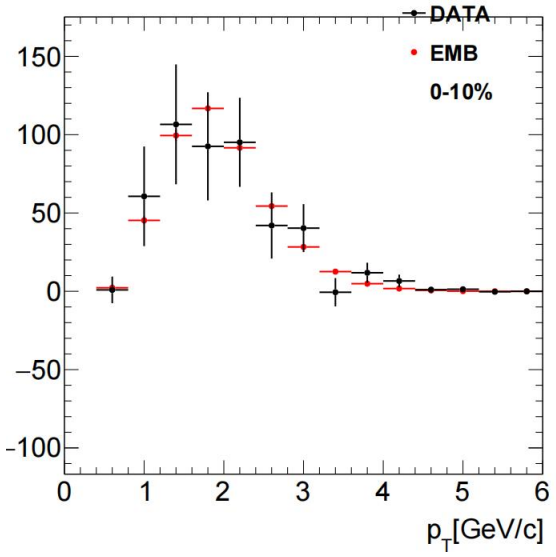
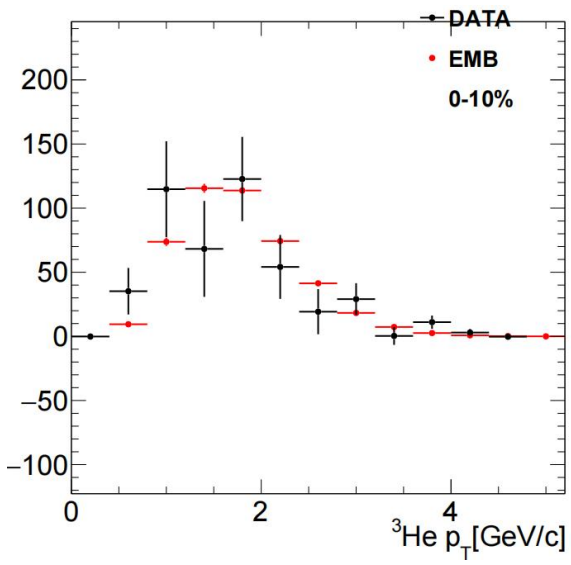
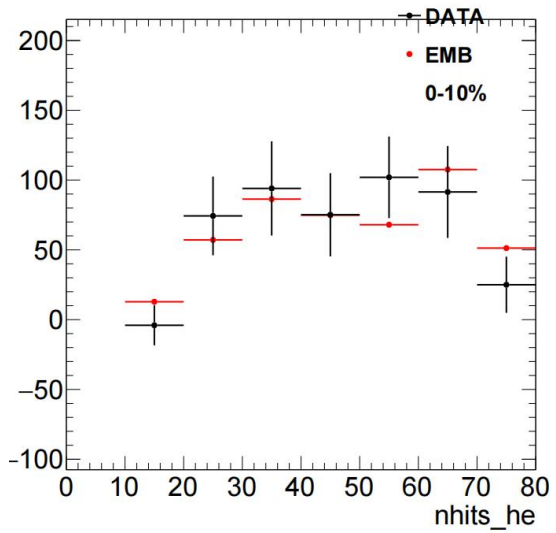
Update of signal reconstruction($^{3}_{\Lambda}H$) in Run2020 FXT Au-Au 5.2GeV

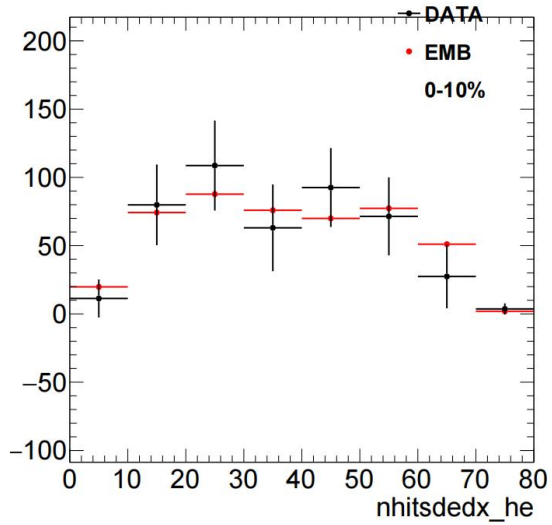
yulou

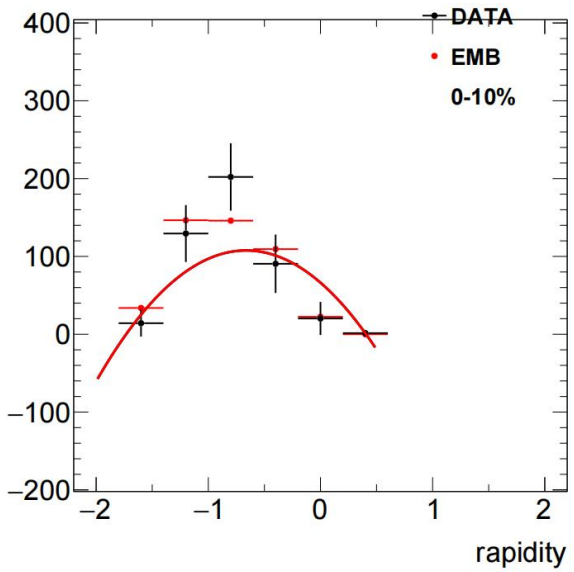
Embedding(0-10%)

