

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)

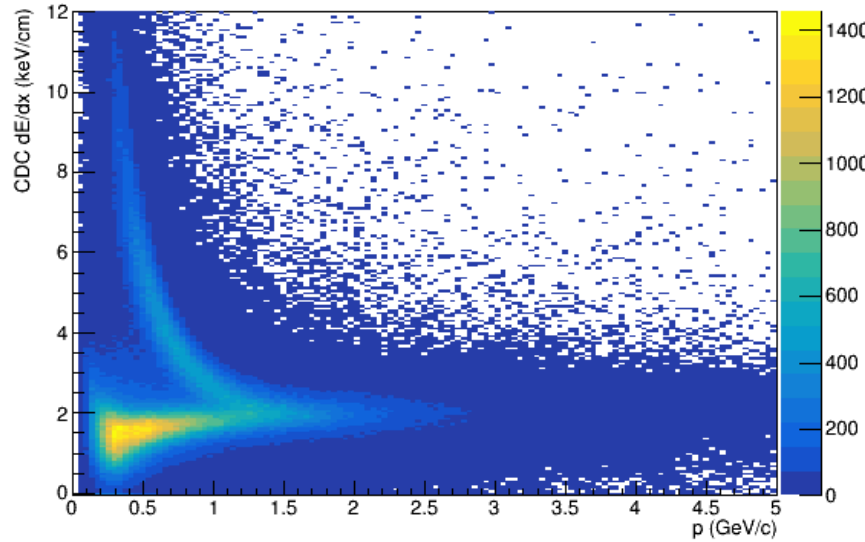
Expect #1 to become more prevalent with increased count rate.

Solutions

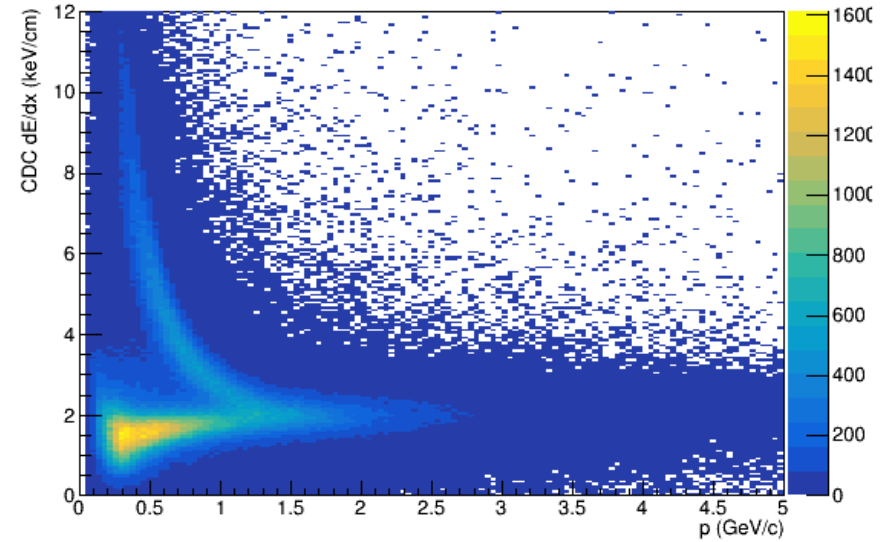
- A. Ignore hits with $dE \leq 0$ in tracking code – partially fixes #1
- B. Use pulse height instead of integral – fixes #1 and maybe #2

