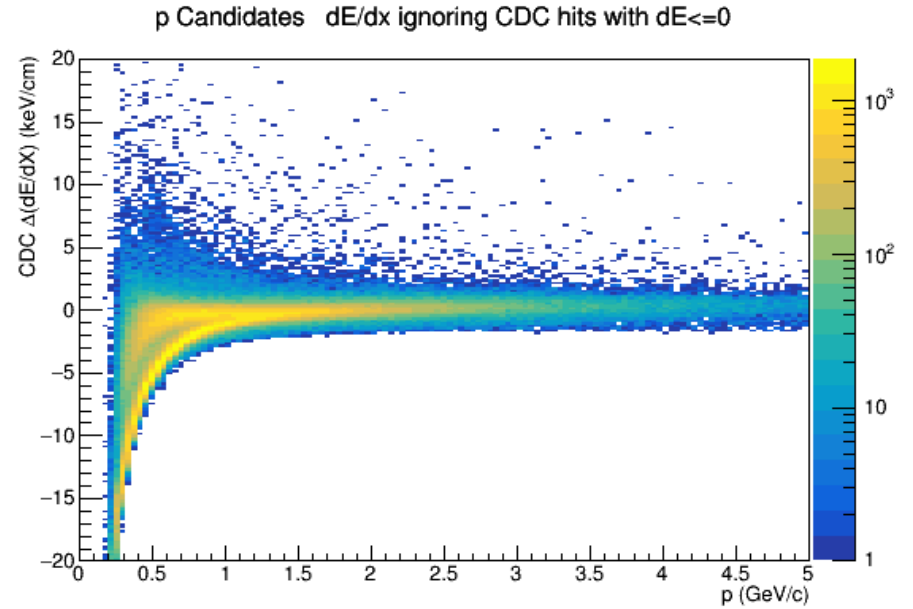
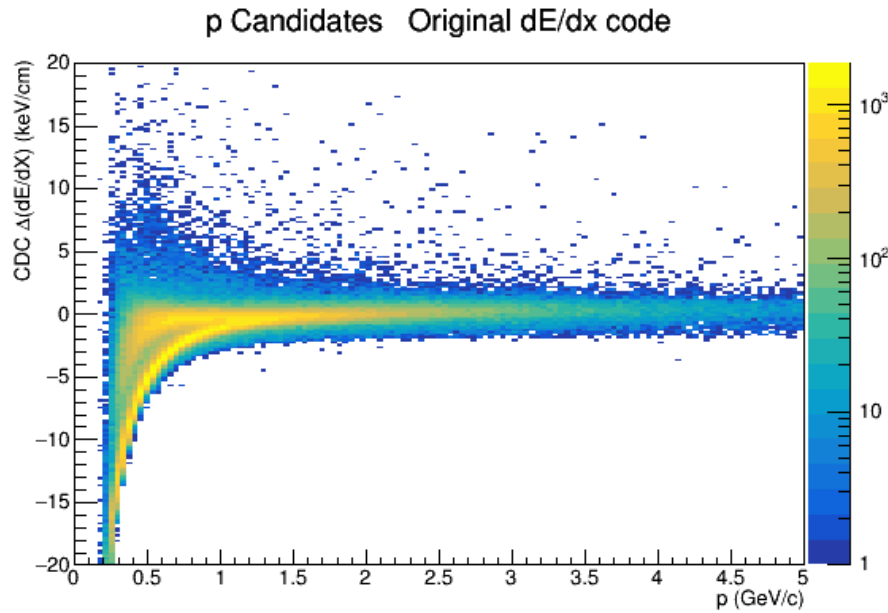
Projection for  $p=0.60$  to  $0.64$  GeV/c



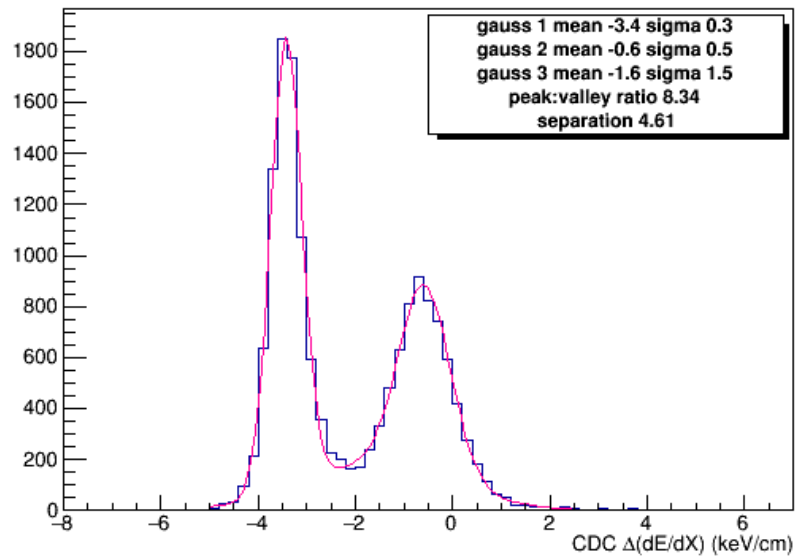
Projection for  $p=0.60$  to  $0.64$  GeV/c



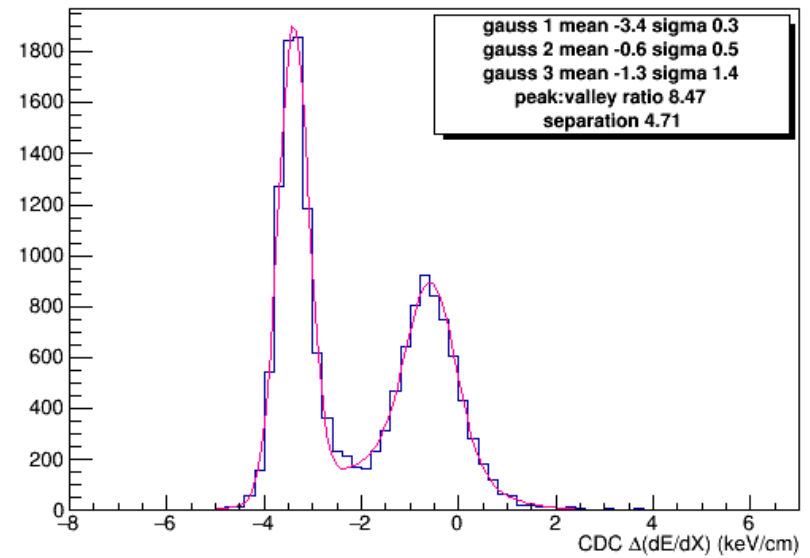
# A: Ignore hits with $dE \leq 0$ , monitoring\_hists, 011366 file 001



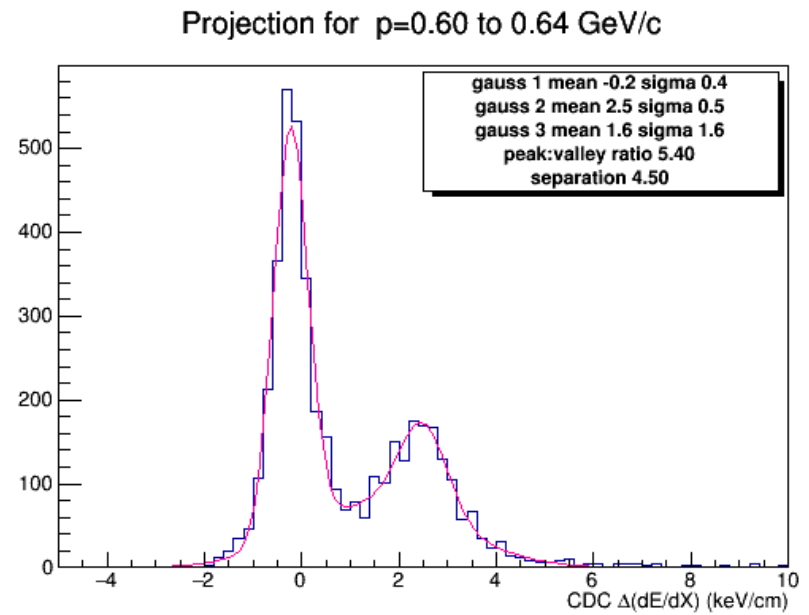
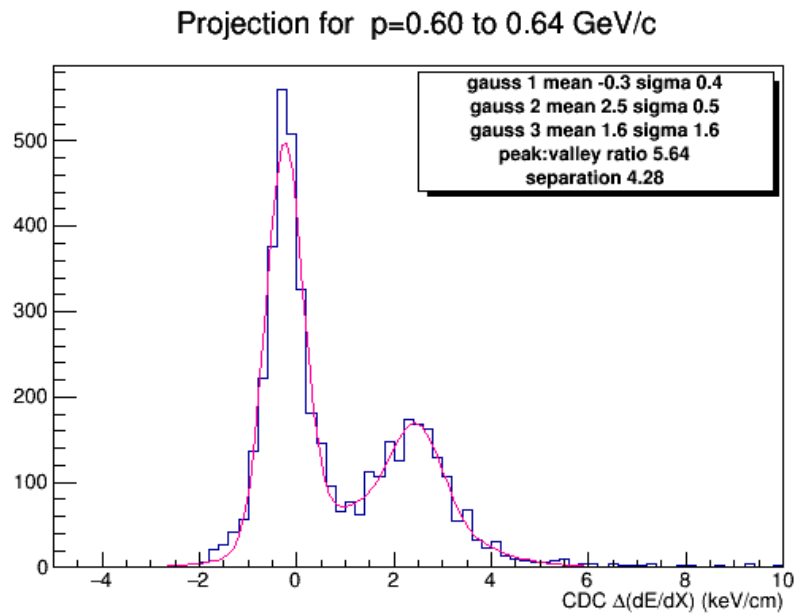
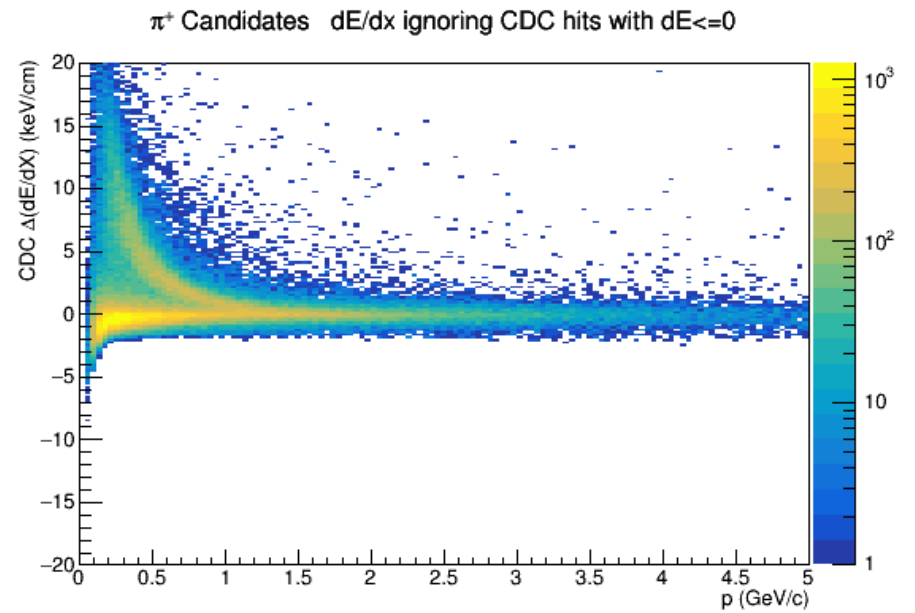
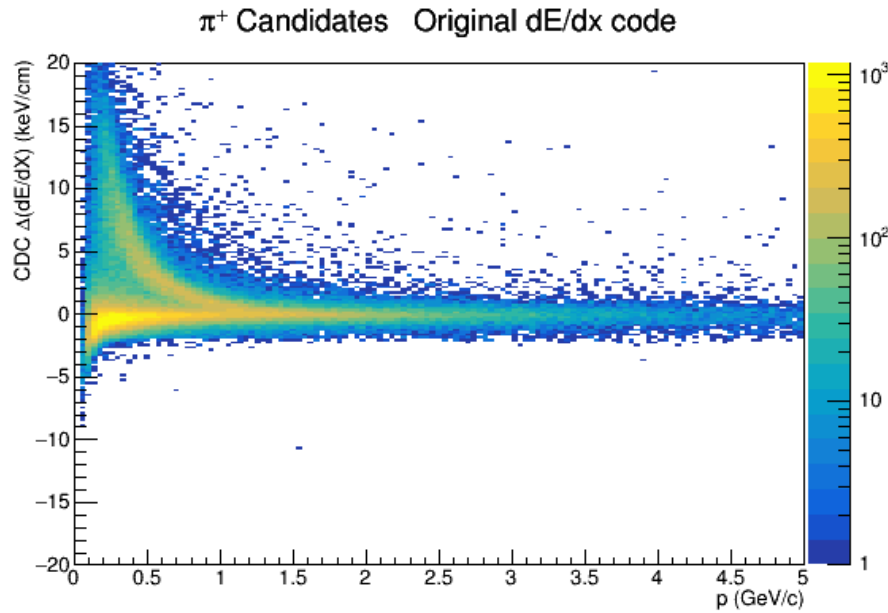
Projection for  $p=0.60$  to  $0.64$  GeV/c