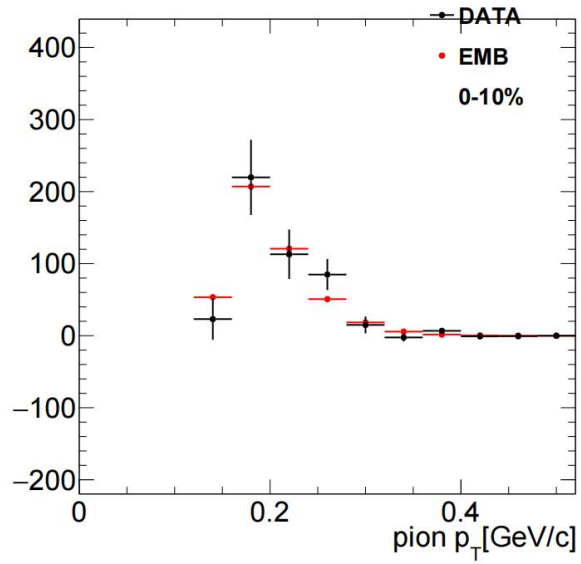


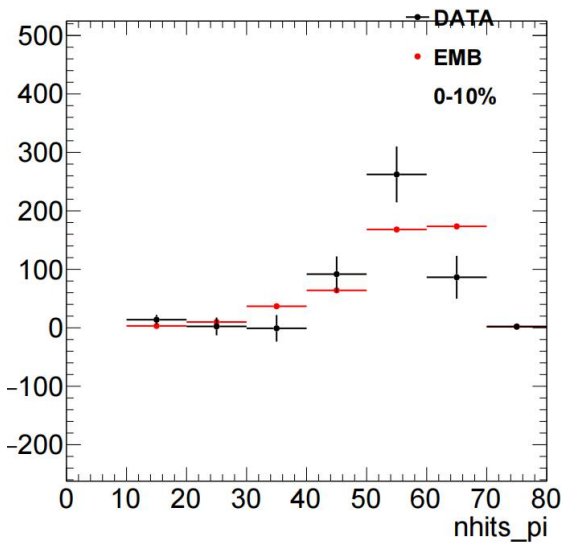


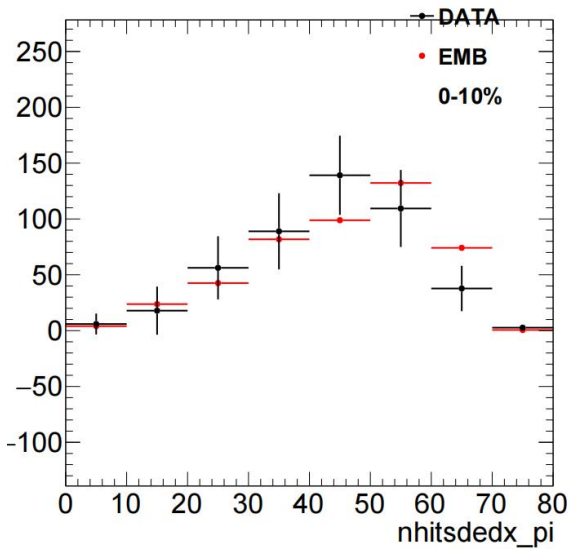




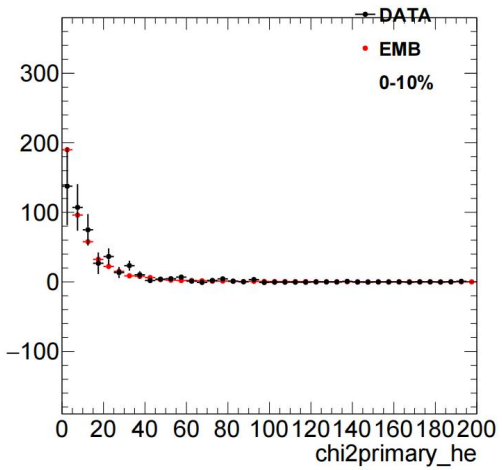


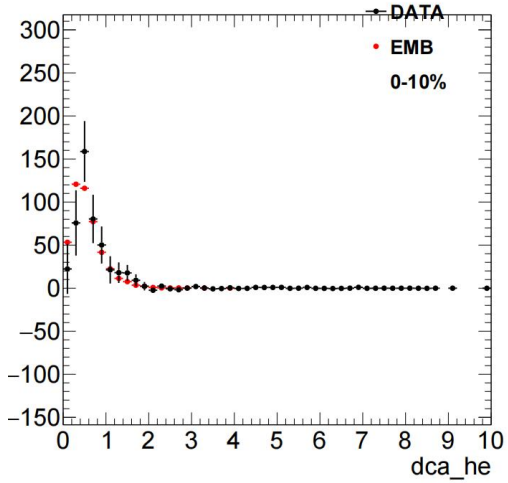


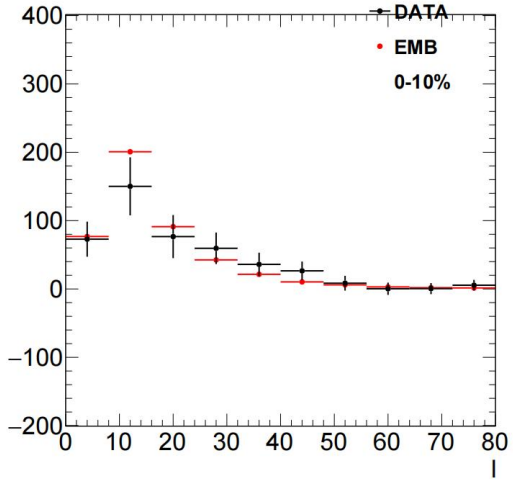


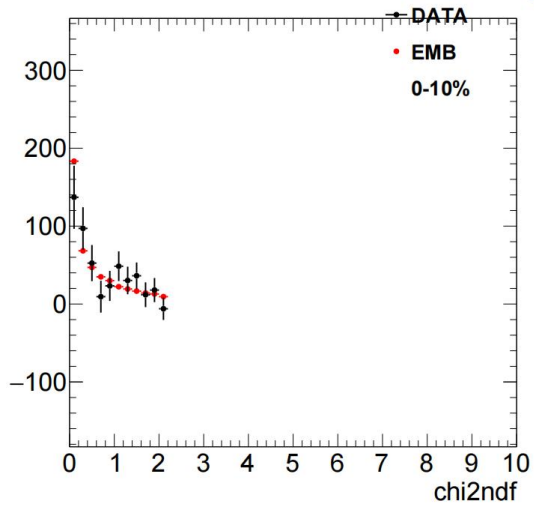


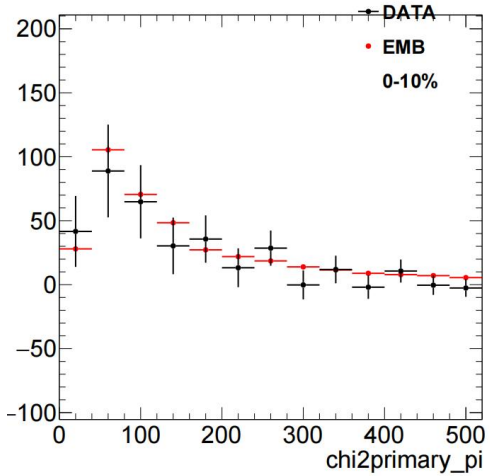
Embedding(0-10%)