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

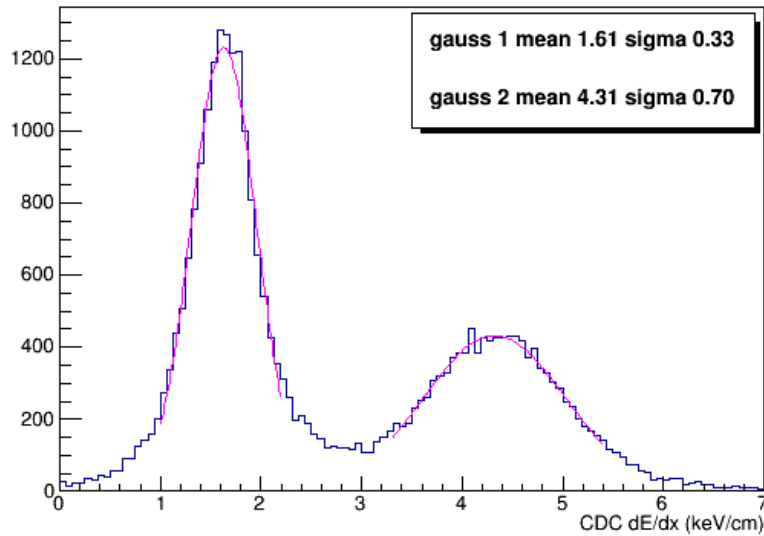
q* Original dE/dx code



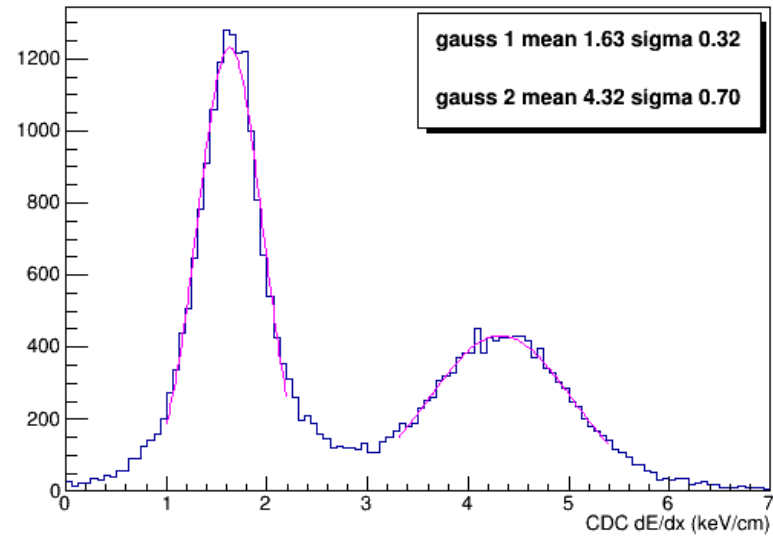
q* dE/dx ignoring CDC hits with $dE \leq 0$



