PID in Run2021 FXT Au+Au 3 GeV

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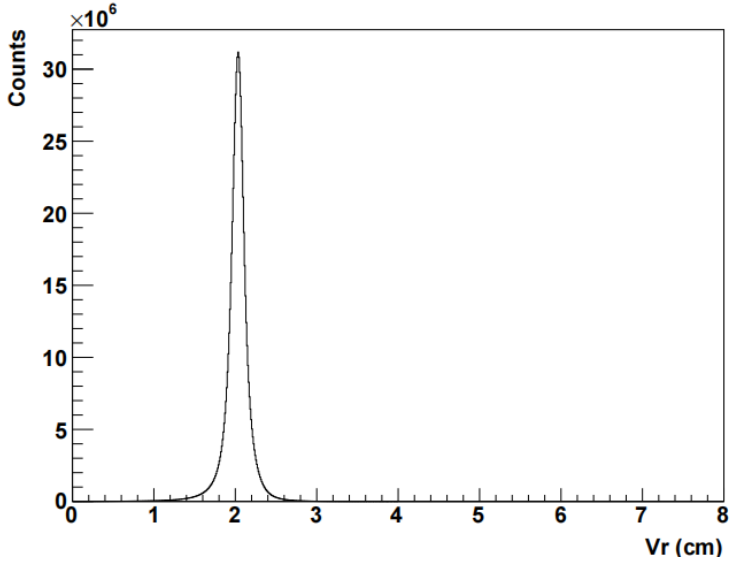
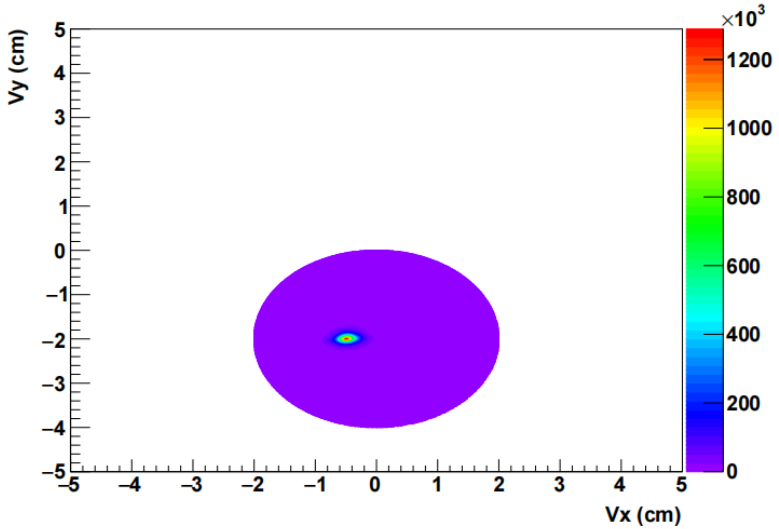
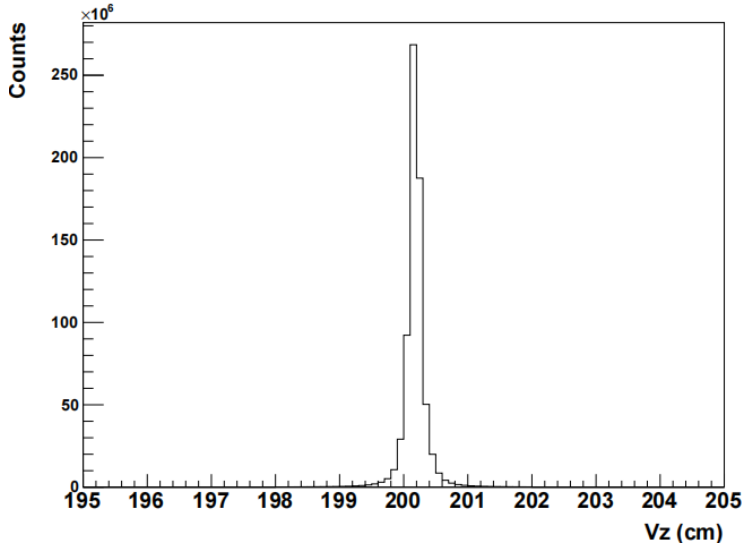
Dataset and event selections