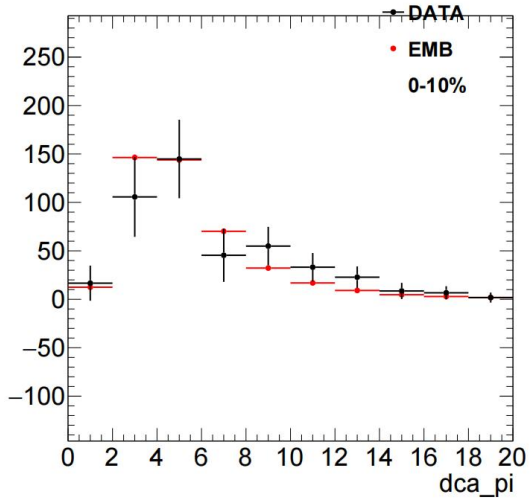


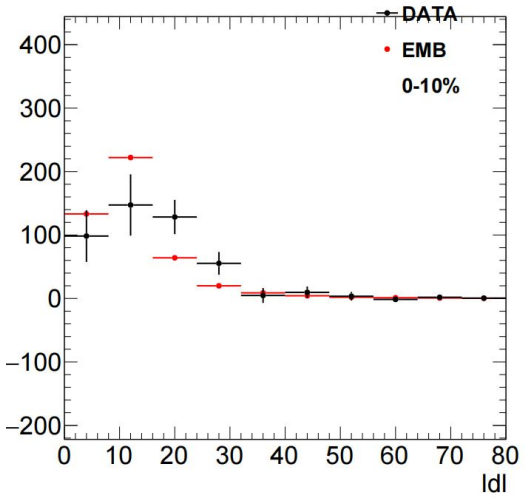


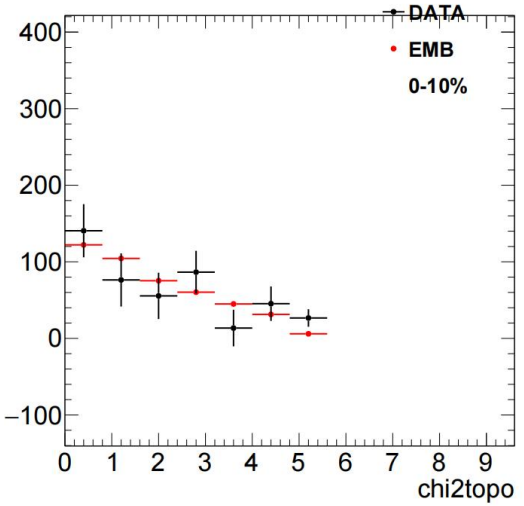










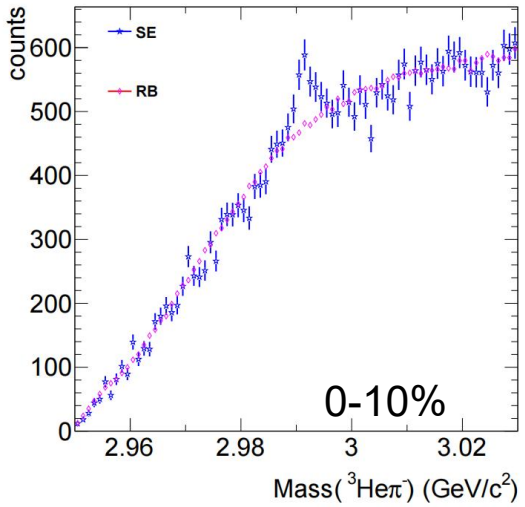


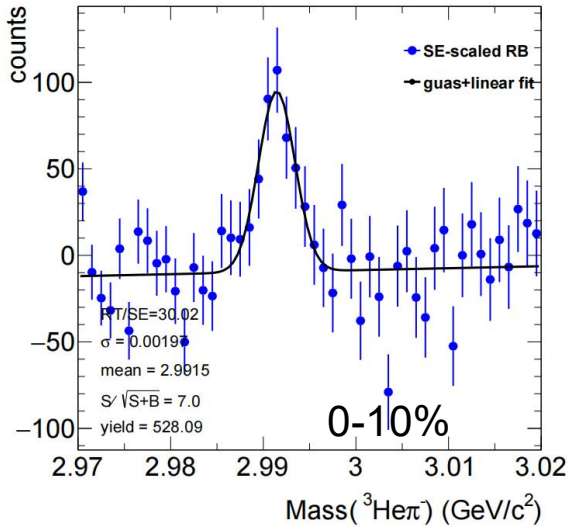
Signal and acceptance

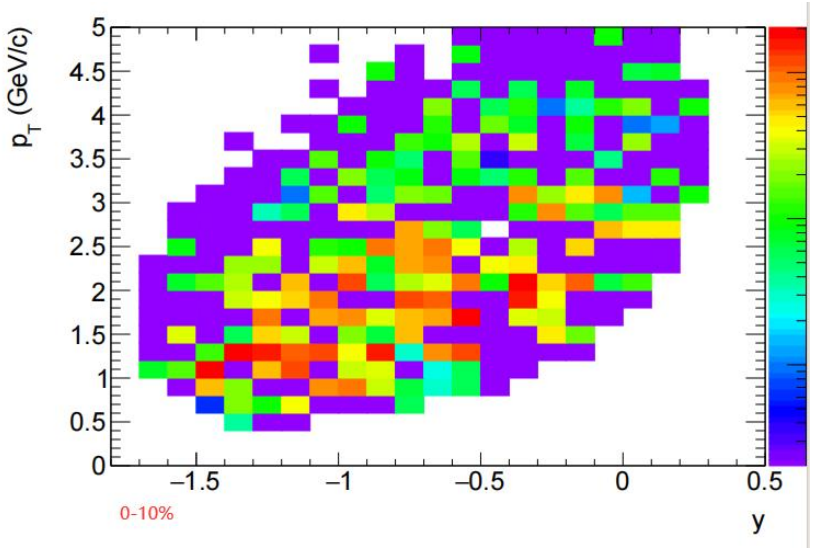
- bin by bin counting

0-10%
l >1, ldl>6
chi2topo<5,
chi2ndf<2.2
chi2prim_pi>5
chi2prim_he>0

pt_pi>0.15

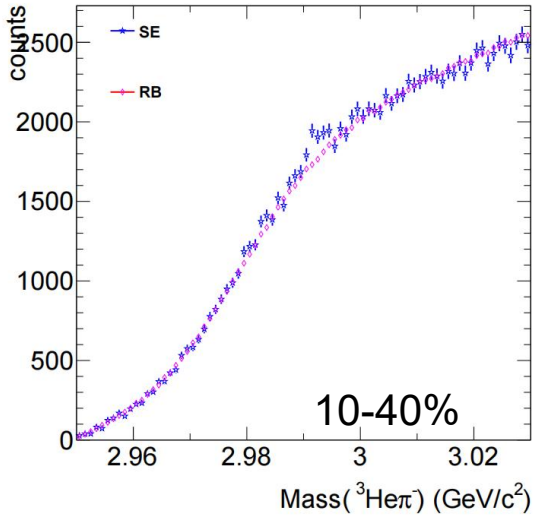


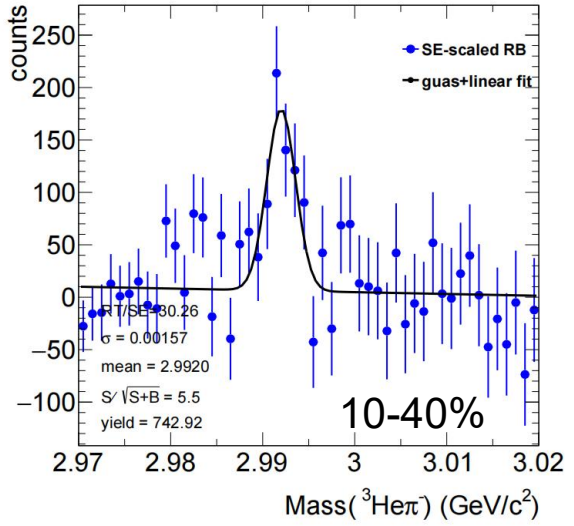


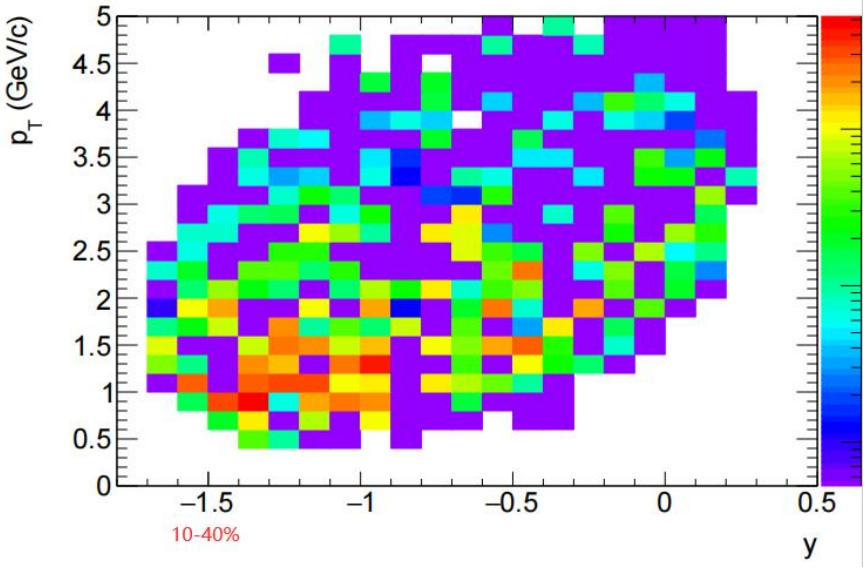


0-40%
l >1, ldl>1
chi2topo<5,
chi2ndf<4
chi2prim_pi>11
chi2prim_he>0

pt_pi>0.15



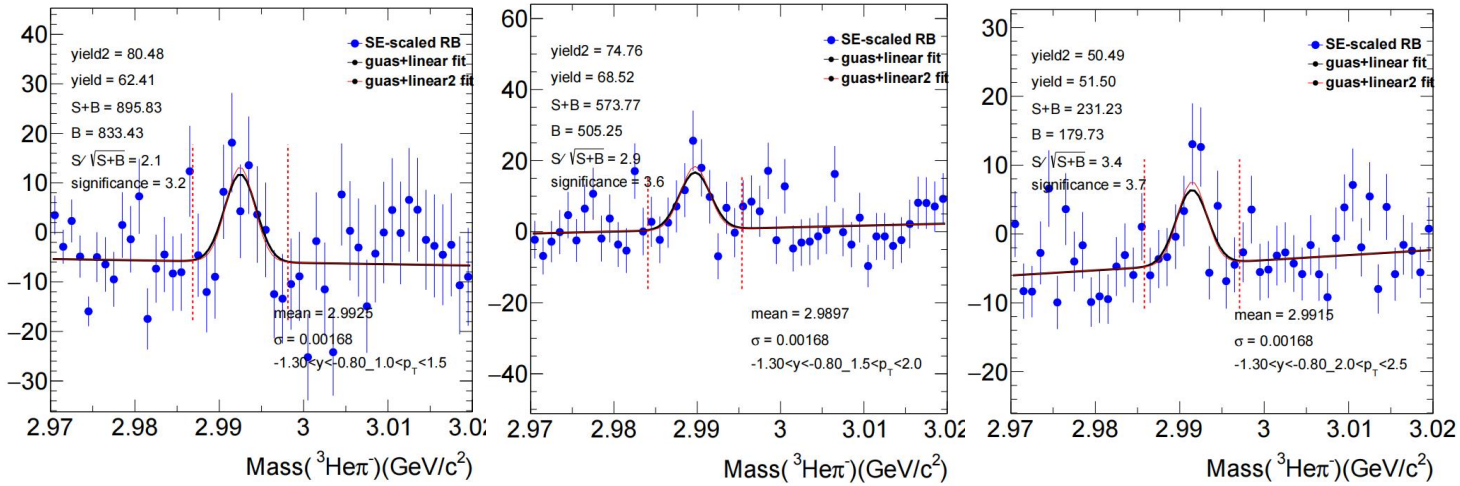


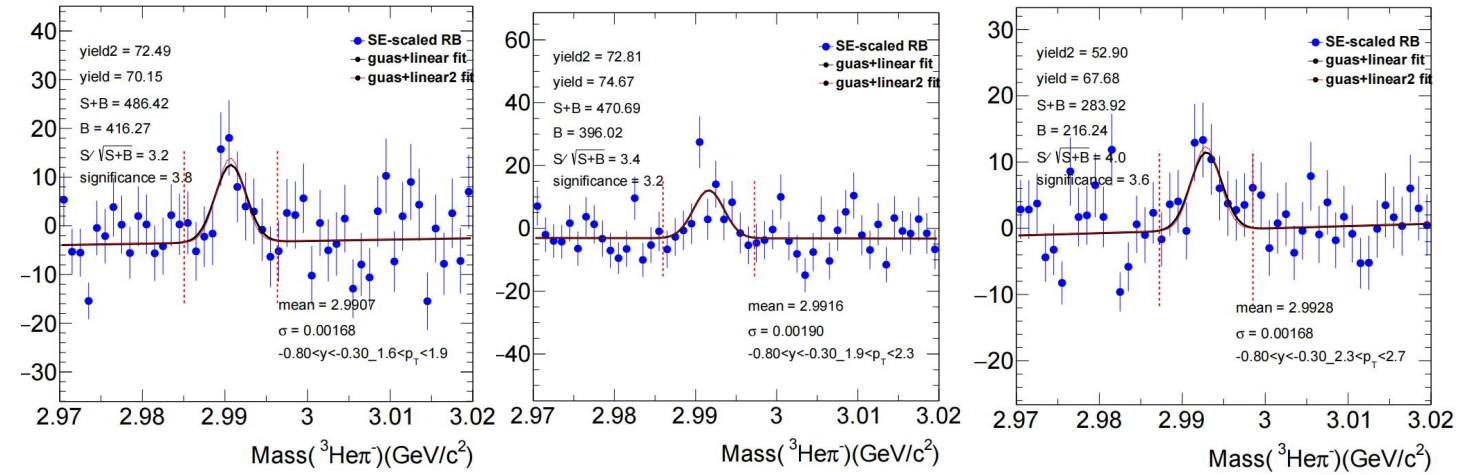


Signal with different pt and y ranges

- Cen:0-10%.
- the mass window in each y_pt bin :fitmean-3*fitsigma<particlemass<fitmean+3*fitsigma(bin by bin counting)
- fit function:gaus+line

-1.3<y<-0.8





-0.8<y<-0.3

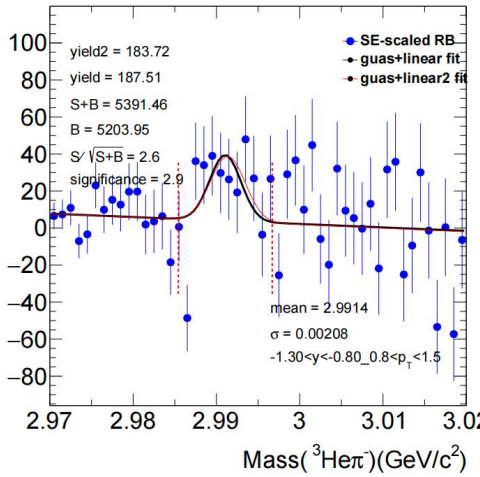
- integral method(red line)
  - Fix fitmean range(guided by 0-40%) (mean-sigma,mean+sigma)
  - Fix fitsigma range(guided by 0-40%) (sigma-0.0002,sigma+0.0002)

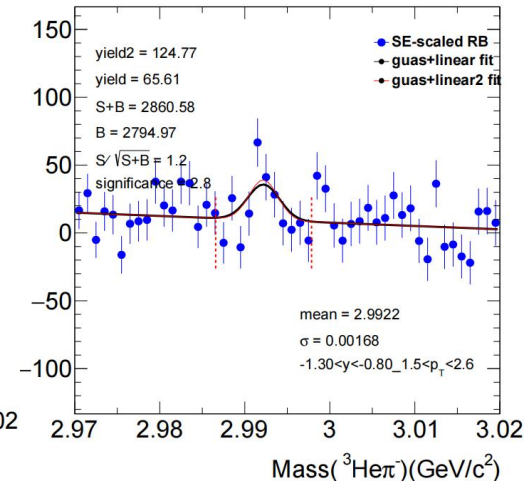
- bin by bin counting(black line)
  - Fix fitmean range(guided by 0-40%) (mean-sigma,mean+sigma)