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

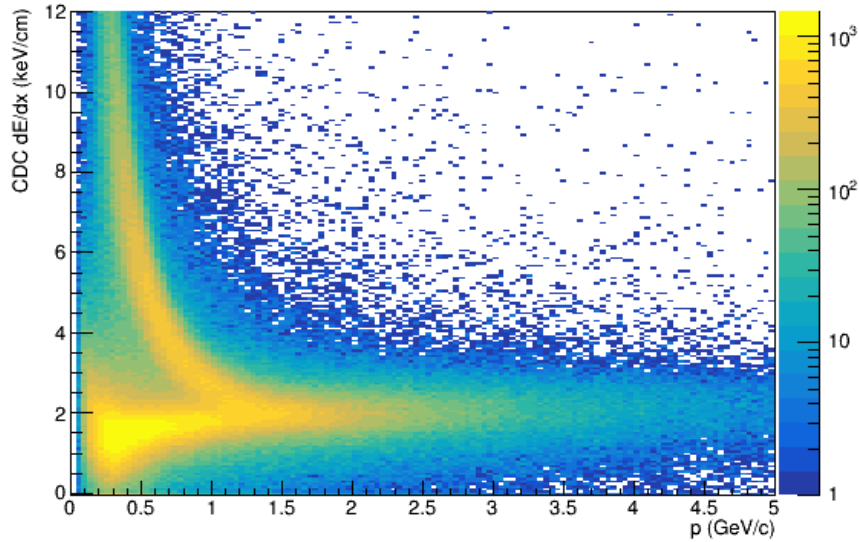


Projection for $p=0.60$ to 0.64 GeV/c

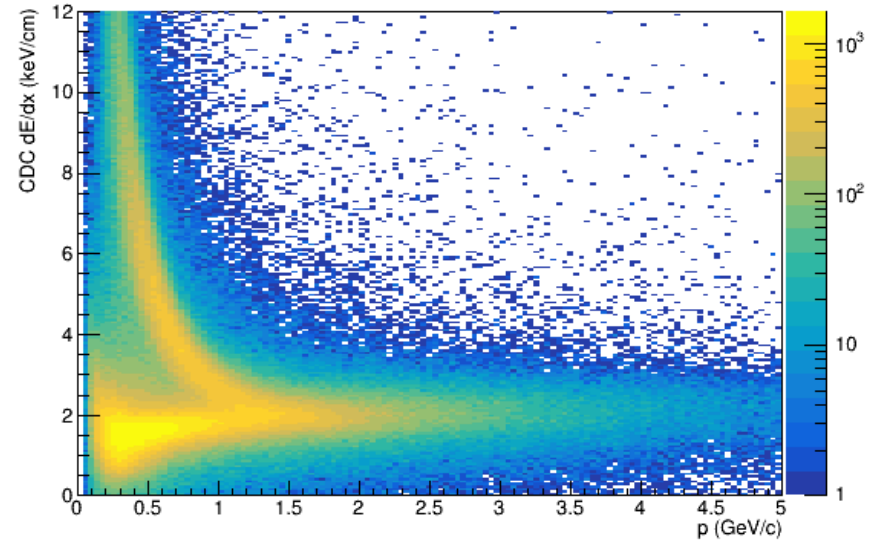


A: Ignore hits with $dE \leq 0$, monitoring_hists, 011366 file 001

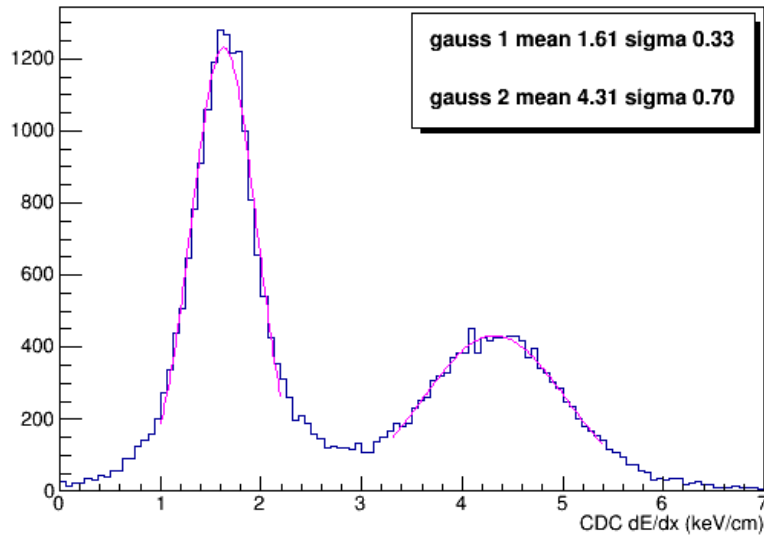
q⁺ Original dE/dx code



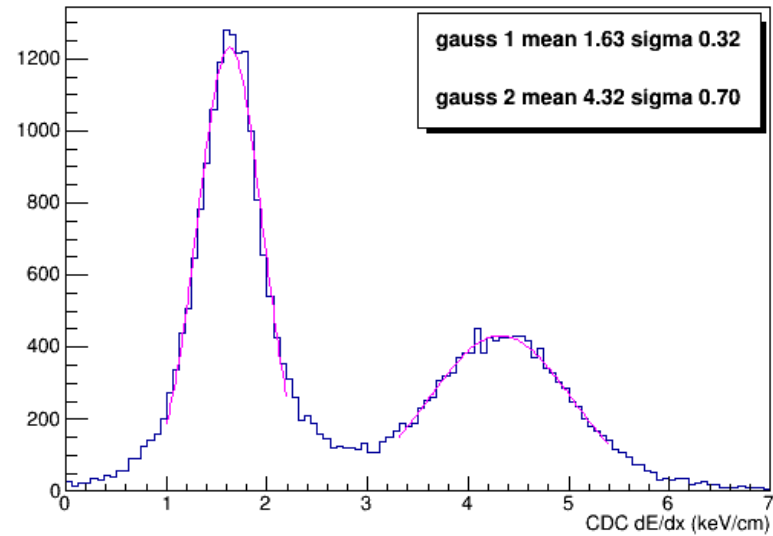
q⁺ dE/dx ignoring CDC hits with $dE \leq 0$