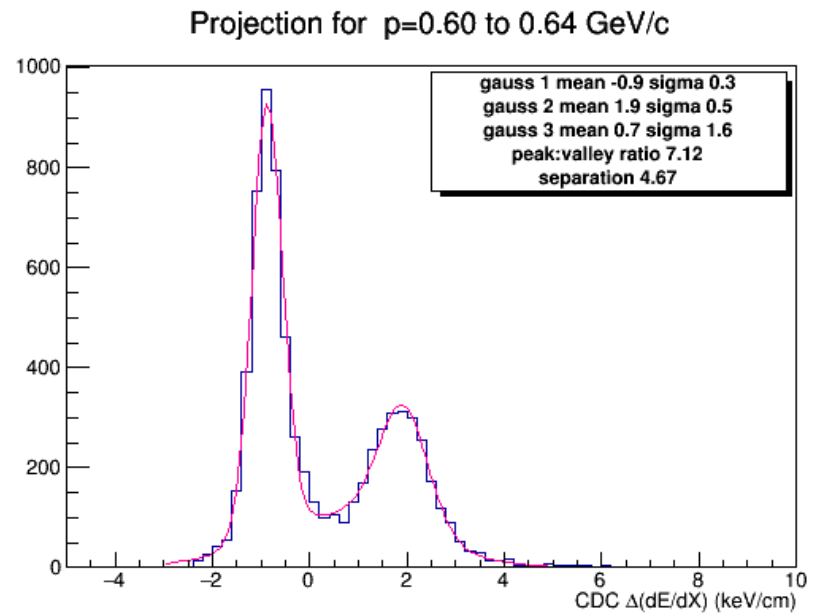
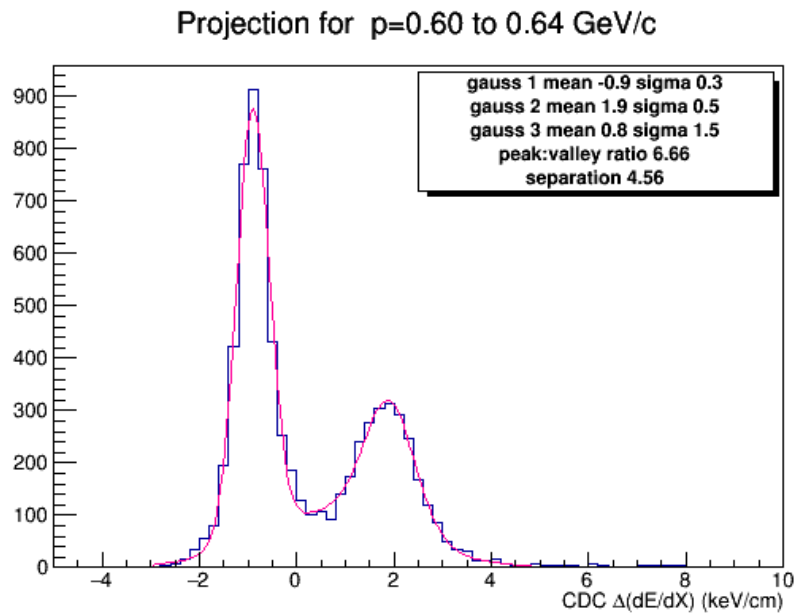
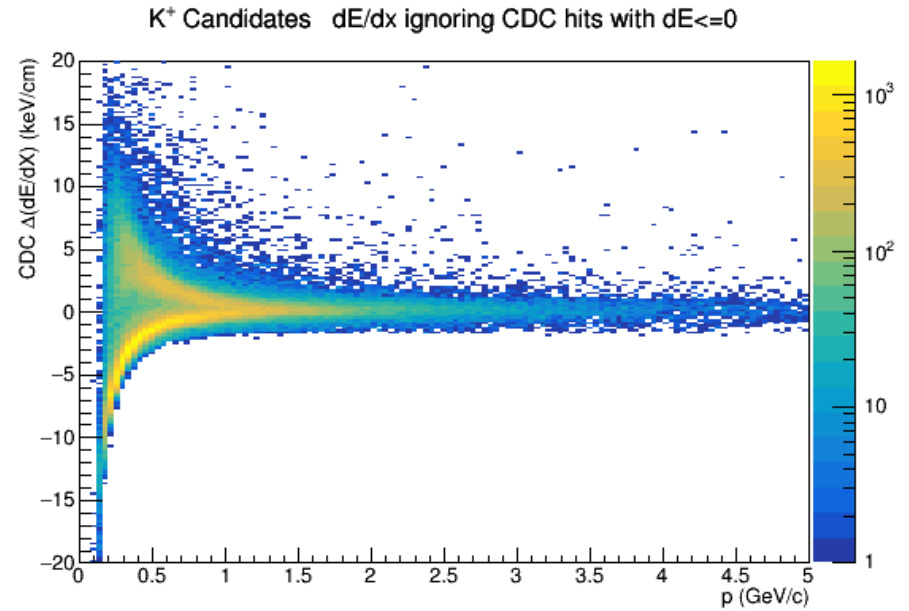
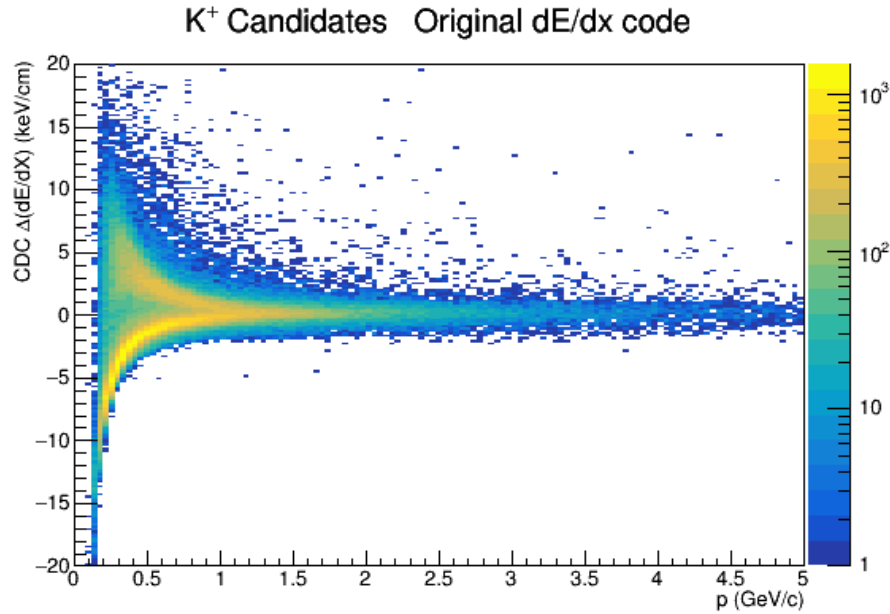
Projection for  $p=0.60$  to  $0.64$  GeV/c



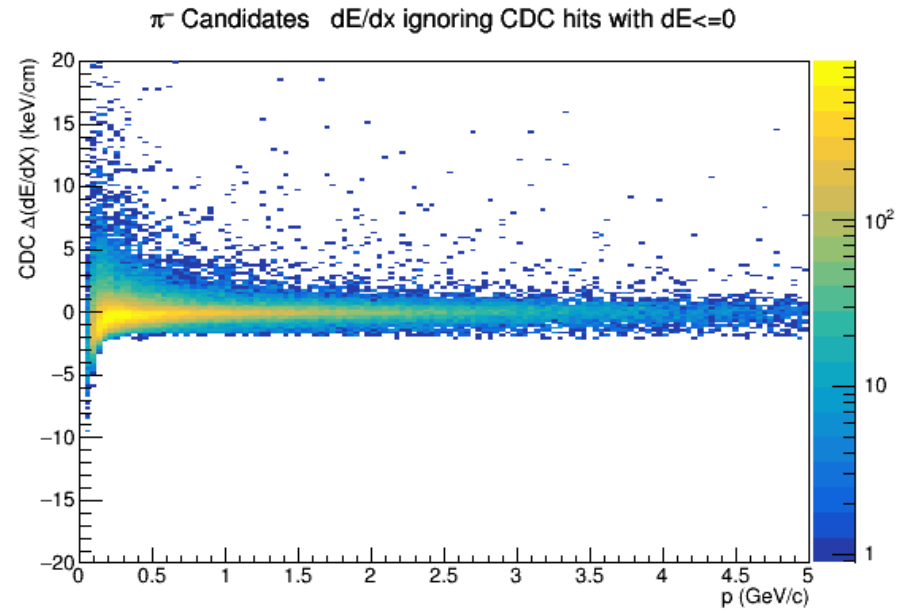
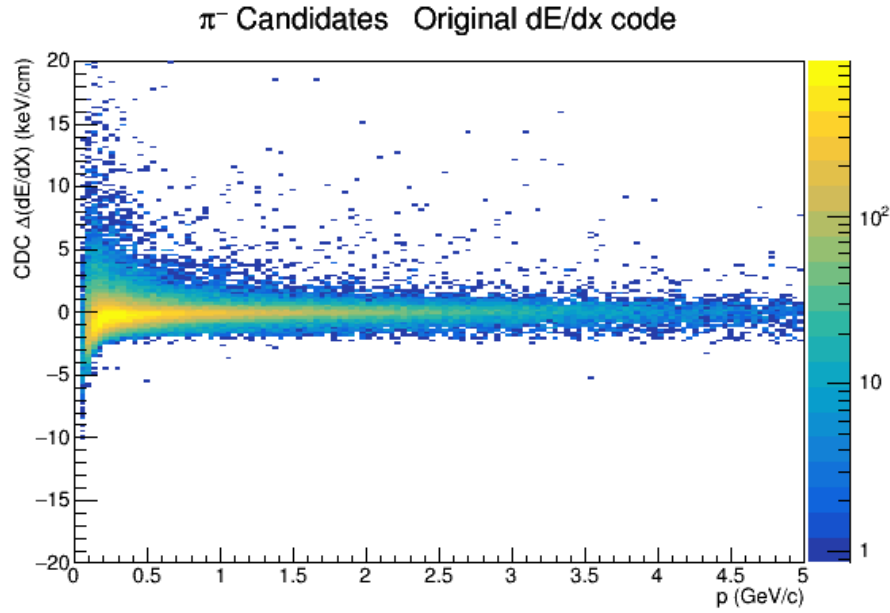
# A: Ignore hits with $dE \leq 0$ , monitoring\_hists, 011366 file 001