  - Fix fitsigma(guided by 0-40%)

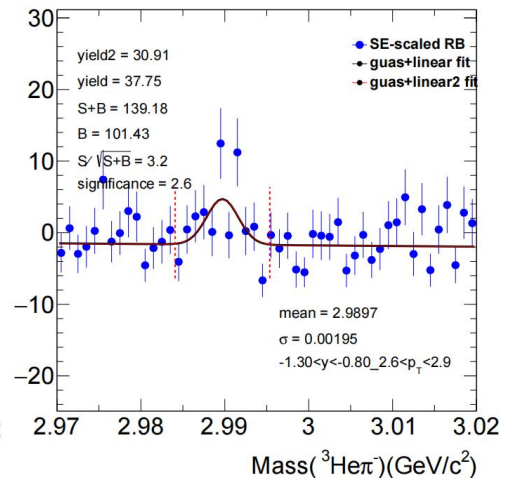
Signal with different pt and y ranges

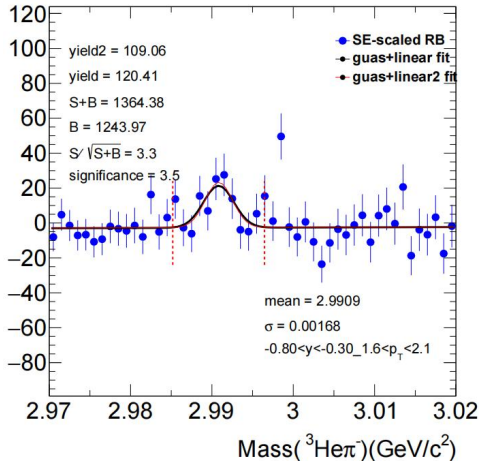
- Cen:10-40%.
- the mass window in each y_pt bin :fitmean-3*fitsigma<particlemass<fitmean+3*fitsigma(bin by bin counting)
- fit function:gaus+line

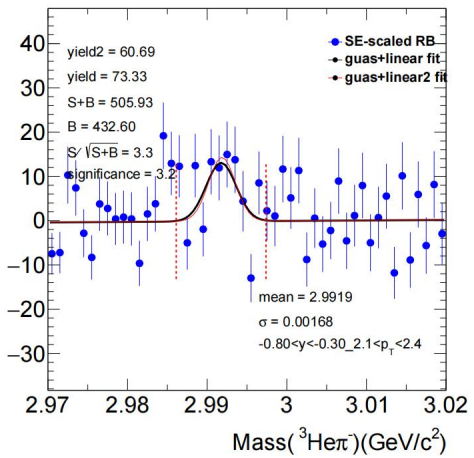
-1.3<y<-0.8

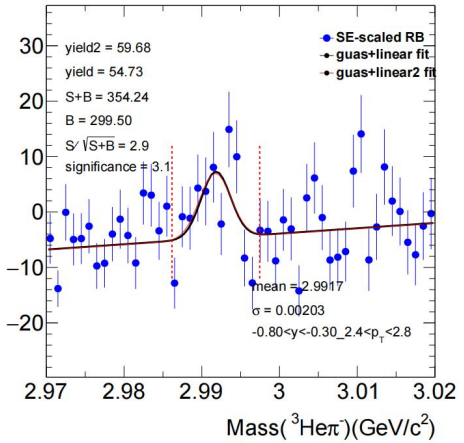












-0.8<y<-0.3

- integral method(red line)
  - Fix fitmean range(guided by 0-40%) (mean-sigma,mean+sigma)
  - Fix fitsigma range(guided by 0-40%) (sigma-0.0002,sigma+0.0002)

- bin by bin counting(black line)
  - Fix fitmean range(guided by 0-40%) (mean-sigma,mean+sigma)
  - Fix fitsigma(guided by 0-40%)

P_T spectra

•Cen:0-10%.

•yield:integral method (fit function's first parameter)

$$\frac{d^2N}{dp_T dy} = \frac{1}{\text{B.R.}} \times \frac{N^{\text{raw}}}{N_{\text{evt}}\Delta(p_T)\Delta(y)} \times \frac{1}{\varepsilon_{\text{TPC}} \times \varepsilon_{\text{PID}}}$$

^3_2He: 3σ

Used fit function:boltzmann

◉dNdy

•data+integral:data_point*pt_width(sum of data)+integral of fit function(form 0 to 10 except the measured pt range)

•integral:integral of fit function(form 0 to 10)

or scale method?