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

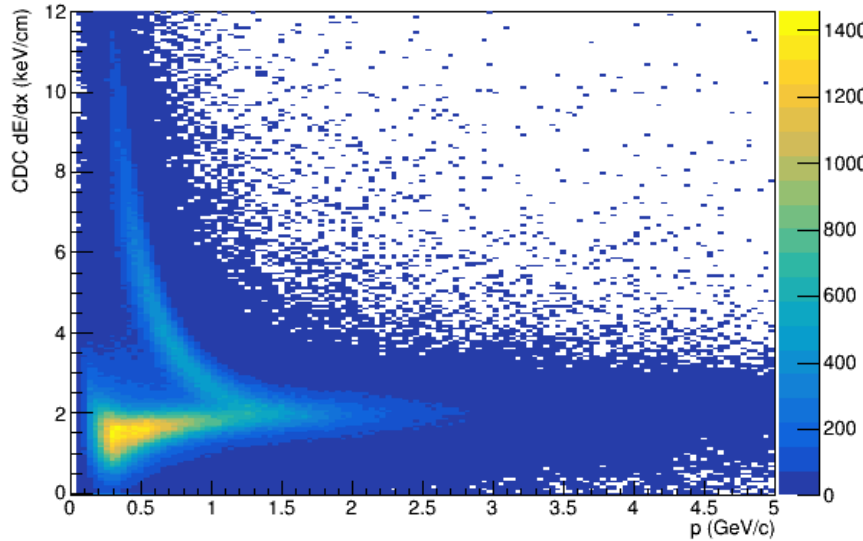


Projection for $p=0.60$ to 0.64 GeV/c

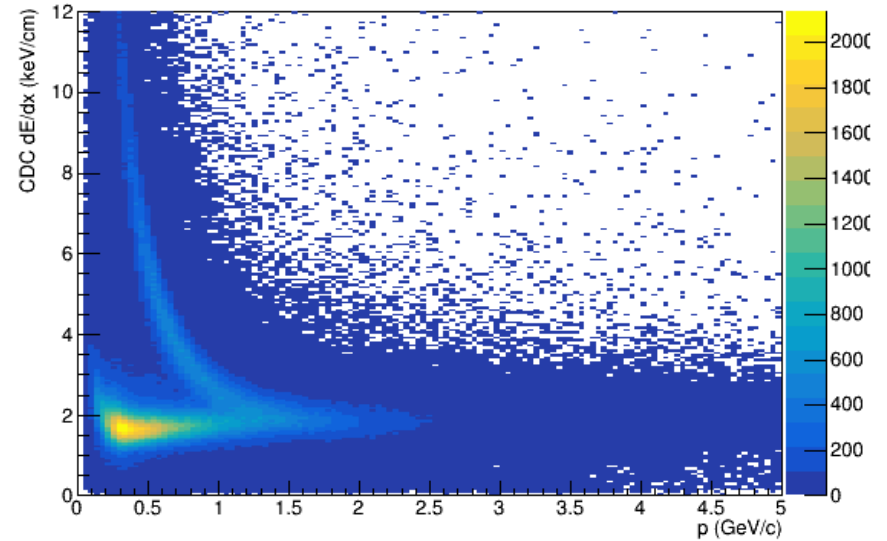


B: Use pulse height x29 instead of integral, monitoring_hists, 011366 file 001

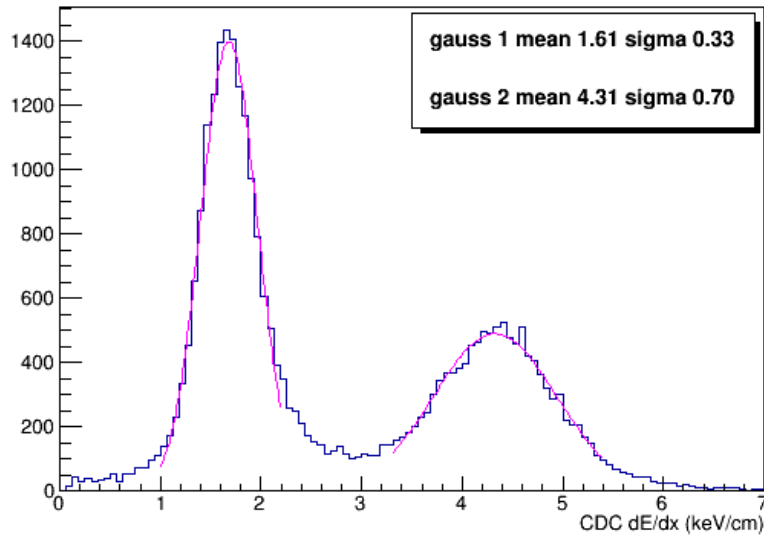
q* Original dE/dx code



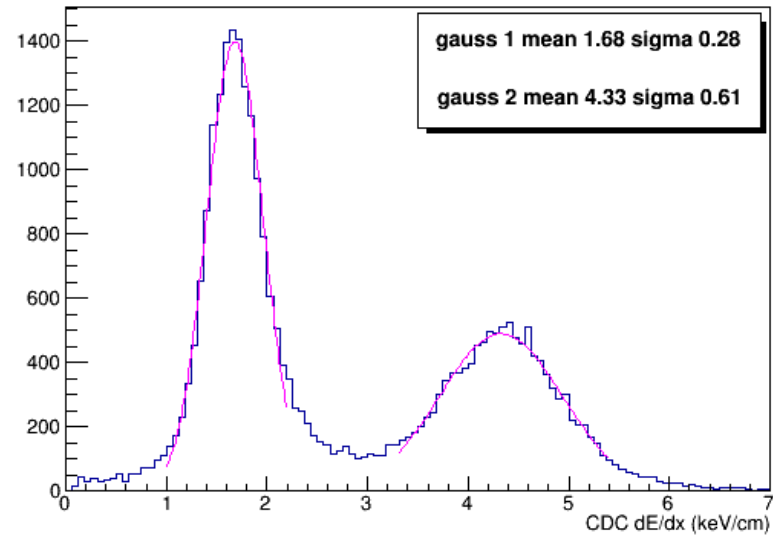
q* dE/dx using CDC peak height instead of integral