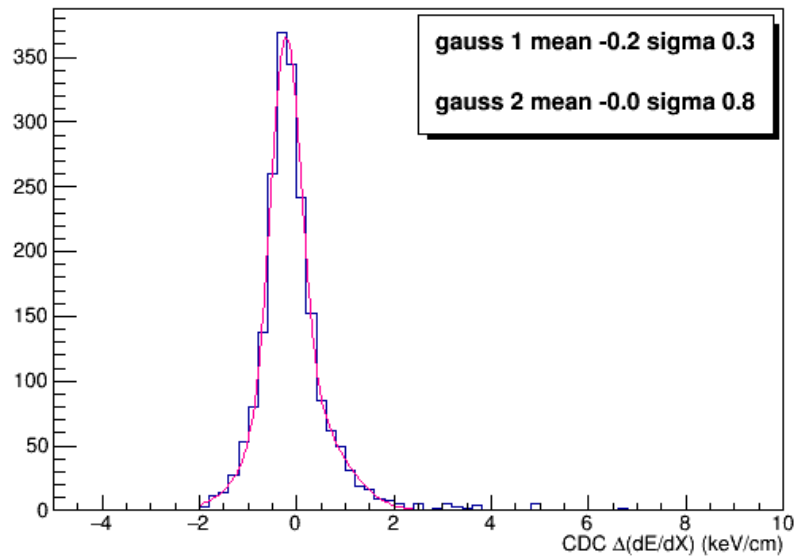
# A: Ignore hits with $dE \leq 0$ , monitoring\_hists, 011366 file 001



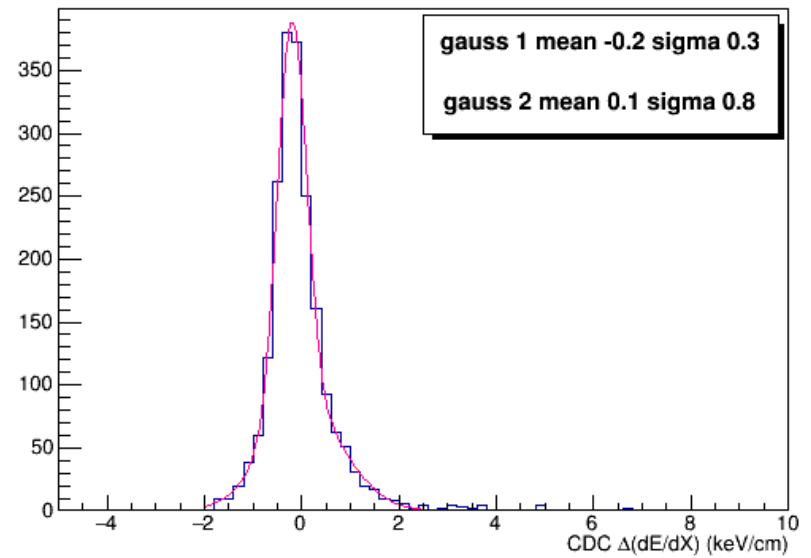
# A: Ignore hits with $dE \leq 0$ , monitoring\_hists, 011366 file 001



Projection for  $p=0.60$  to  $0.64$  GeV/c

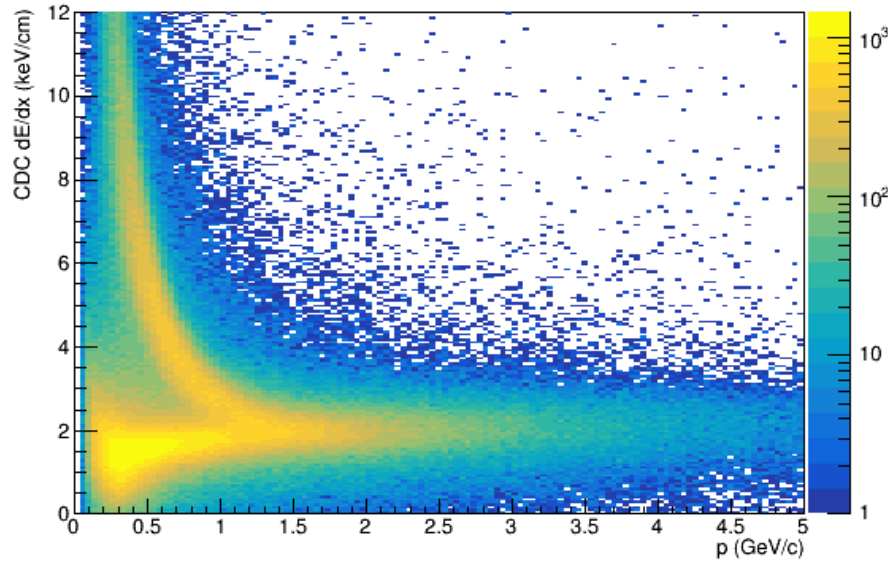


Projection for  $p=0.60$  to  $0.64$  GeV/c

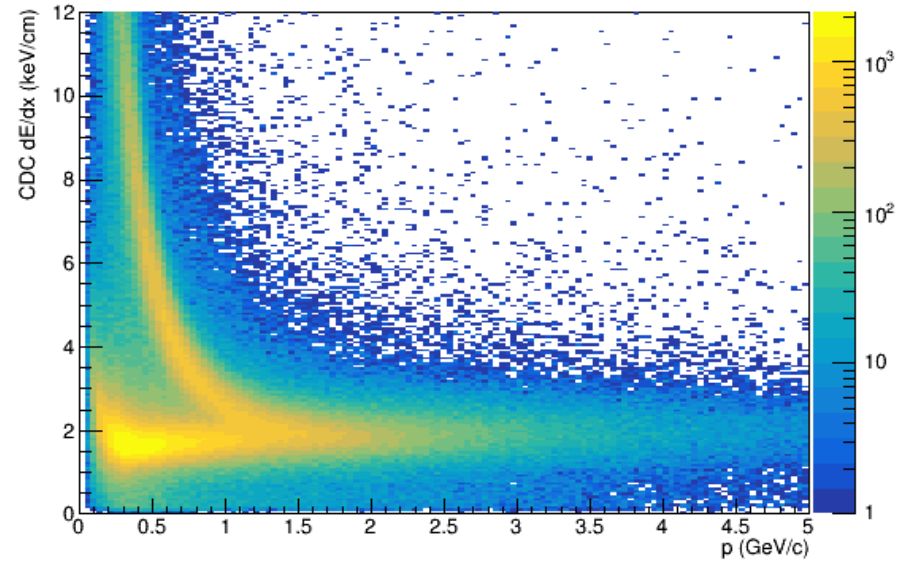


B: Use pulse height x29 instead of integral, monitoring\_hists, 011366 file 001

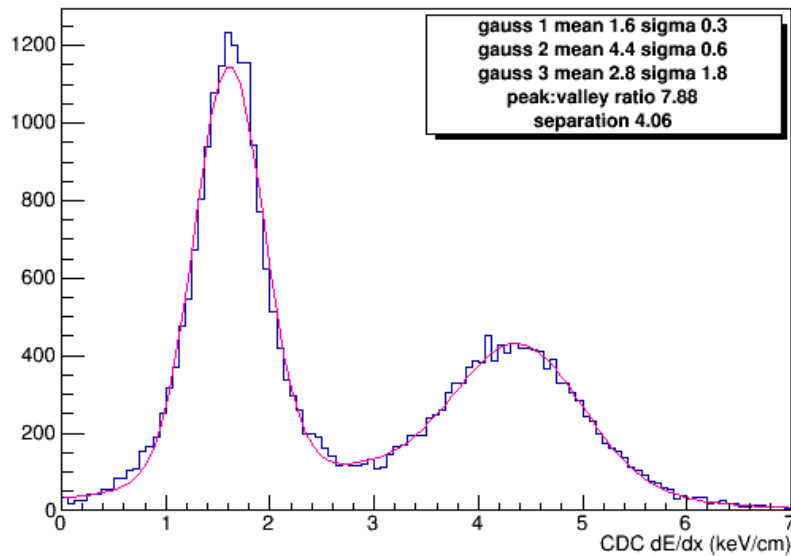
q<sup>+</sup> Original dE/dx code



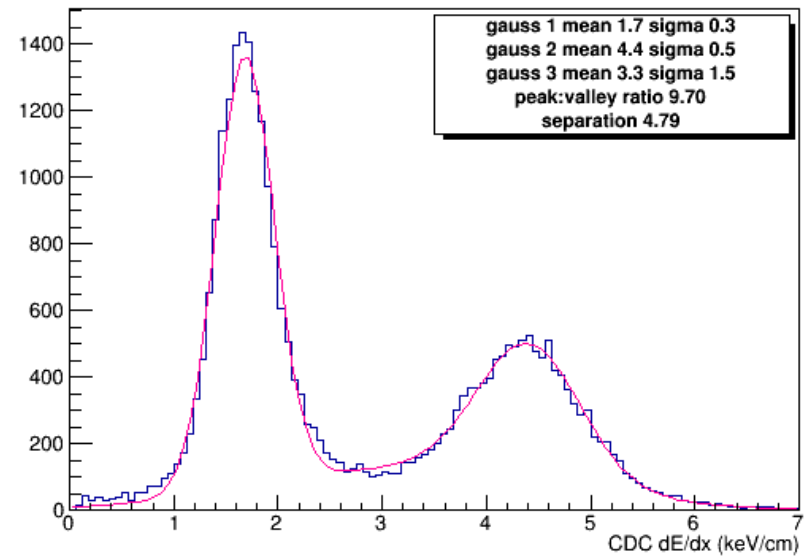
q<sup>+</sup> dE/dx using peak height instead of integral