(sum of data)*(integral of fit functionfrom 0 to 10)/(integration of fit funcition in measured pt range)

◉dNdy_error

•scale method:

(error of the sum of data)*(integral of fit functionfrom 0 to 10)/(integration of fit funcition in measured pt range)

dNdy(0-10%):

-0.8~-0.3

data+integral:0.0143964
integral(pt:0-10):0.0118682
error:0.00241609

-1.3~-0.8

data+integral:0.017816
integral(0-10):0.0132242
error:0.00353573

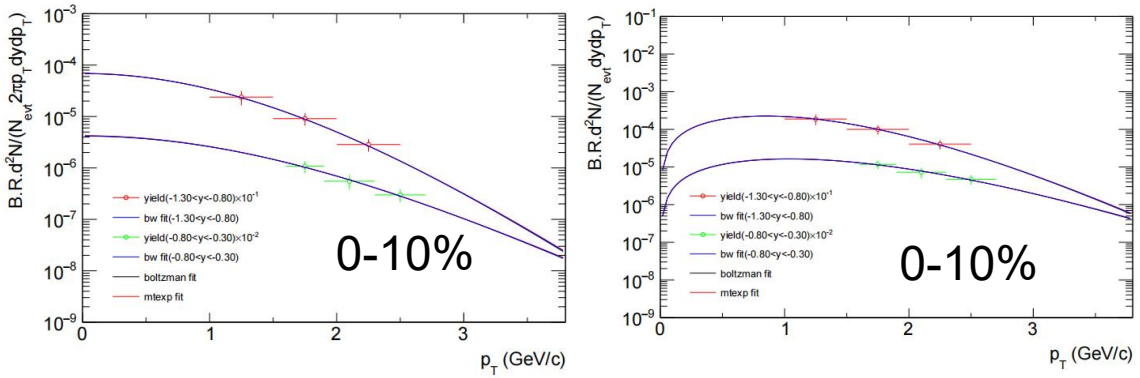
dNdy(10-40%):

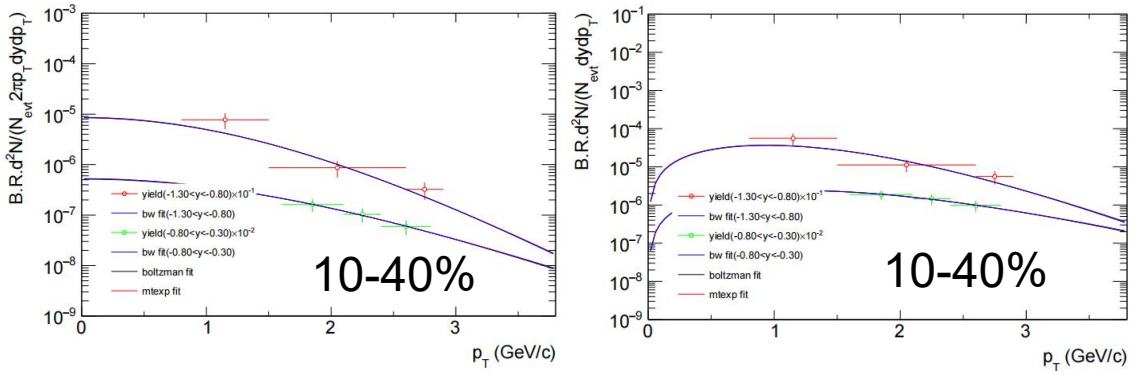
-0.8~-0.3

data+integral:0.0026539
integral(pt:0-10):0.00204764
error:0.00048554800000

-1.3~-0.8

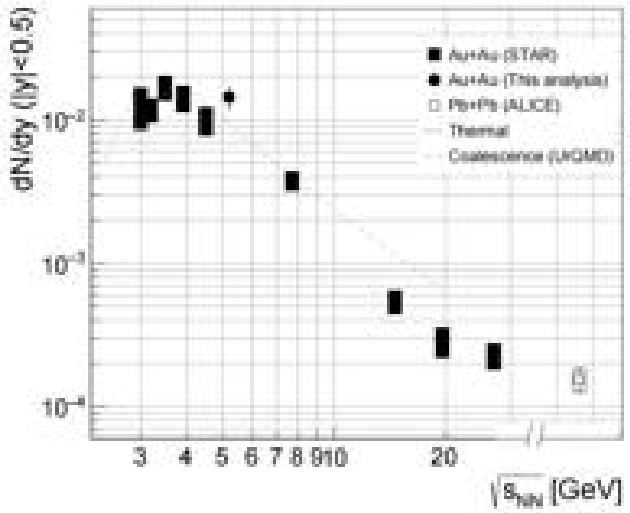
data+integral:0.00441176
integral(pt:0-10):0.00238693
error:0.00118202



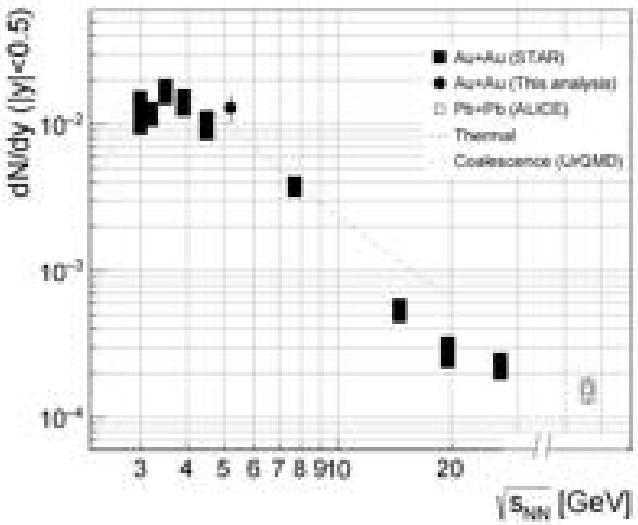


P_T spectra

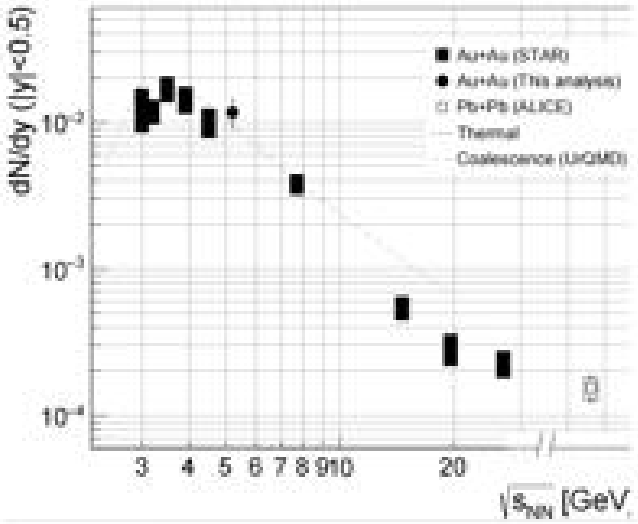
- Cen:0-10%.
- yield:integral method (fit function's first parameter)



data+integral(y:-0.8~-0.3)



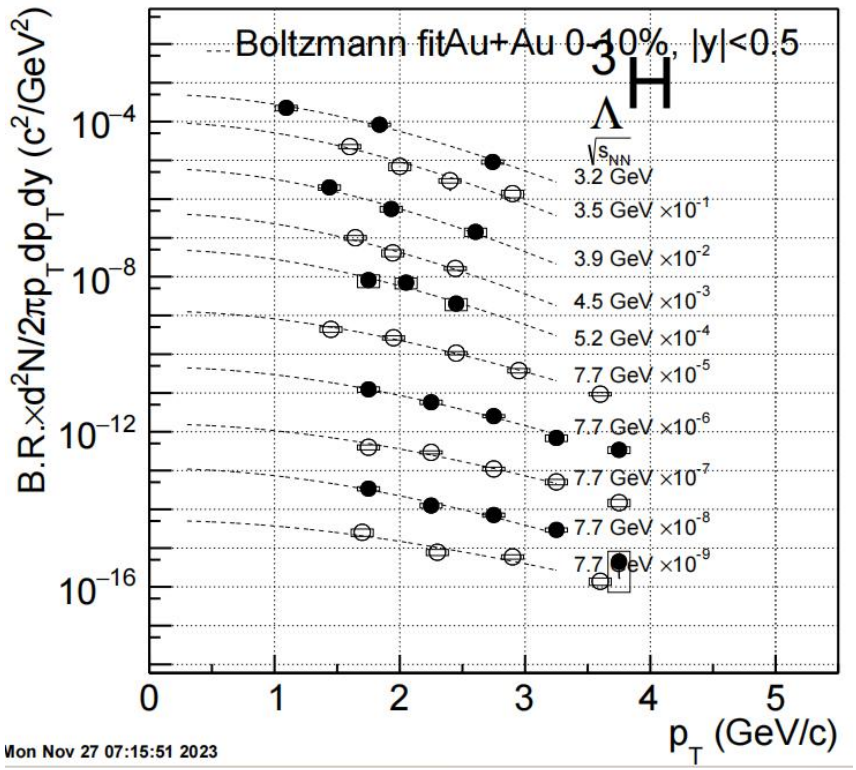
data+integral(y:-0.7~-0.2)