Projection for p=0.60 to 0.64 GeV/c

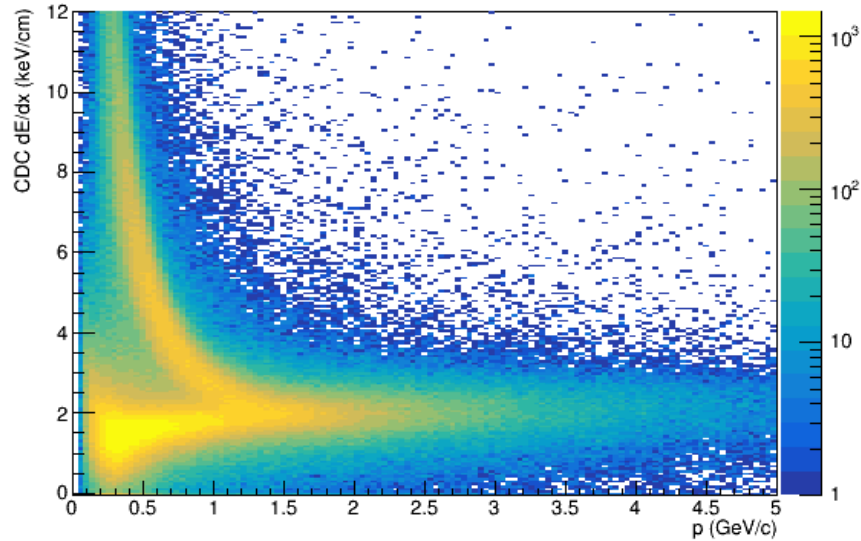


Projection for p=0.60 to 0.64 GeV/c

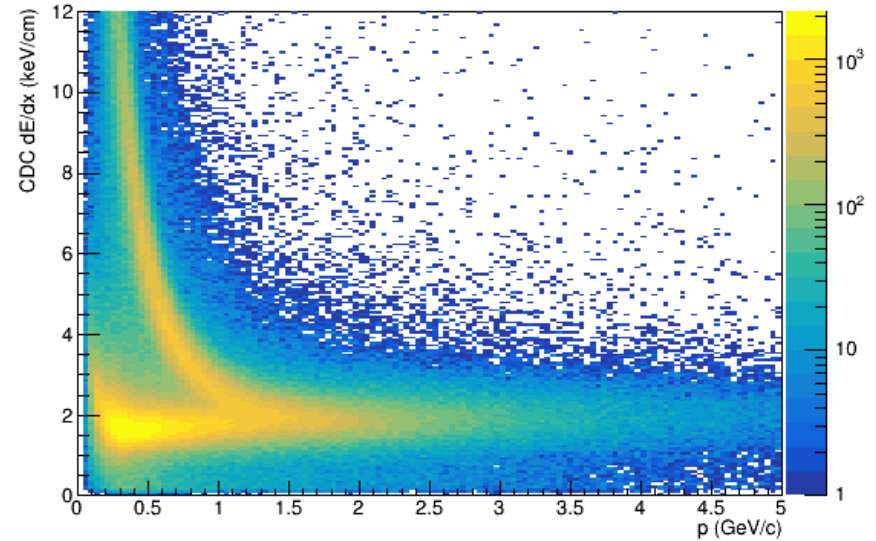


B: Use pulse height x29 instead of