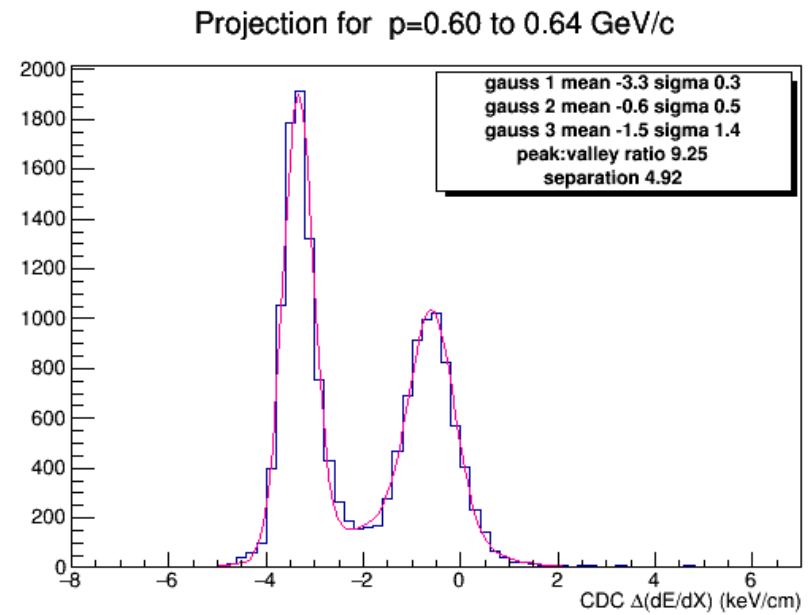
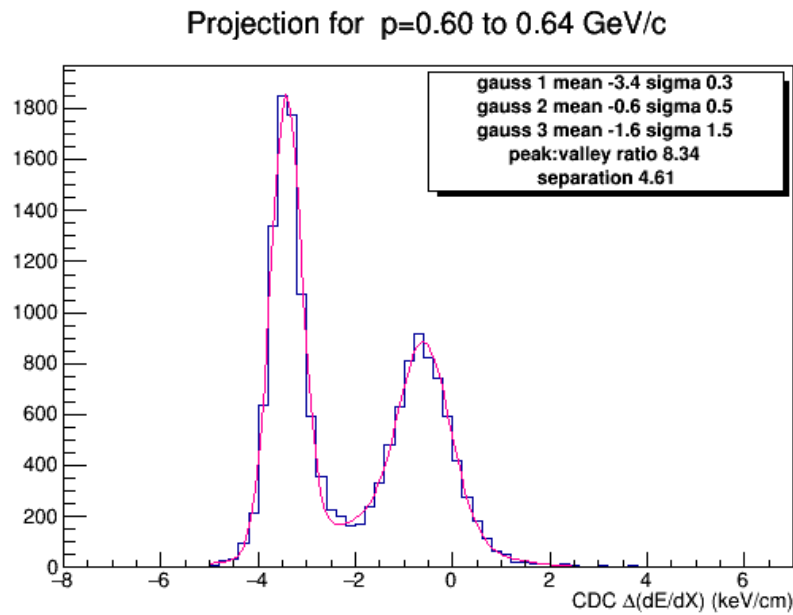
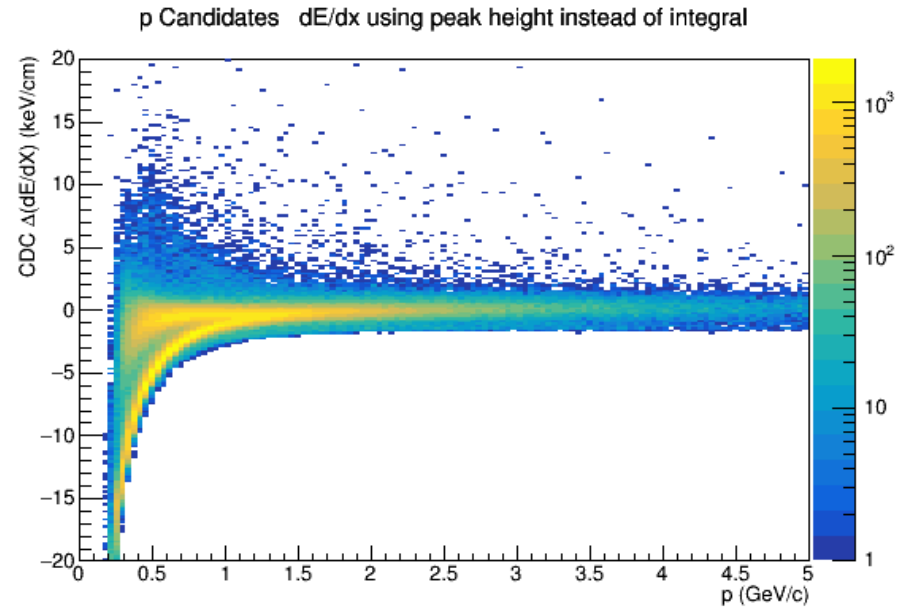
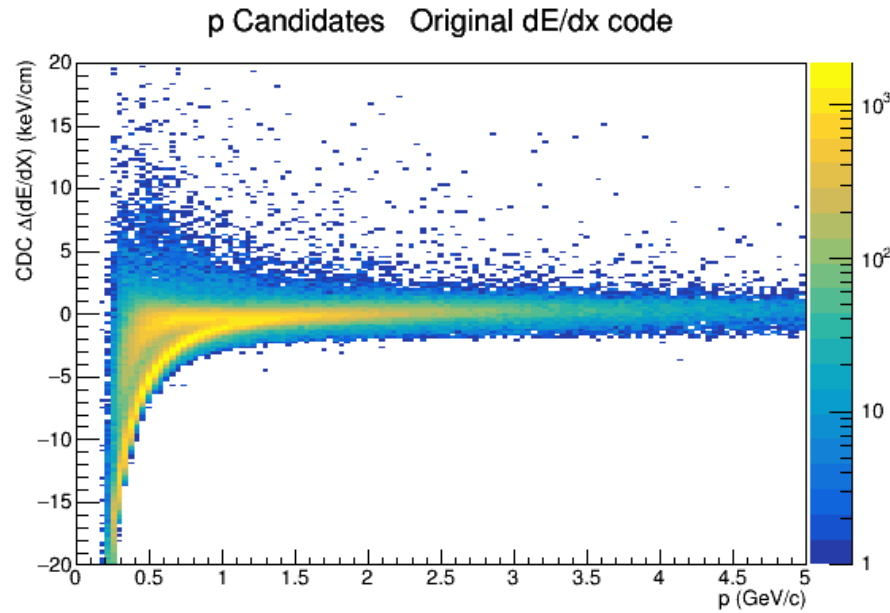
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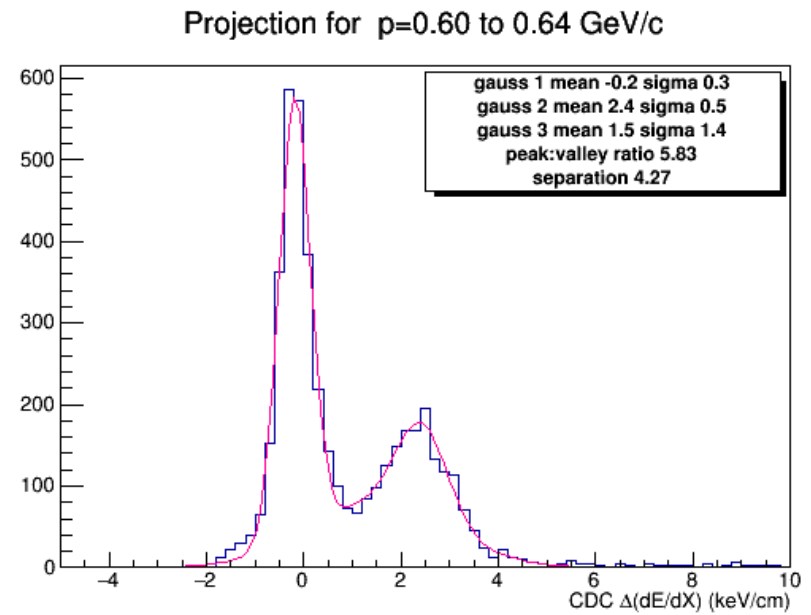
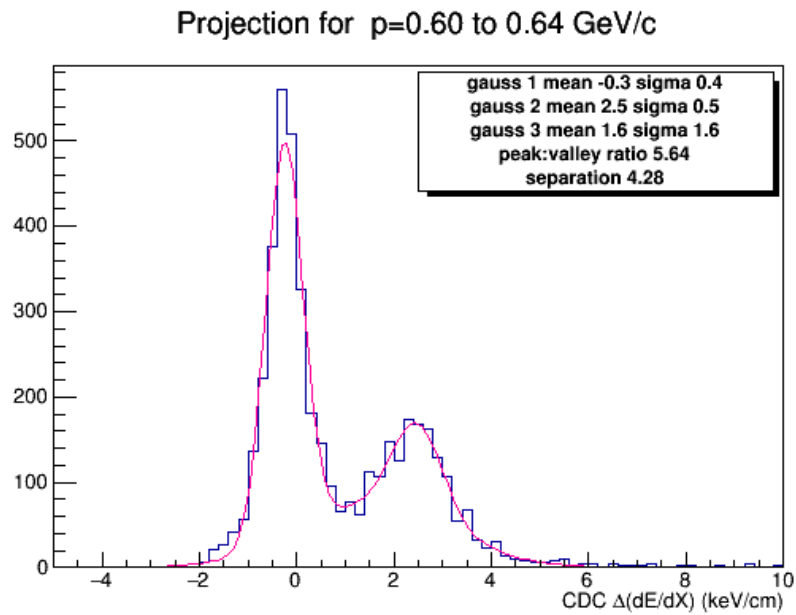
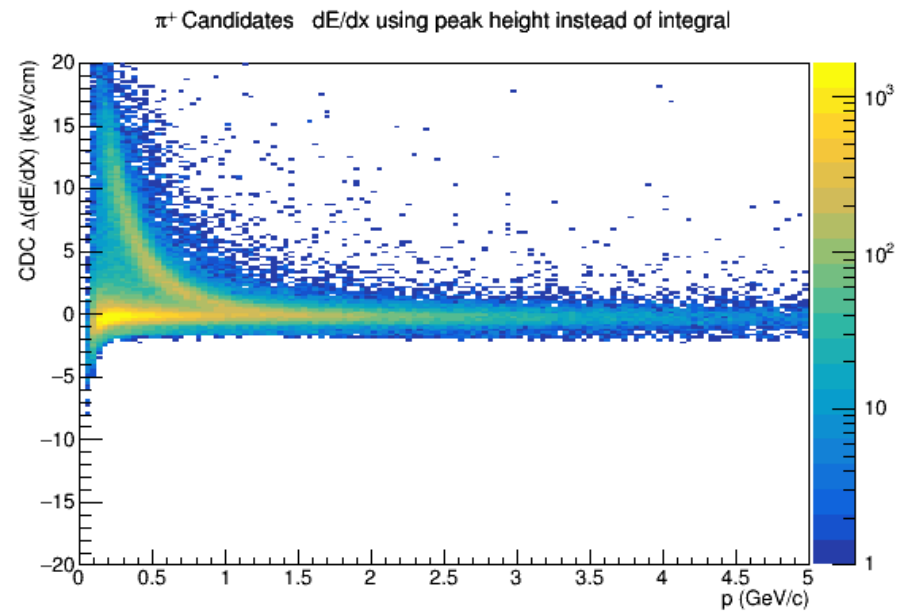
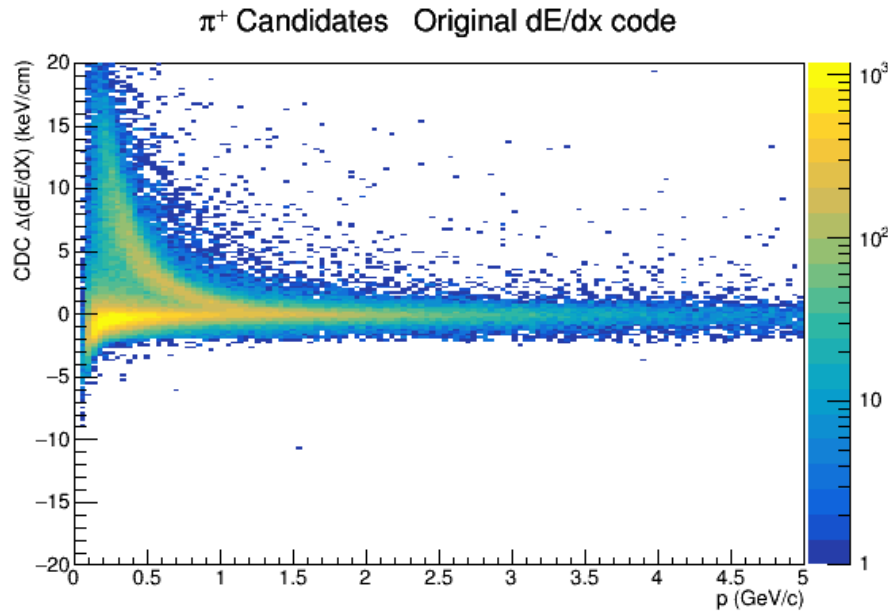