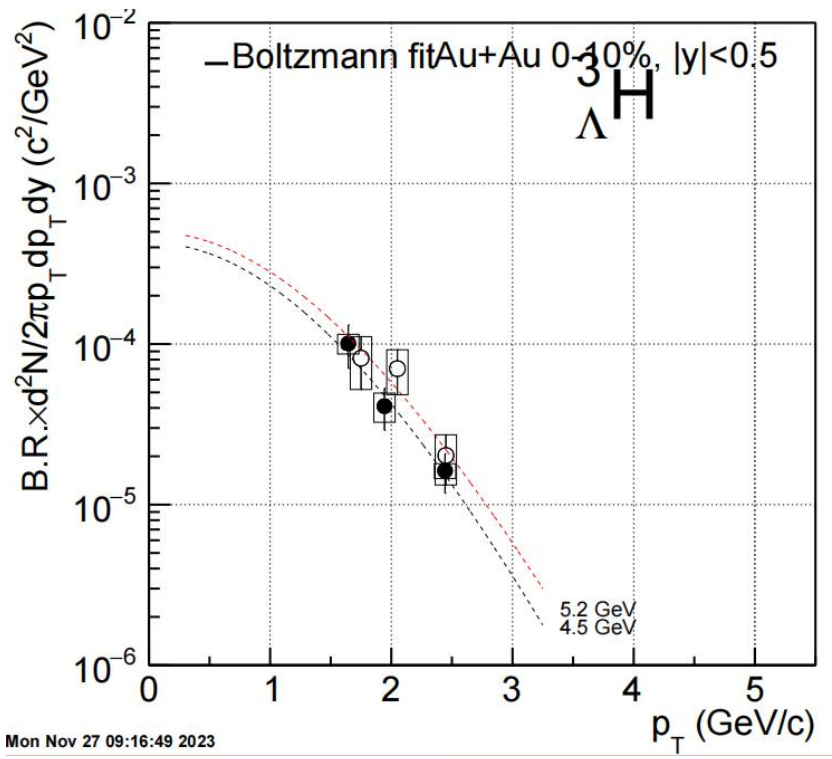


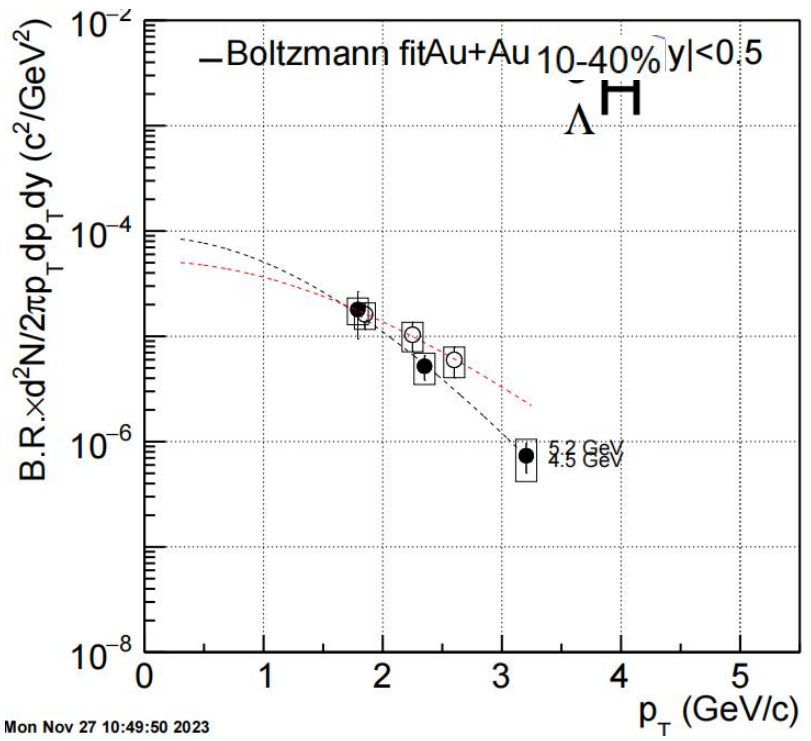
integral(y:-0.7~-0.2)

P_T spectra

- Cen:0-10%.
- yield:integral method (fit function's first parameter)







System error

- About the system error of dNdy:
  - from pt weight
  - from particle lifetime weight
  - from nhitfits cut
  - from topological cut
    - from chi2topo cut
    - from chi2ndf cut
    - from l cut?
    - from ldl cut?
    - from chi2primary_pi cut

    all these topological system error combine into one system error (using sum of sqares)?
  - from Pt extrapolation
    - fit function
    - fit parameters(define a default function style)

    the system error from fit function and fit parameters combine into one system error (using sum of sqares)?

Summary

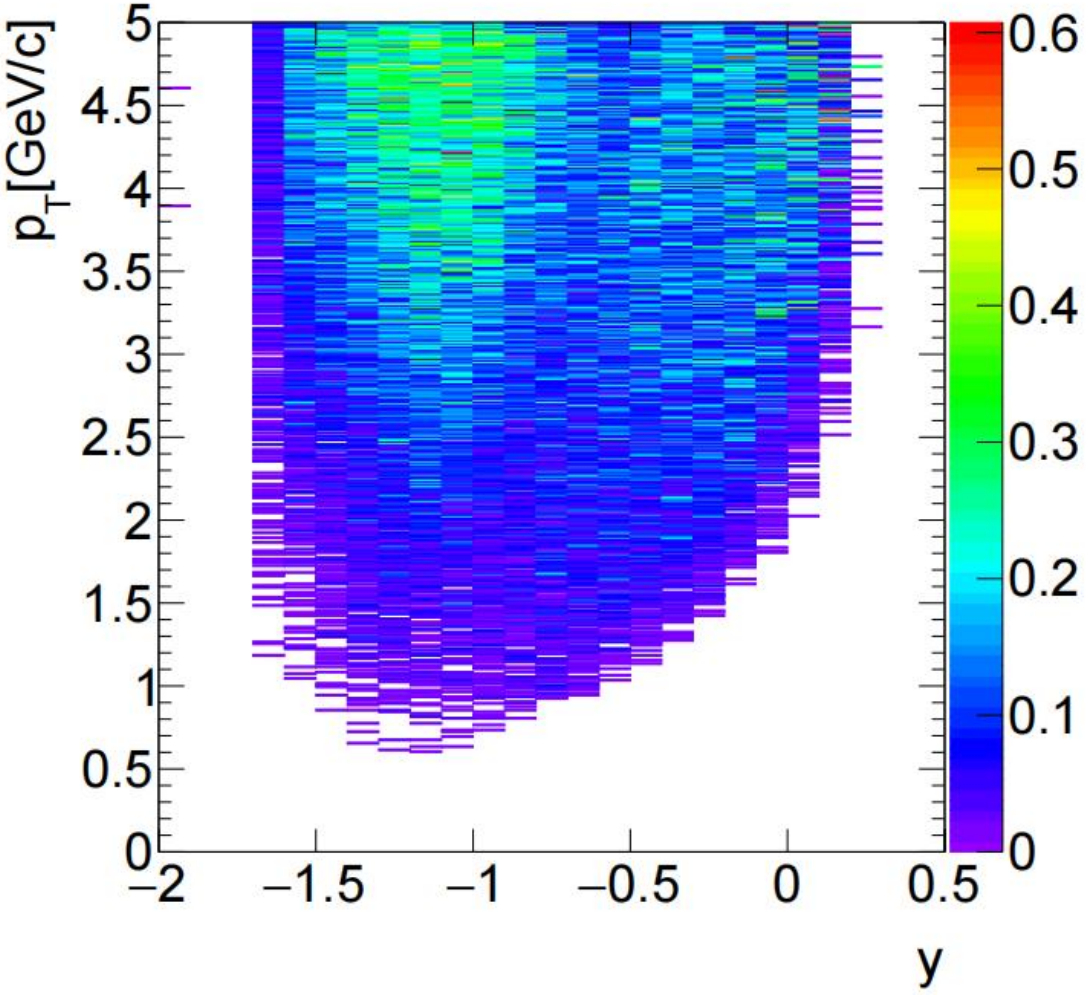
- Get P_T spectra in 10-40%(signal extaction:integral method)
- Get dNdy in 0-10% and 10-40% using boltzmann function