integral, monitoring_hists, 011366 file 001

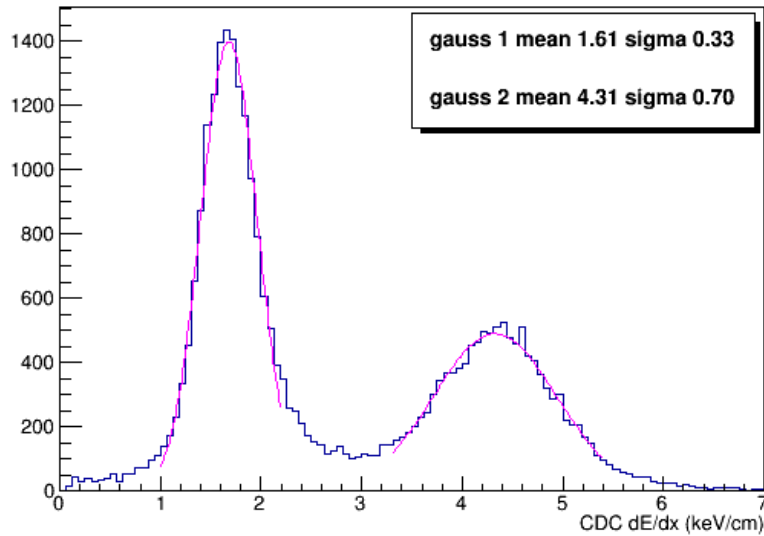
q⁺ Original dE/dx code



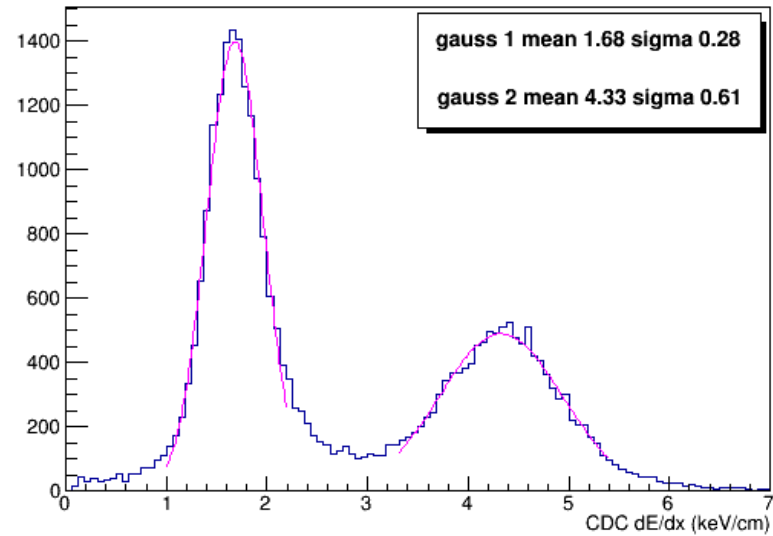
q⁺ dE/dx using CDC peak height instead of integral