# B: Use pulse height x29 instead of integral, monitoring\_hists, 011366 file 001



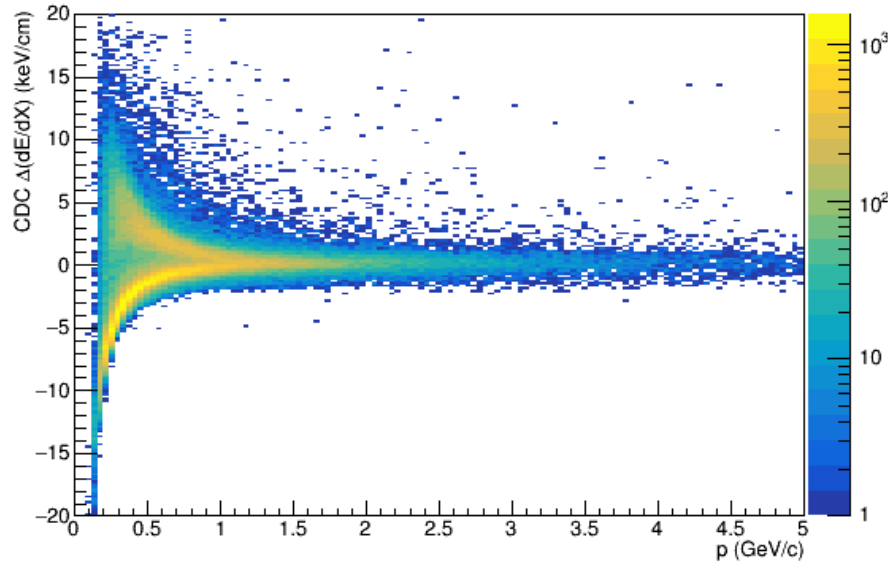


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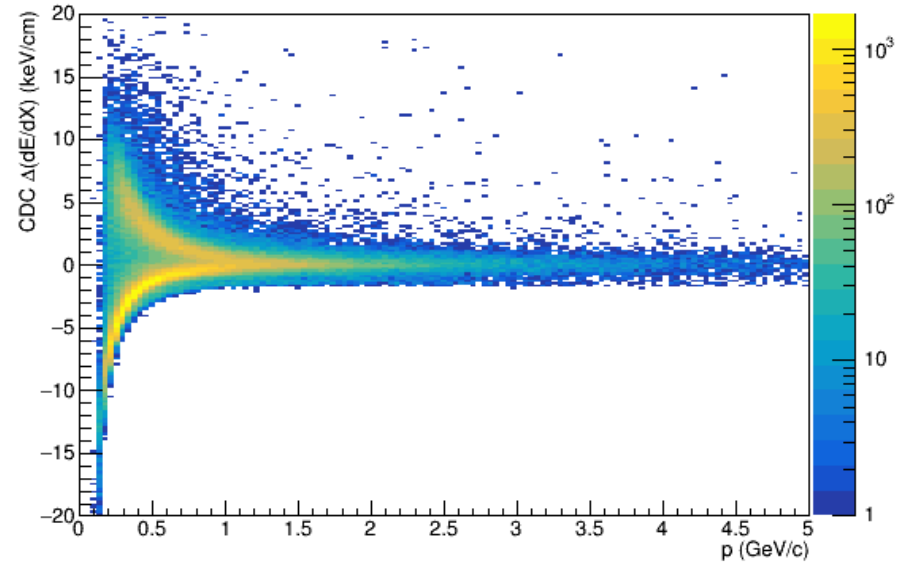


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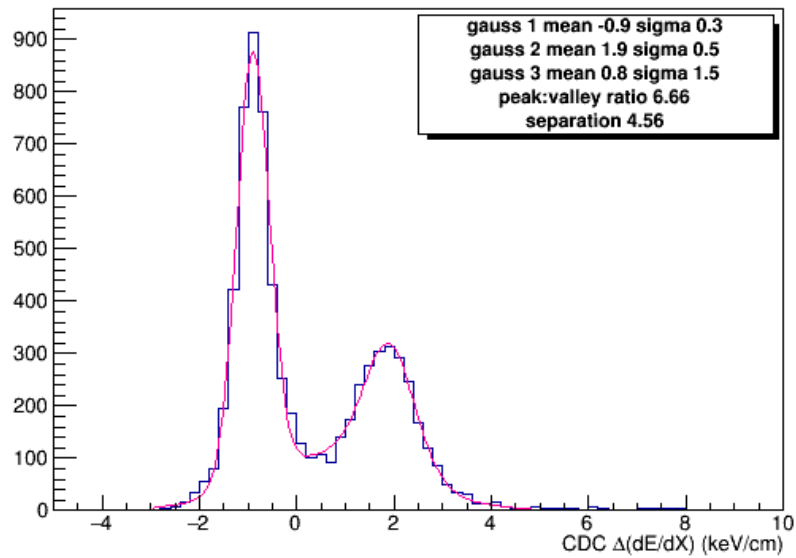
## K<sup>+</sup> Candidates Original dE/dx code



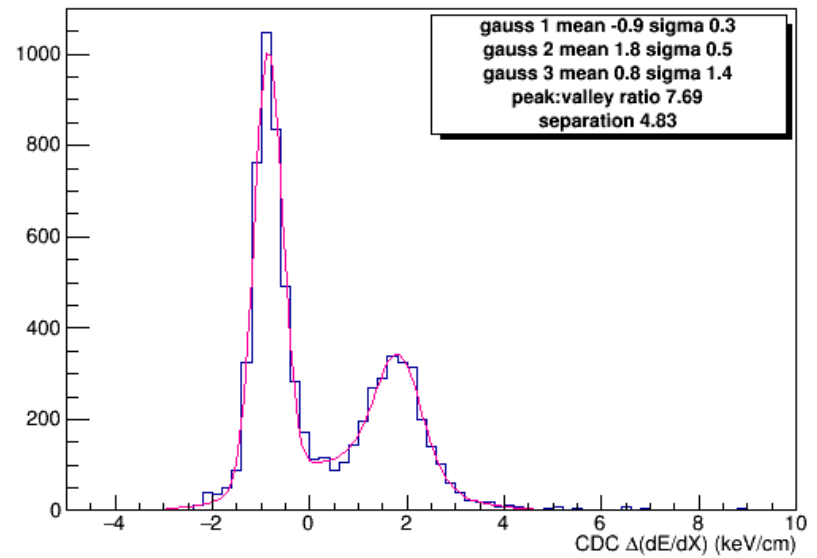
## K<sup>+</sup> Candidates dE/dx using peak height instead of integral



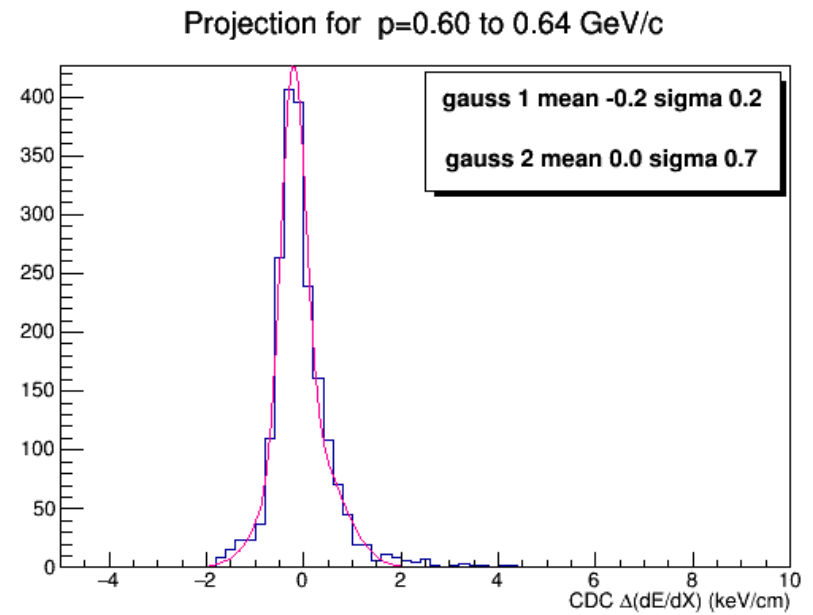
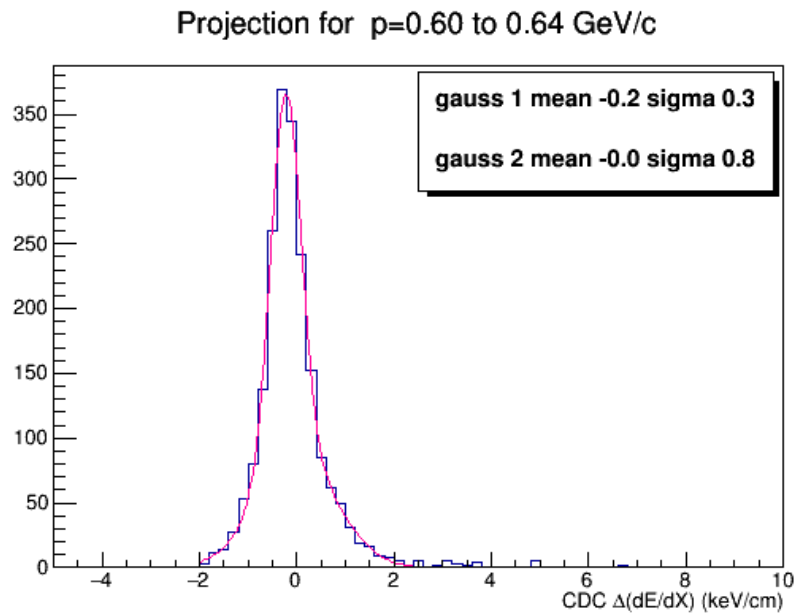
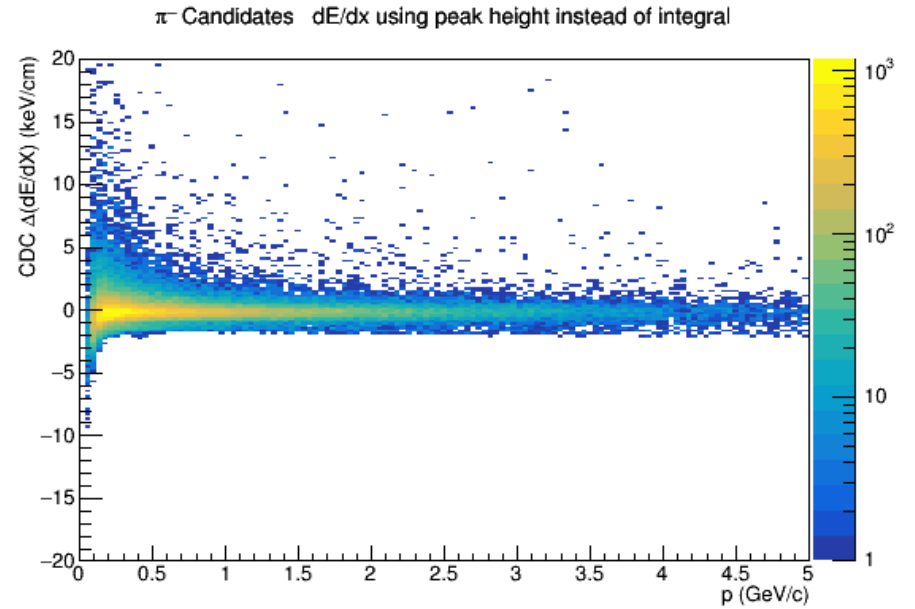
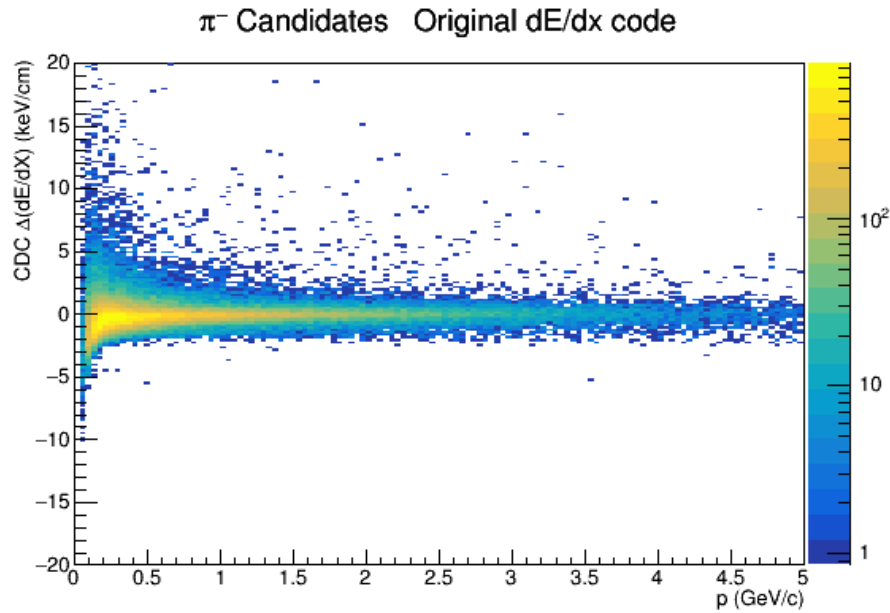
## Projection for $p=0.60$ to $0.64$ GeV/c