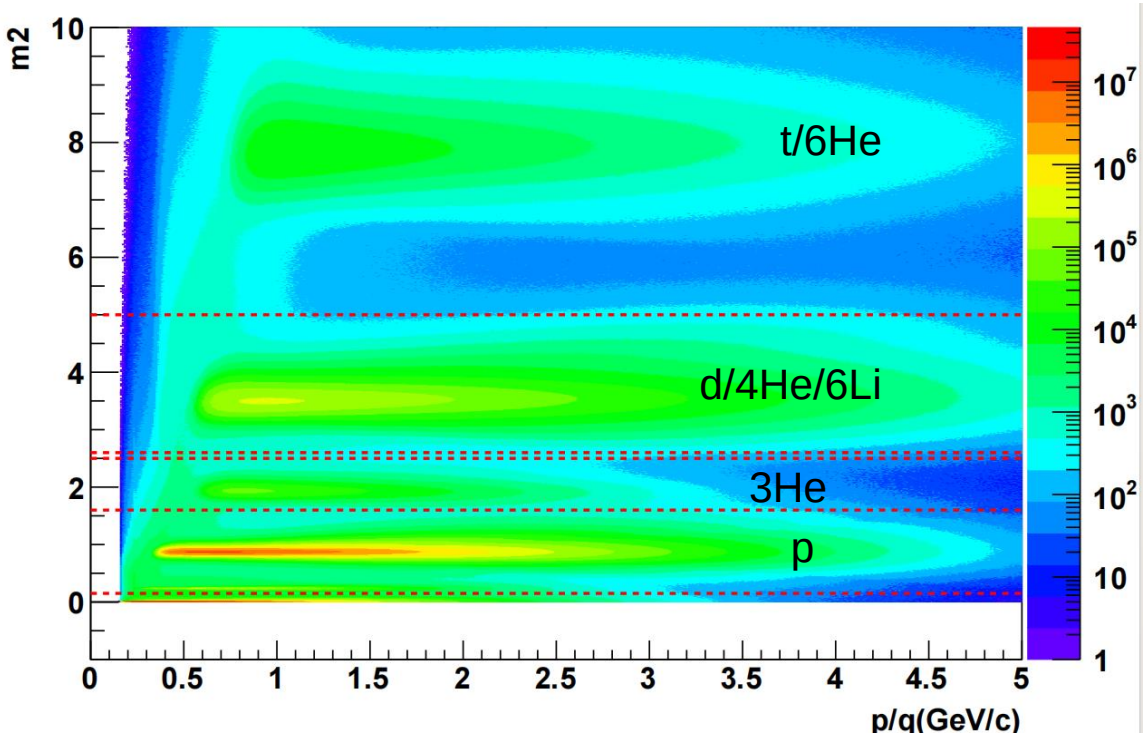
	information
Dataset	Data: production_3p85GeV_fixedTarget_2020
Trigger	820030,820020,820010
Vertex cuts	198 < Vz < 202 cm $\sqrt{Vx^2 + (Vy+2)^2} < 2$
Number of events	~ 697M events