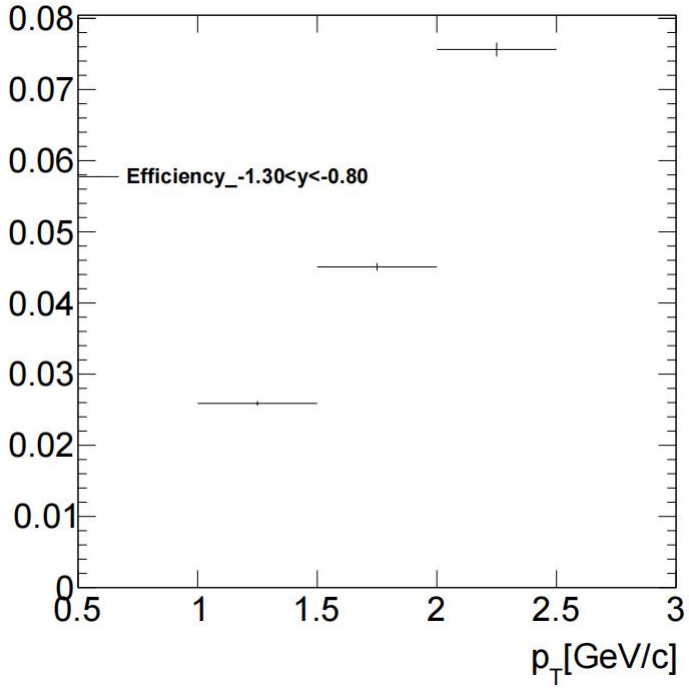
To do list

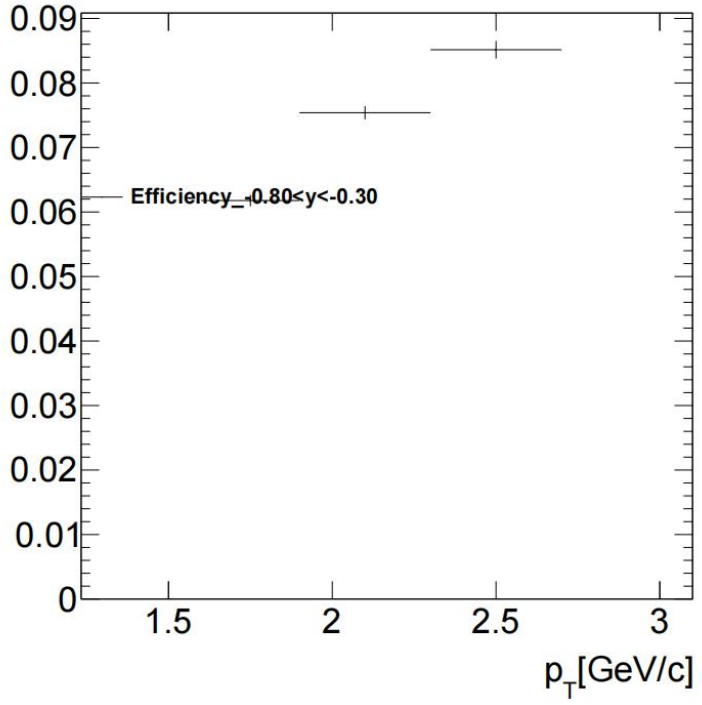
- Get system error in 0-10% and 10-40%

- Cen:0-10%.

Efficiency

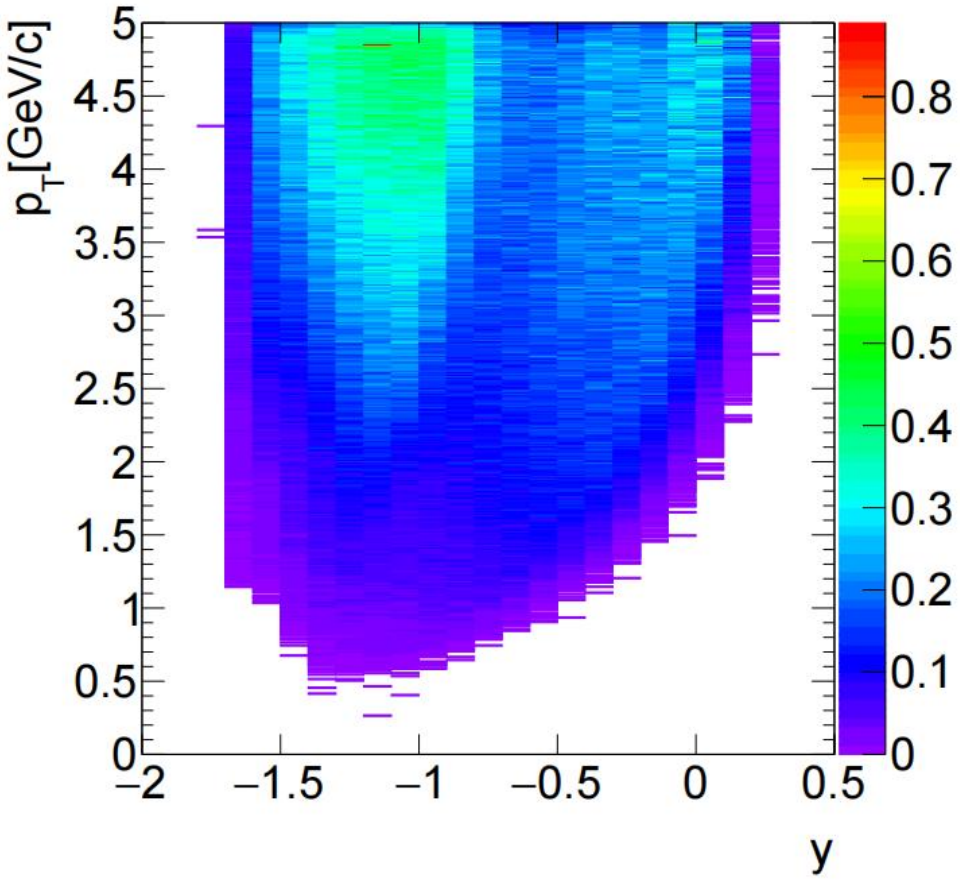


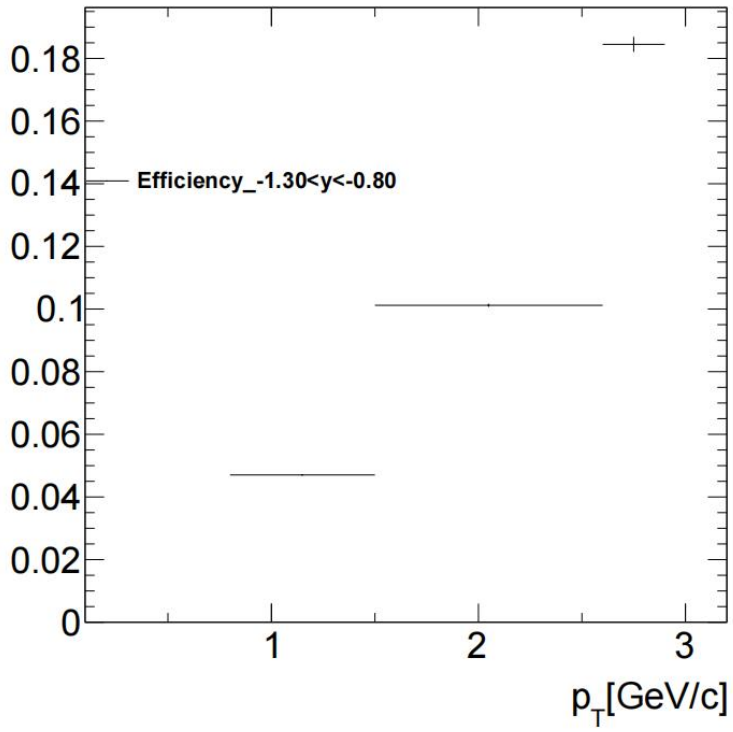


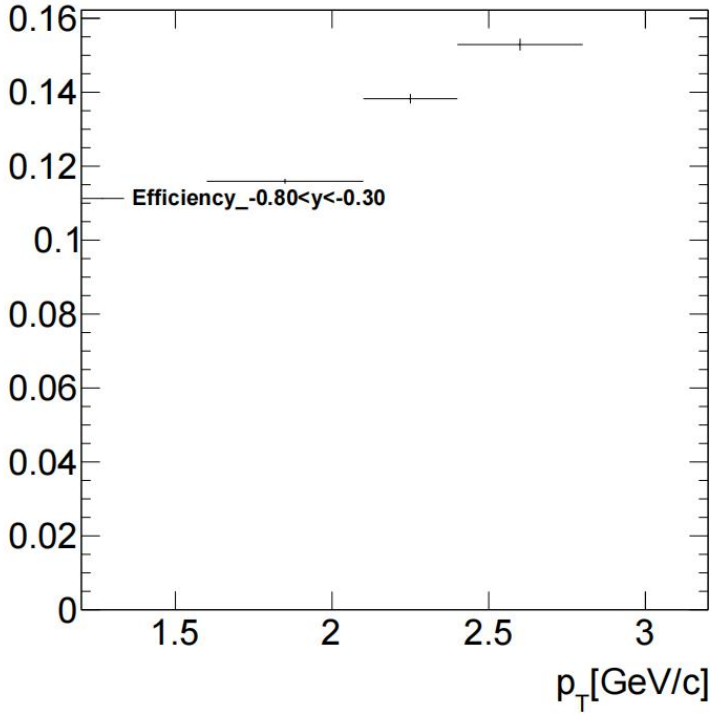


- Cen:10-40%.