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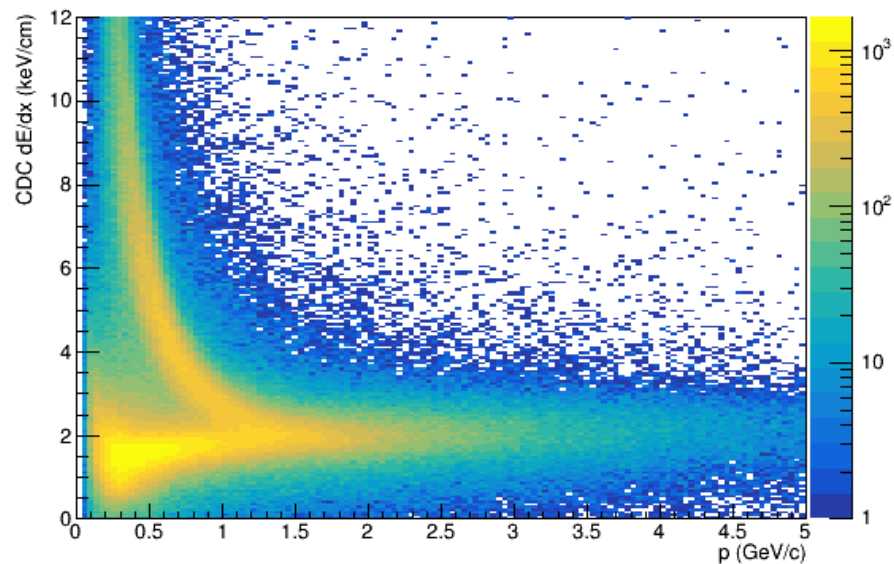


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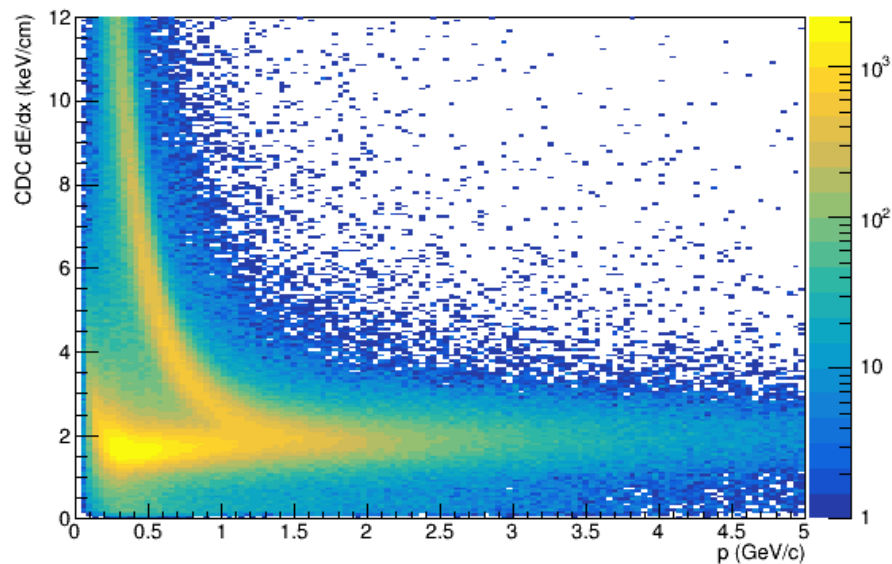


# Compare A and B

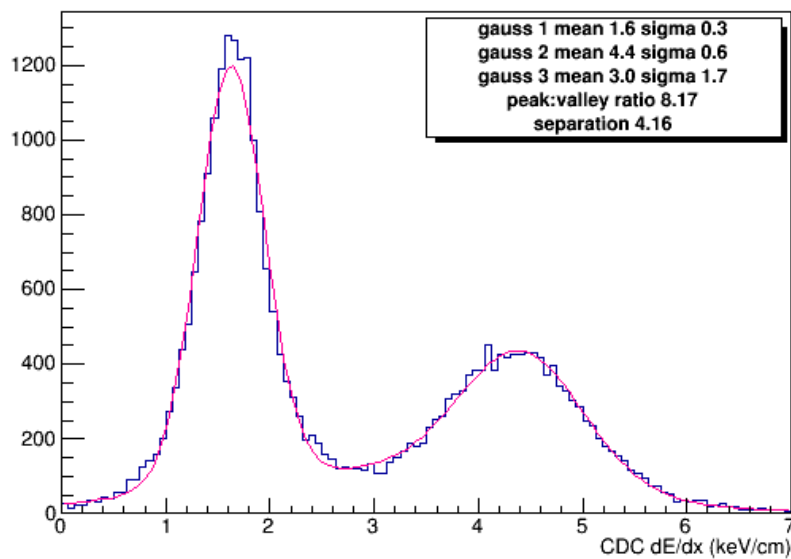
q<sup>+</sup> dE/dx ignoring CDC hits with dE≤0



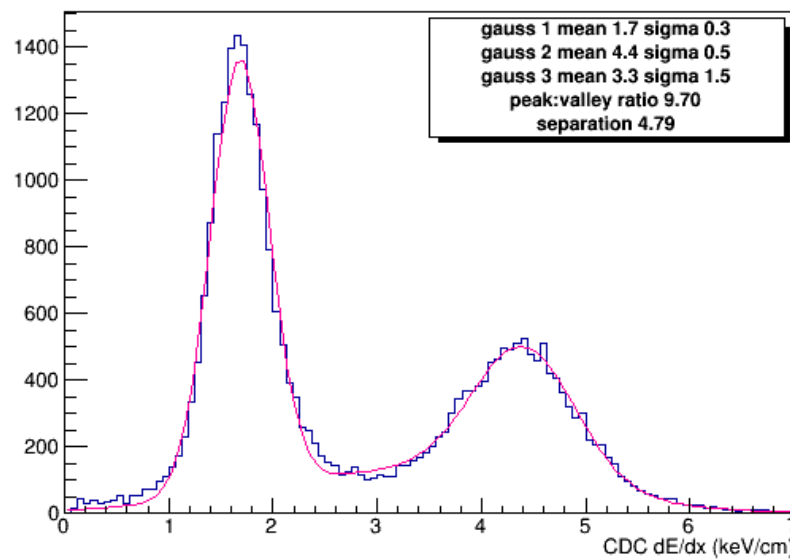
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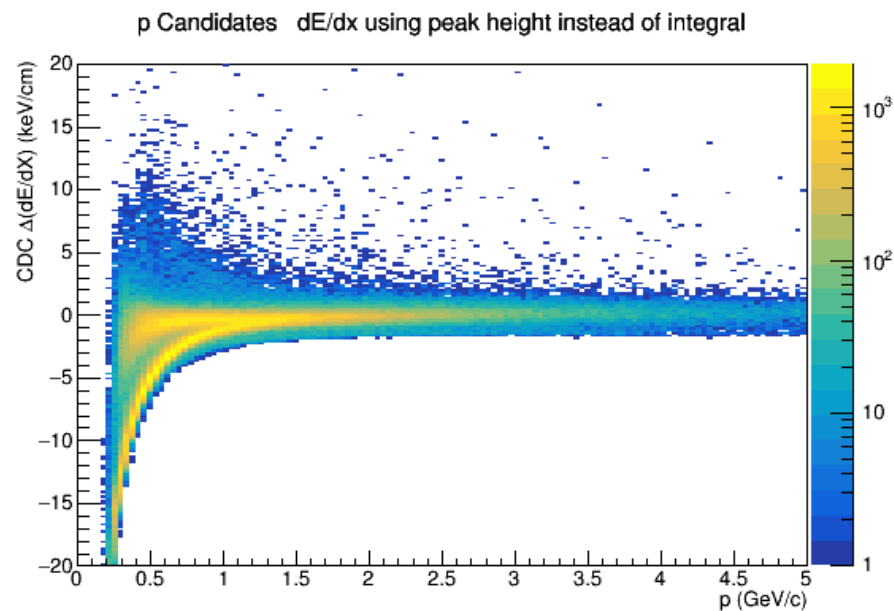
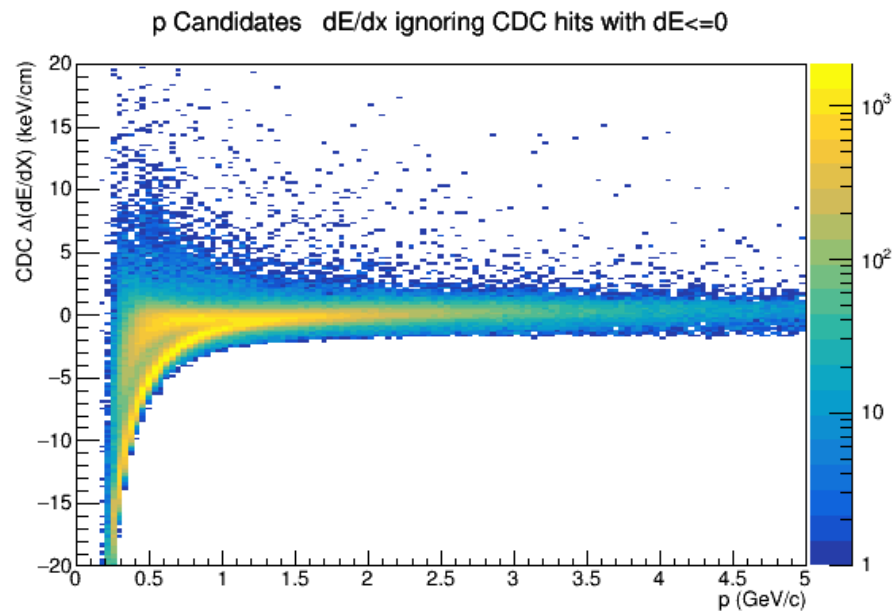
Projection for p=0.60 to 0.64 GeV/c