TOF mass cut

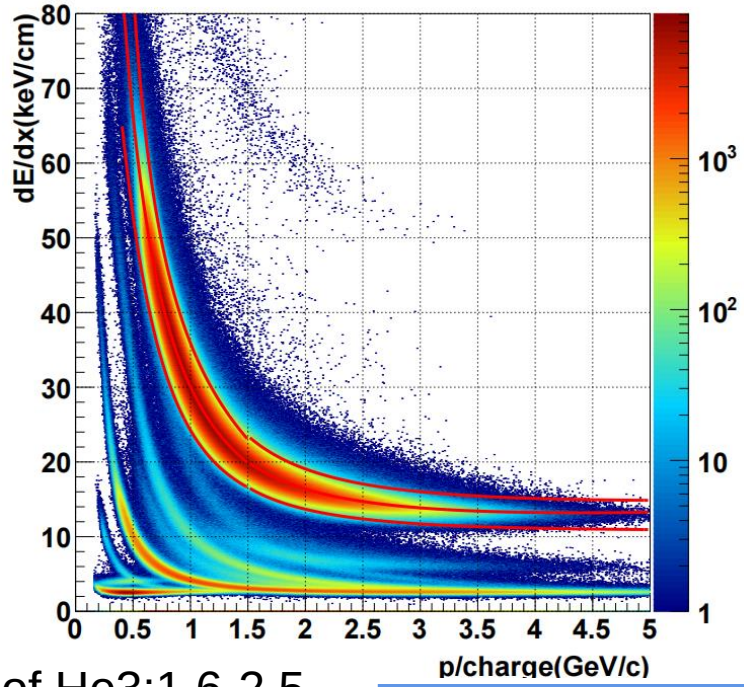


m2 cut of He4:2.6-5.0

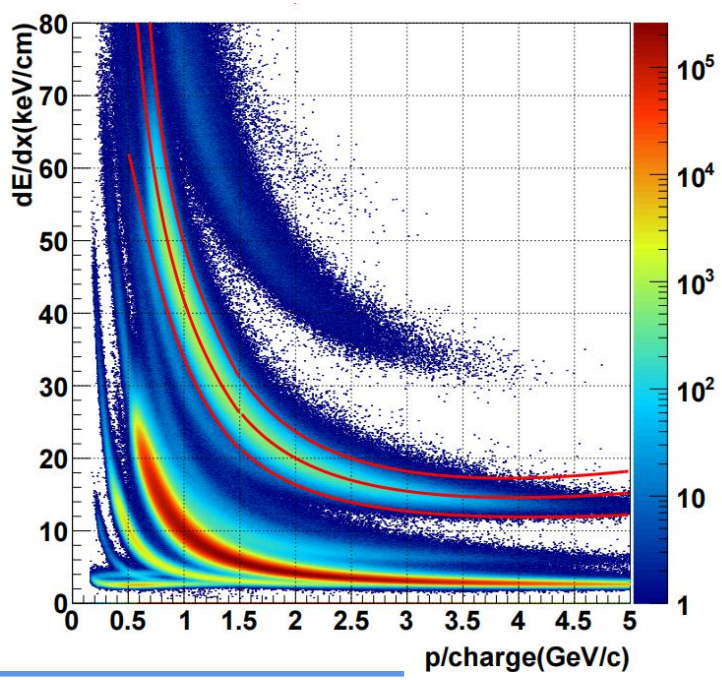
m2 cut of He3:1.6-2.5

PID of He3 and He4: method first

1. Cut the p/q(GeV/c) into pieces(0.05 as a step), then project them into Y-axis(dE/dx)
2. Fit them with gauss function (get a series of mean and sigma values in the corresponding p/q(GeV/c))
3. For mean line, we use a specific function to fit the group of mean vs p/q
4. For upper and lower lines, mean values +(-)3 sigma (upper boundary values and lower boundary values) , then fit them
5. In low p/q, the mean, upper and lower boundary values of first and second p/q range are increased by ~3.5 kev/cm artificially for getting better boundary.