Projection for p=0.60 to 0.64 GeV/c

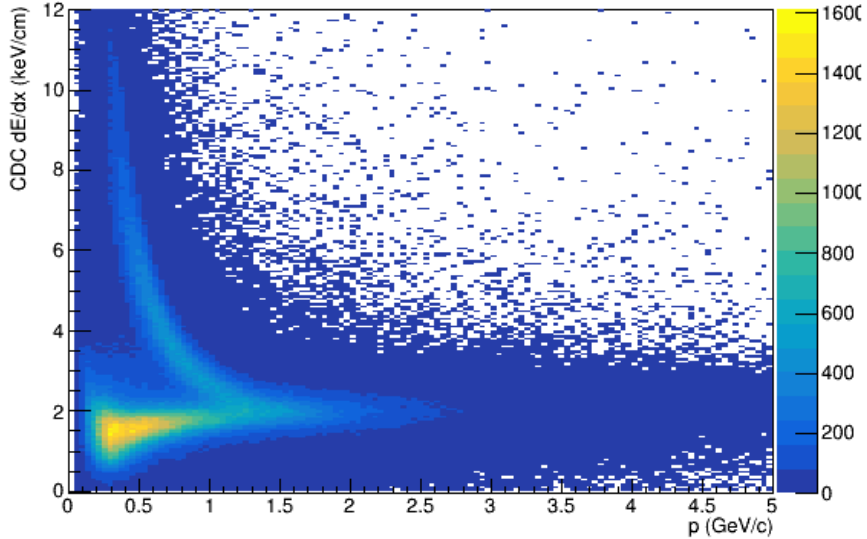


Projection for p=0.60 to 0.64 GeV/c

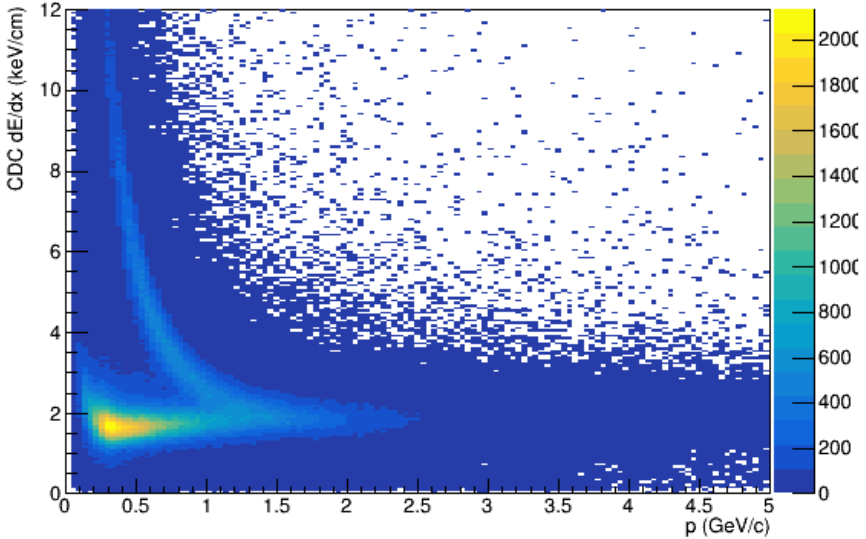


Compare A and B

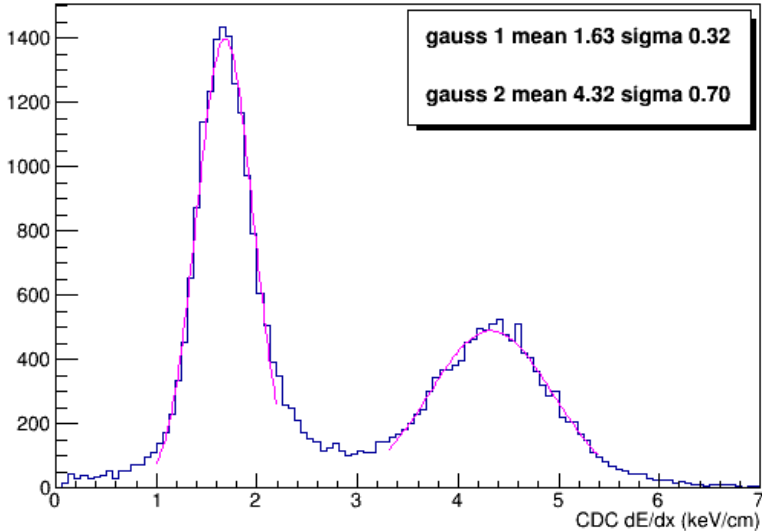
q⁺ dE/dx ignoring CDC hits with dE≤=0



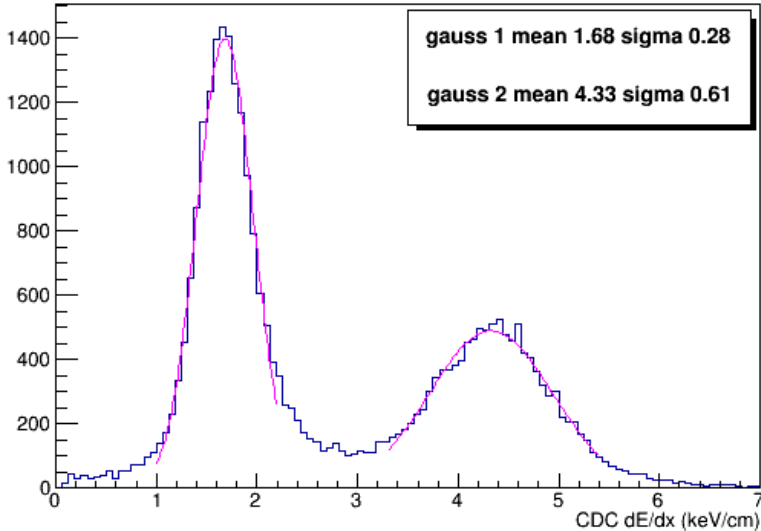
q⁺ dE/dx using CDC peak height instead of integral