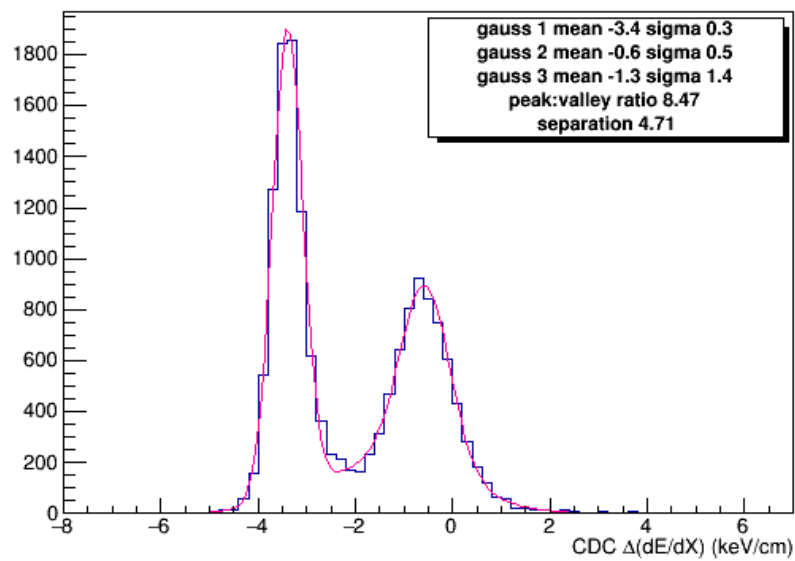
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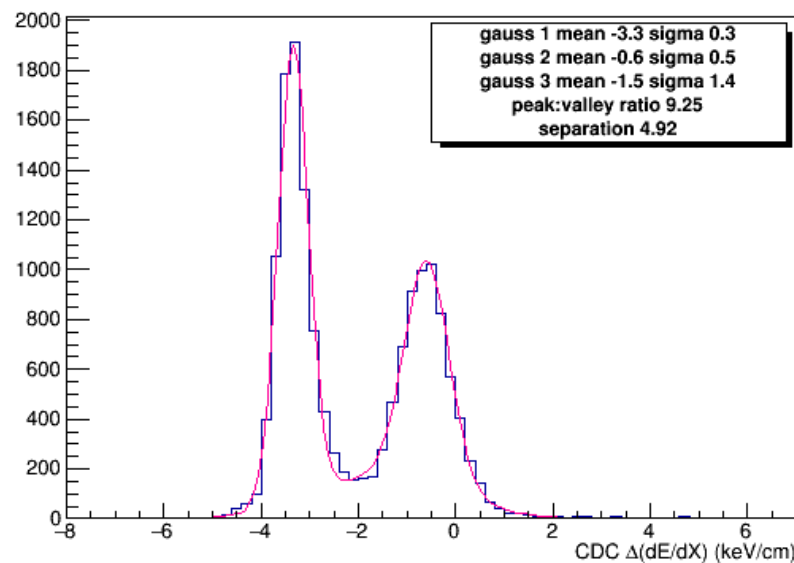
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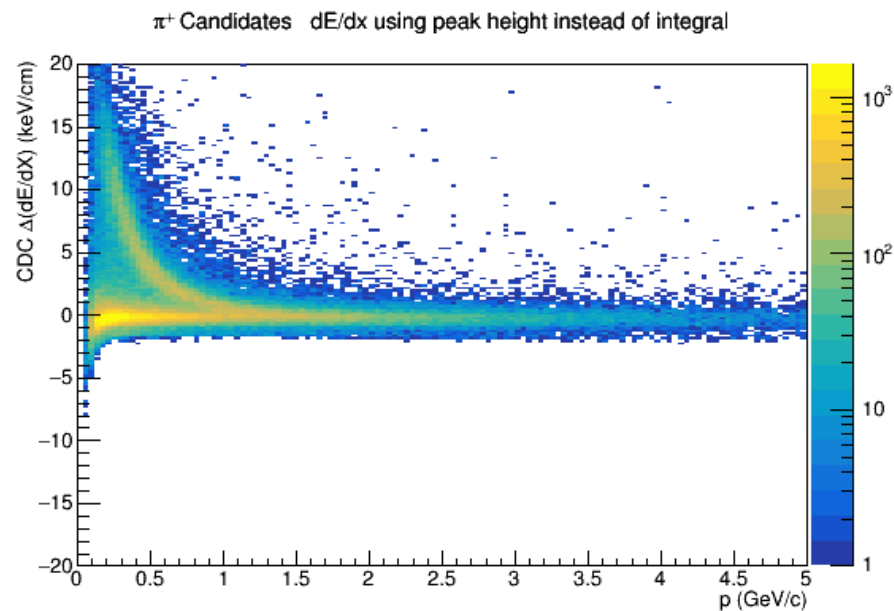
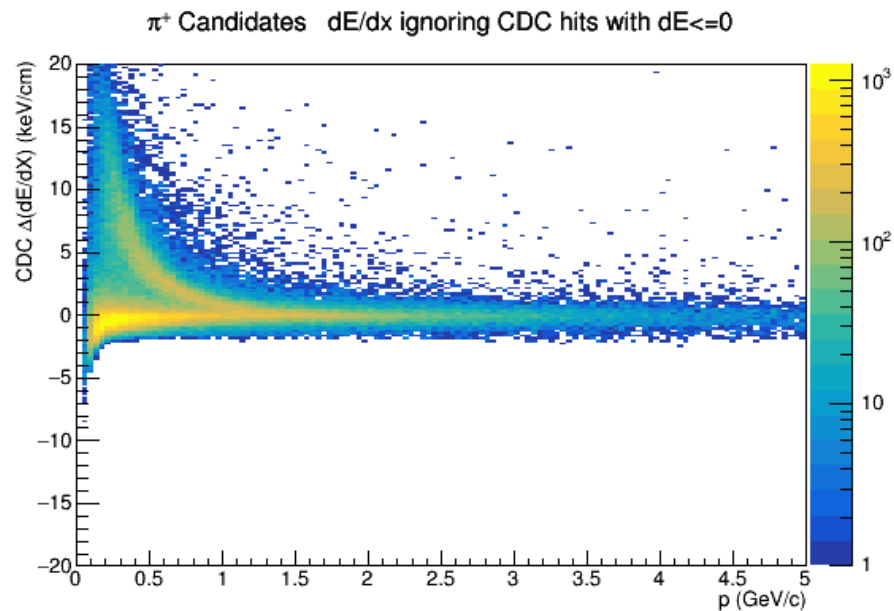
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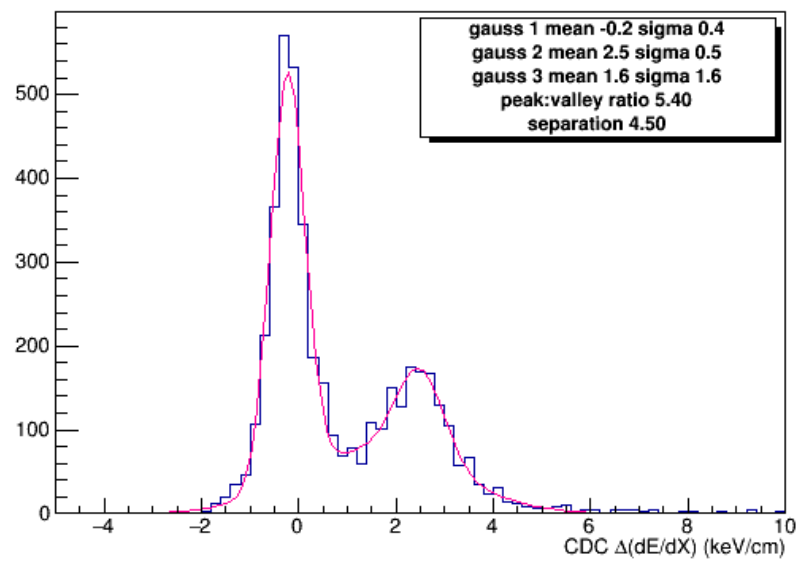
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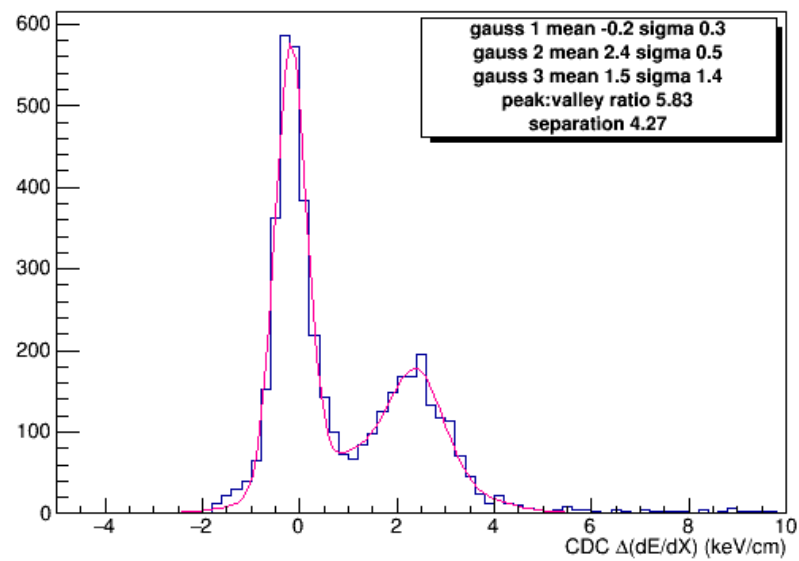
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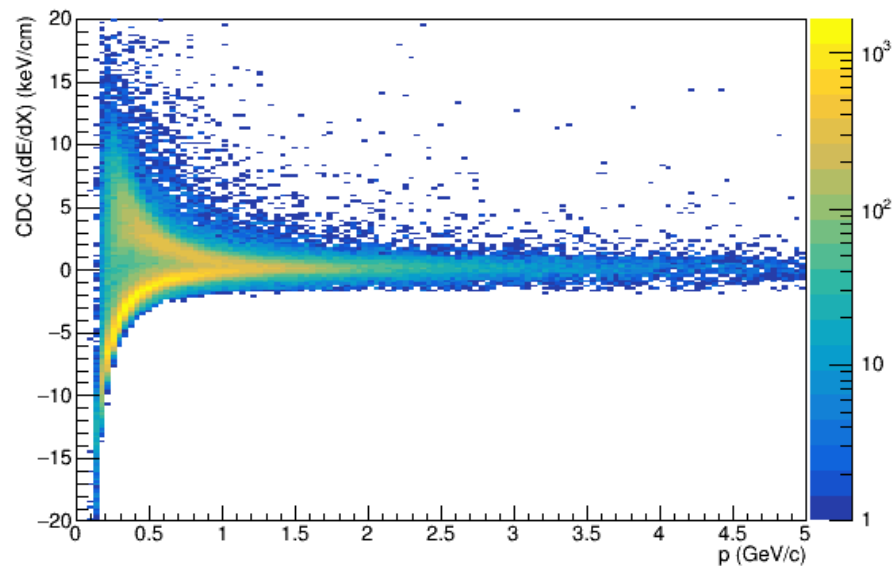