m2 cut of He3:1.6-2.5

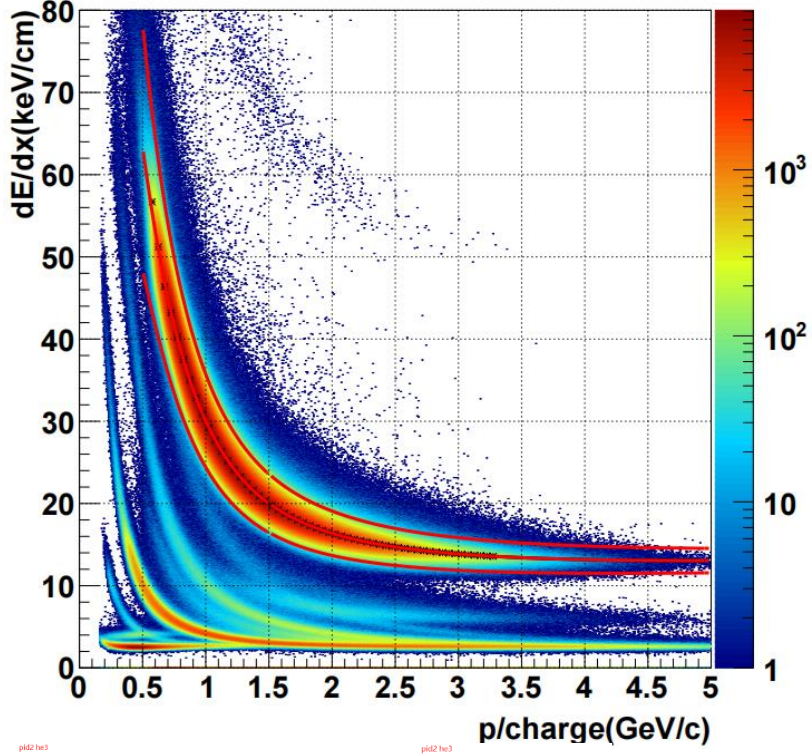


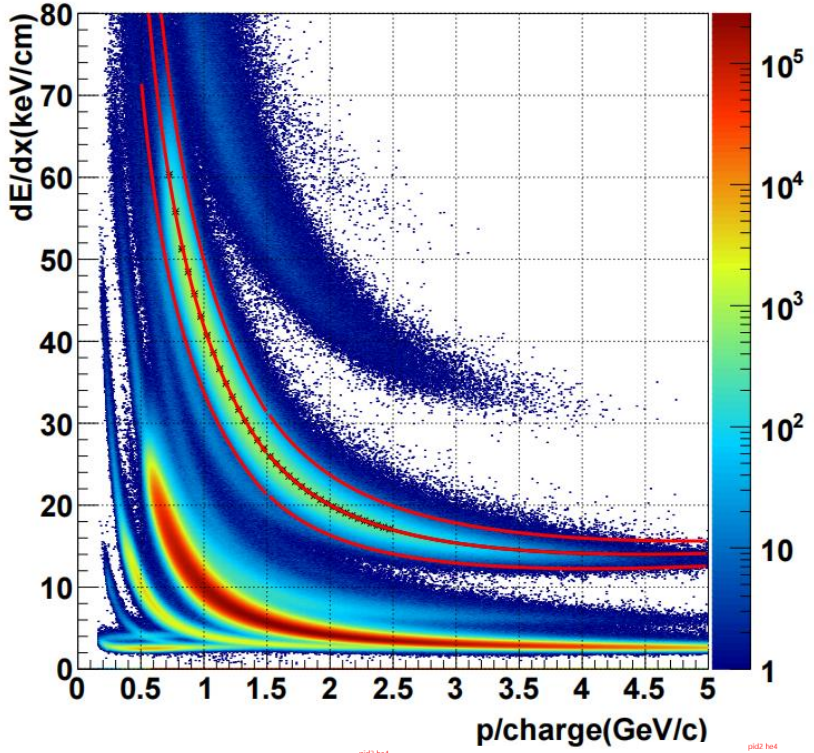
m2 cut of He4:2.6-5.0

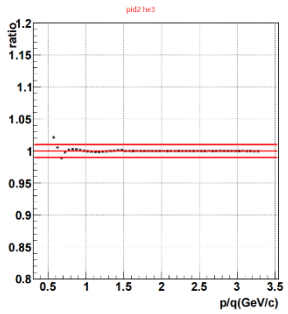
PID of He3 and He4: method second

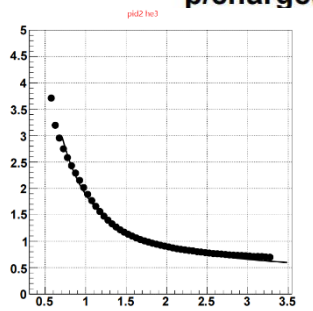
1. Quite similar to the first method in 1~4
2. The only difference is how we get the boundary lines

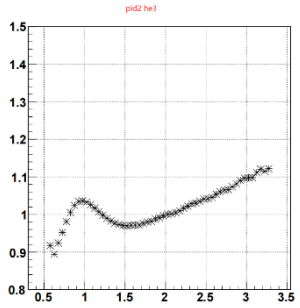
   We use a function to fit the sigma vs p/q, and then the boundary lines=functon of mean line + 3*function of sigma