Projection for p=0.60 to 0.64 GeV/c

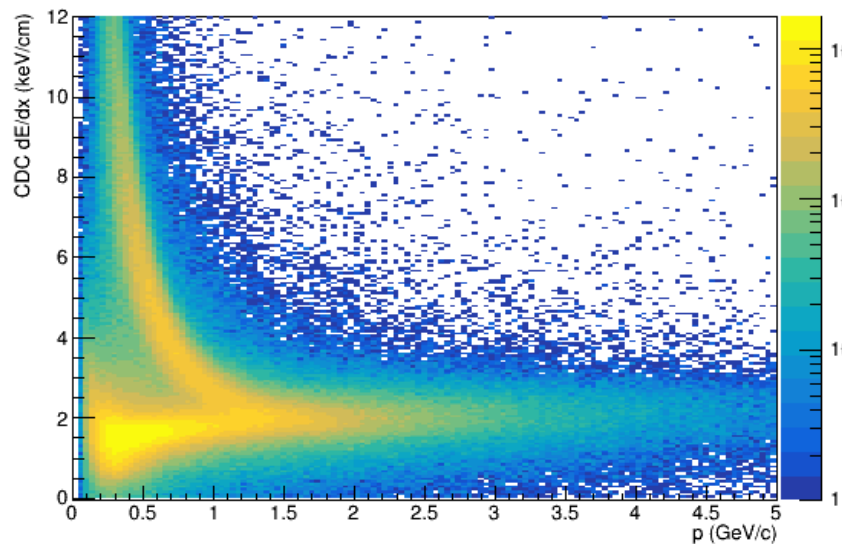


Projection for p=0.60 to 0.64 GeV/c

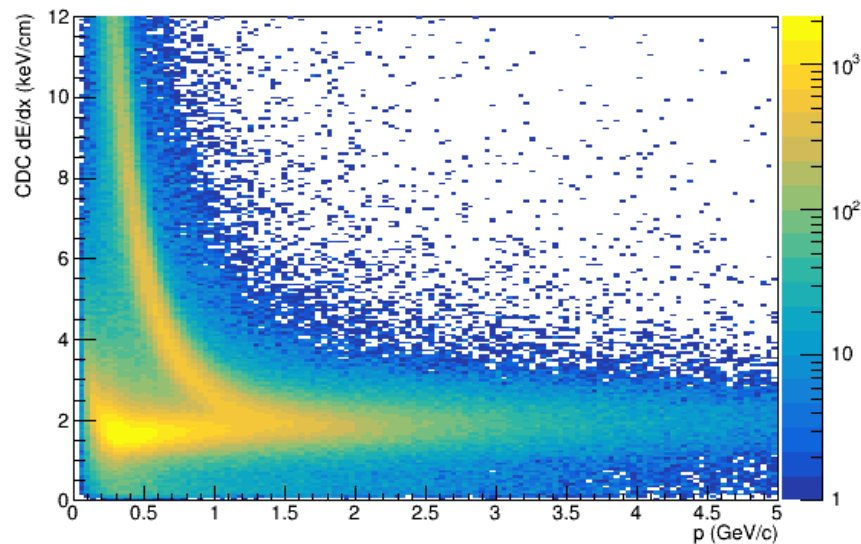


Compare A and B

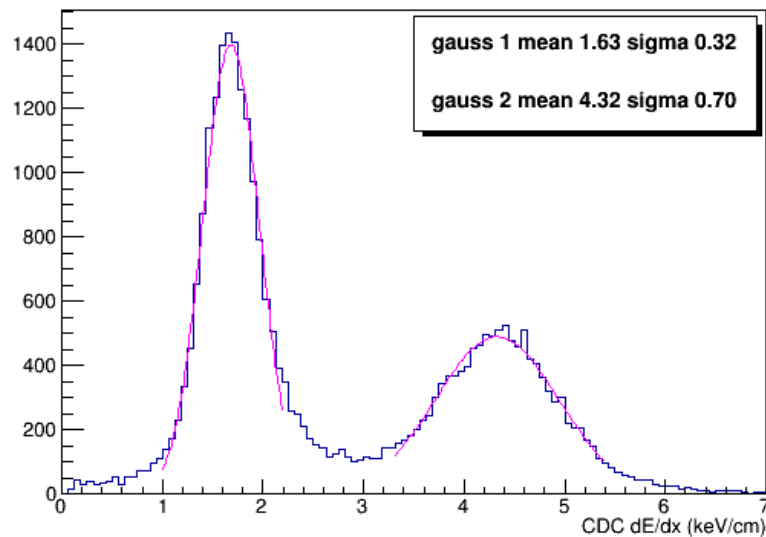
q⁺ dE/dx ignoring CDC hits with dE≤0



q⁺ dE/dx using CDC 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