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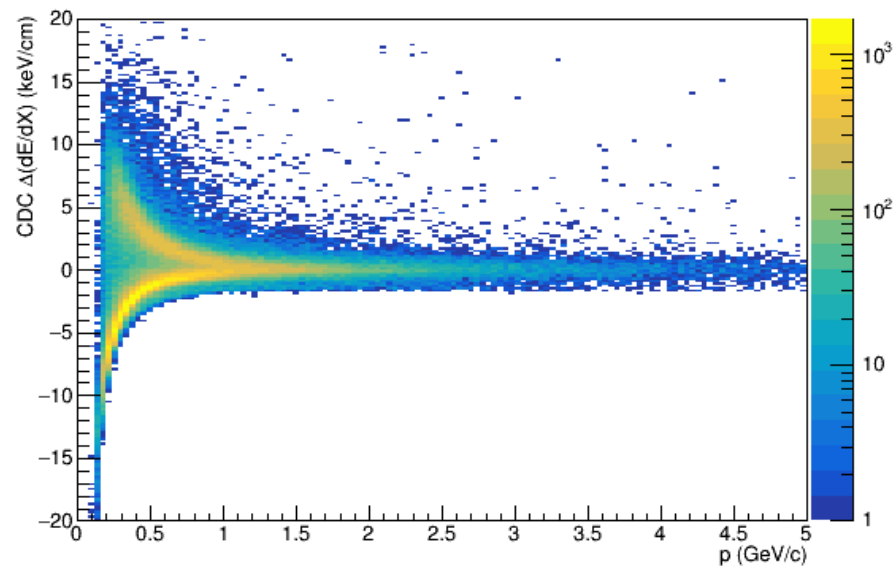


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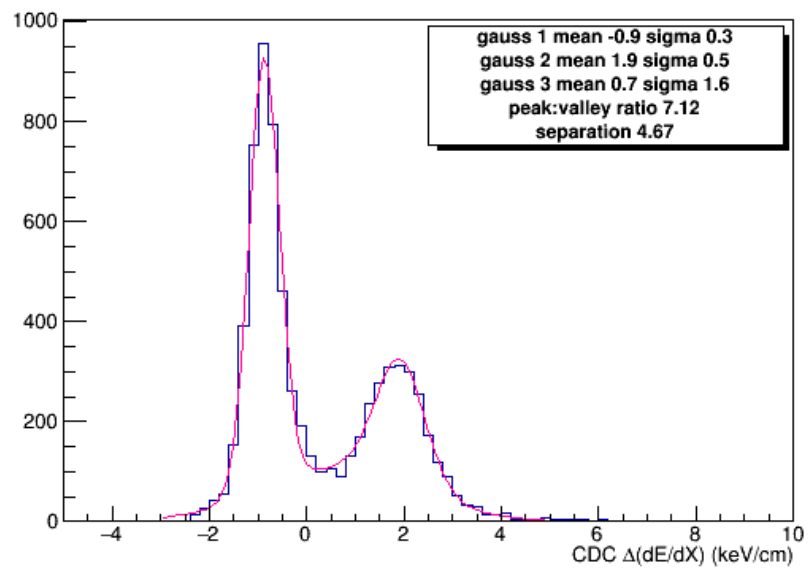
K<sup>+</sup> Candidates dE/dx ignoring CDC hits with dE ≤ 0



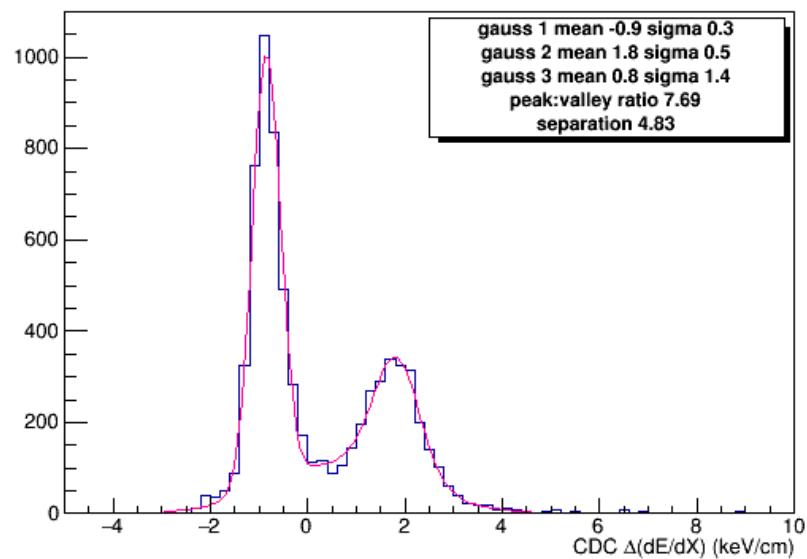
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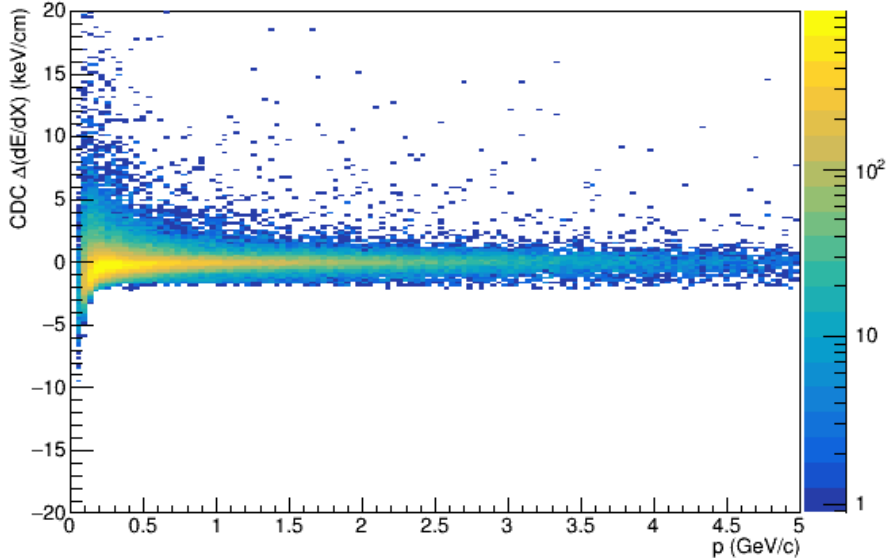


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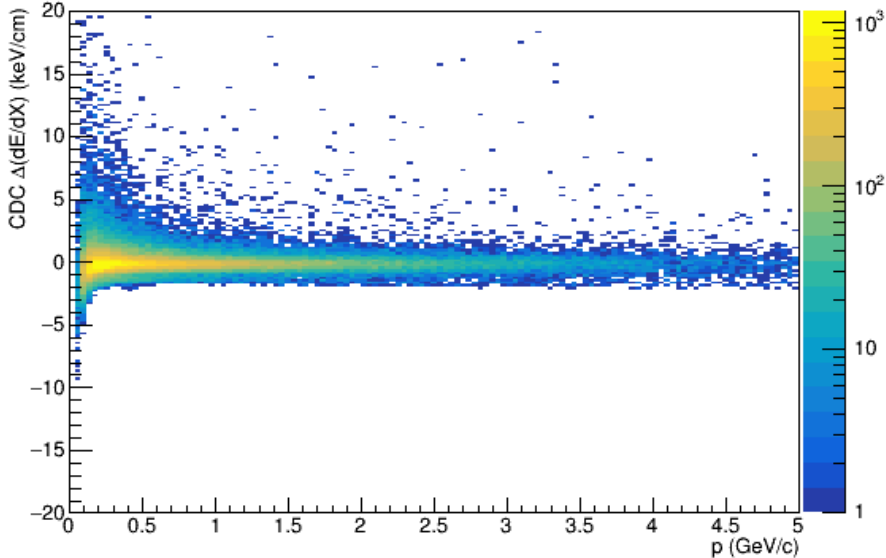


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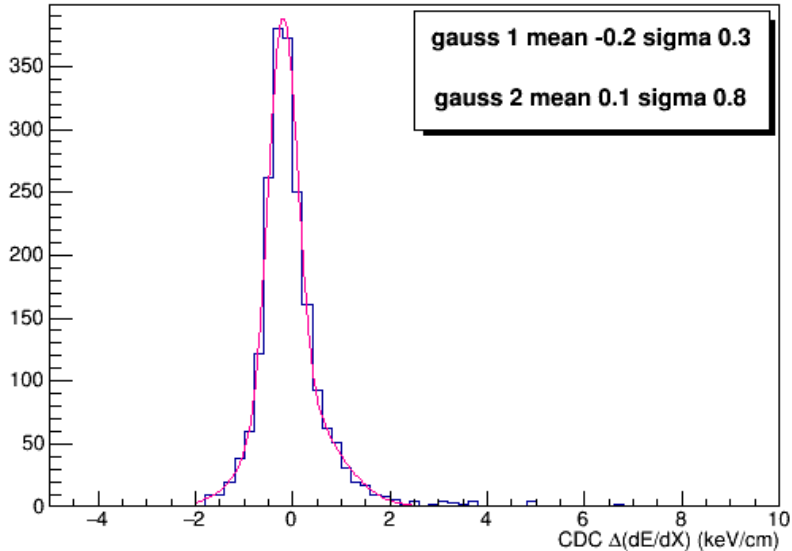
$\pi^-$  Candidates dE/dx ignoring CDC hits with dE<=0



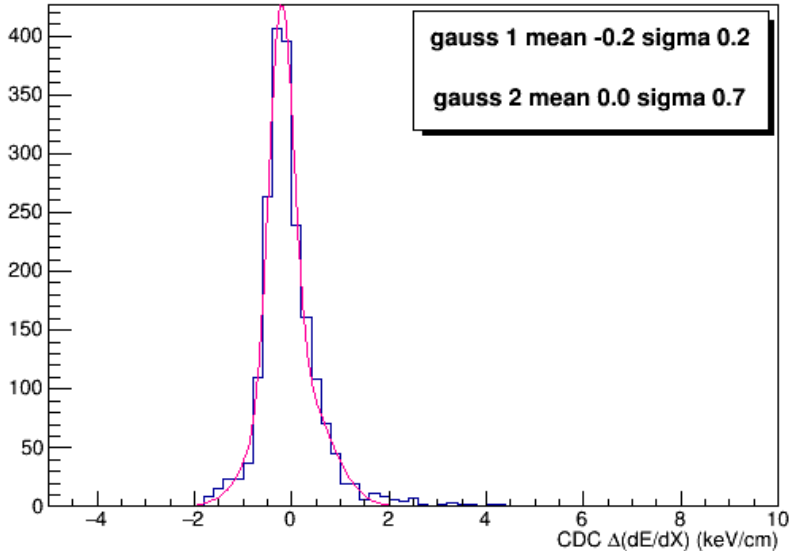
$\pi^-$  Candidates dE/dx using peak height instead of integral



Projection for p=0.60 to 0.64 GeV/c



Projection for p=0.60 to 0.64 GeV/c





Next:

Look at low and high intensity runs

Look at  $dE/dx$  truncation with 20% (instead of 50%)

Look at track angles