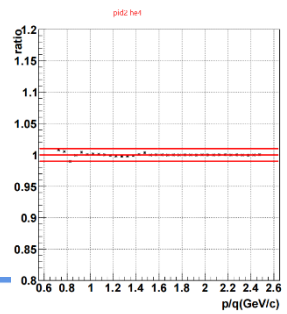


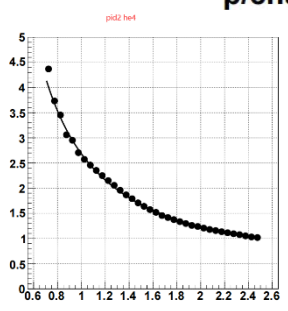


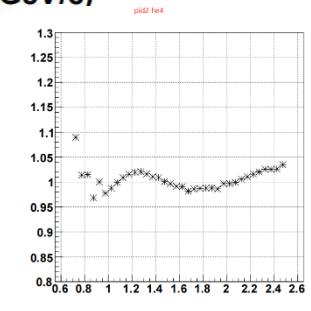




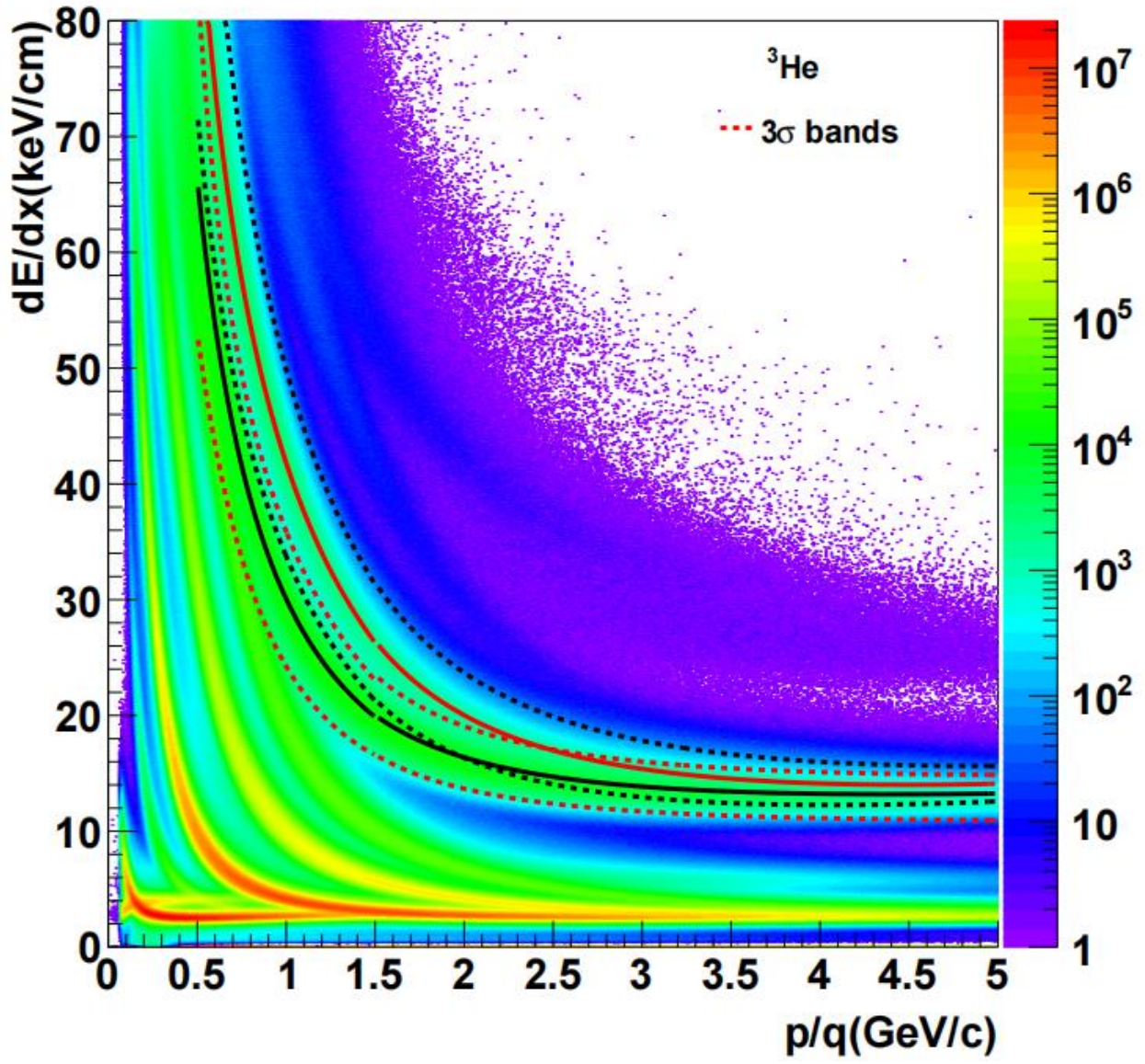








PID of He3 and He4



PID of pion

m2 cut of pion:<0.15