Efficiency





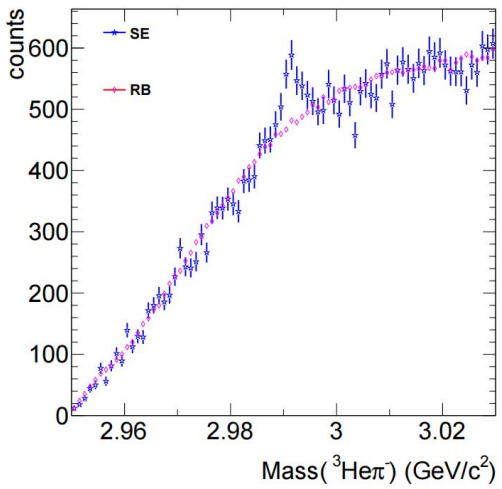


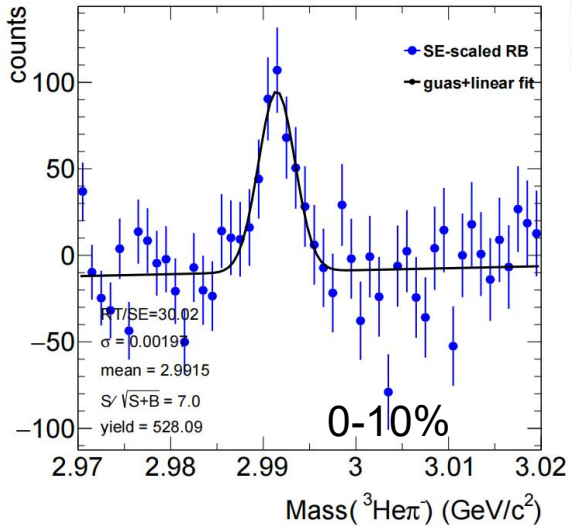
Back up

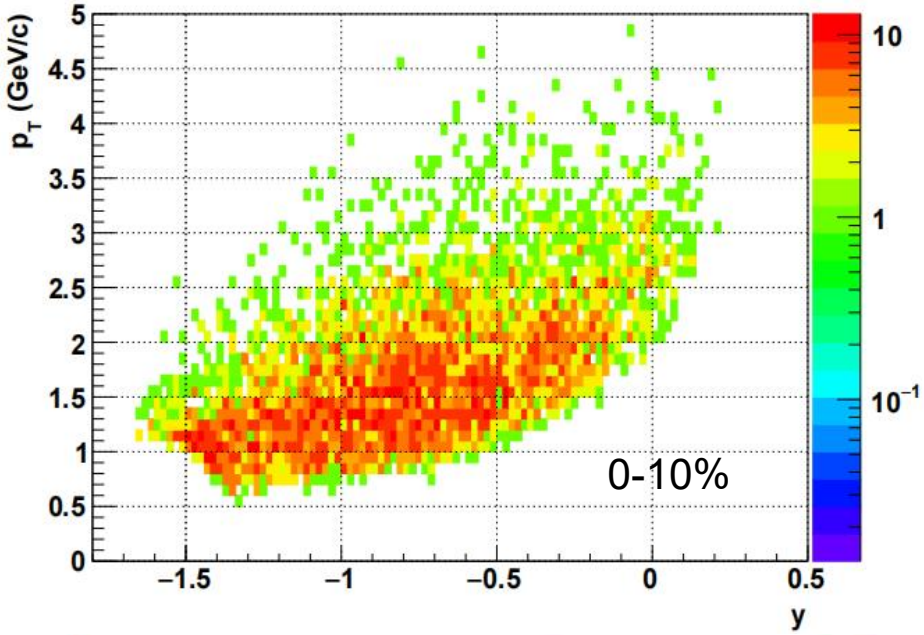
- bin by bin counting

0-10%
l >1, ldl>6
chi2topo<5,
chi2ndf<2.2
chi2prim_pi>5
chi2prim_he>0

pt_pi>0.1

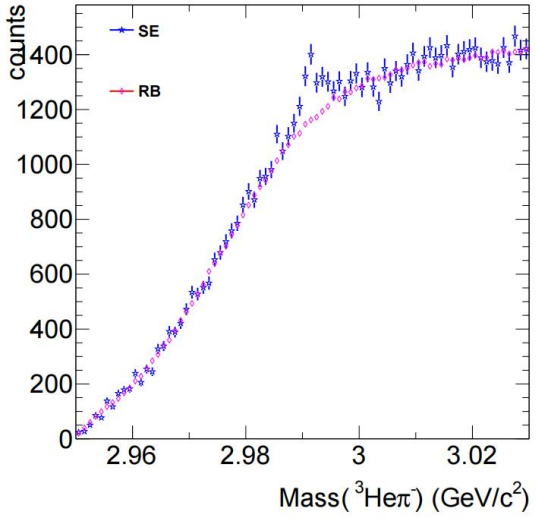


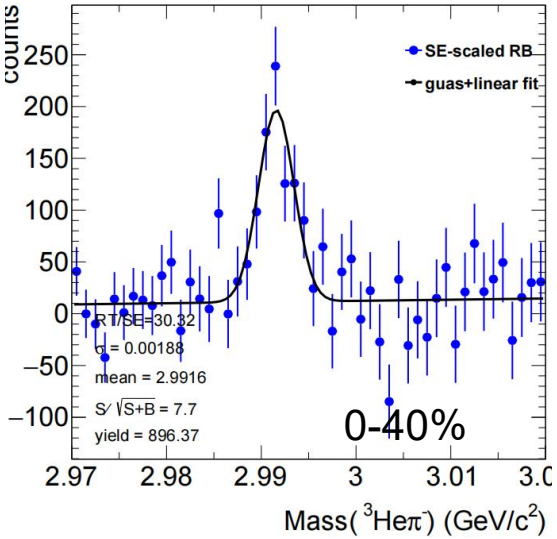


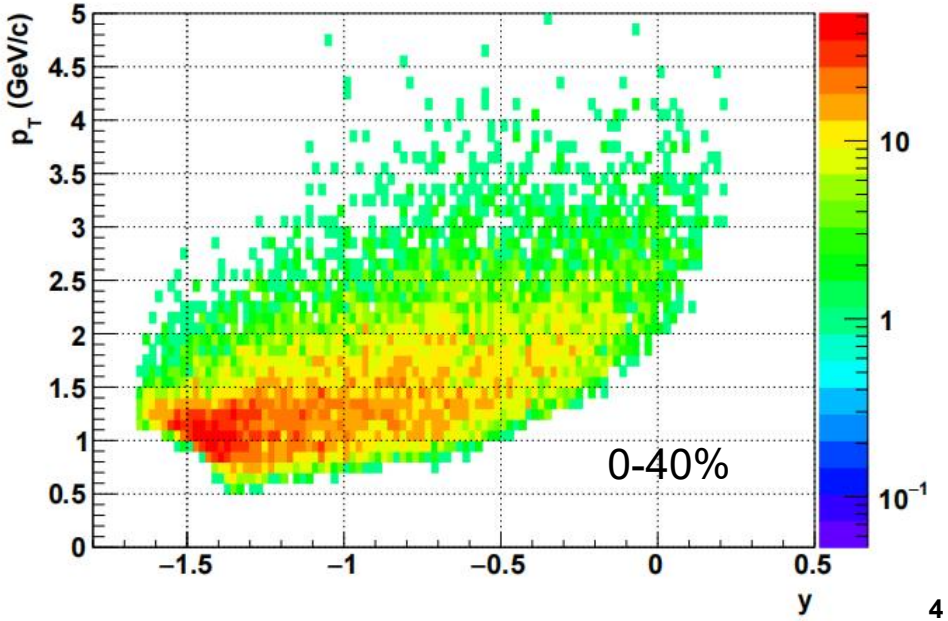


0-40%
l >1, ldl>6
chi2topo<5,
chi2ndf<2.2
chi2prim_pi>5
chi2prim_he>0

pt_pi>0.1

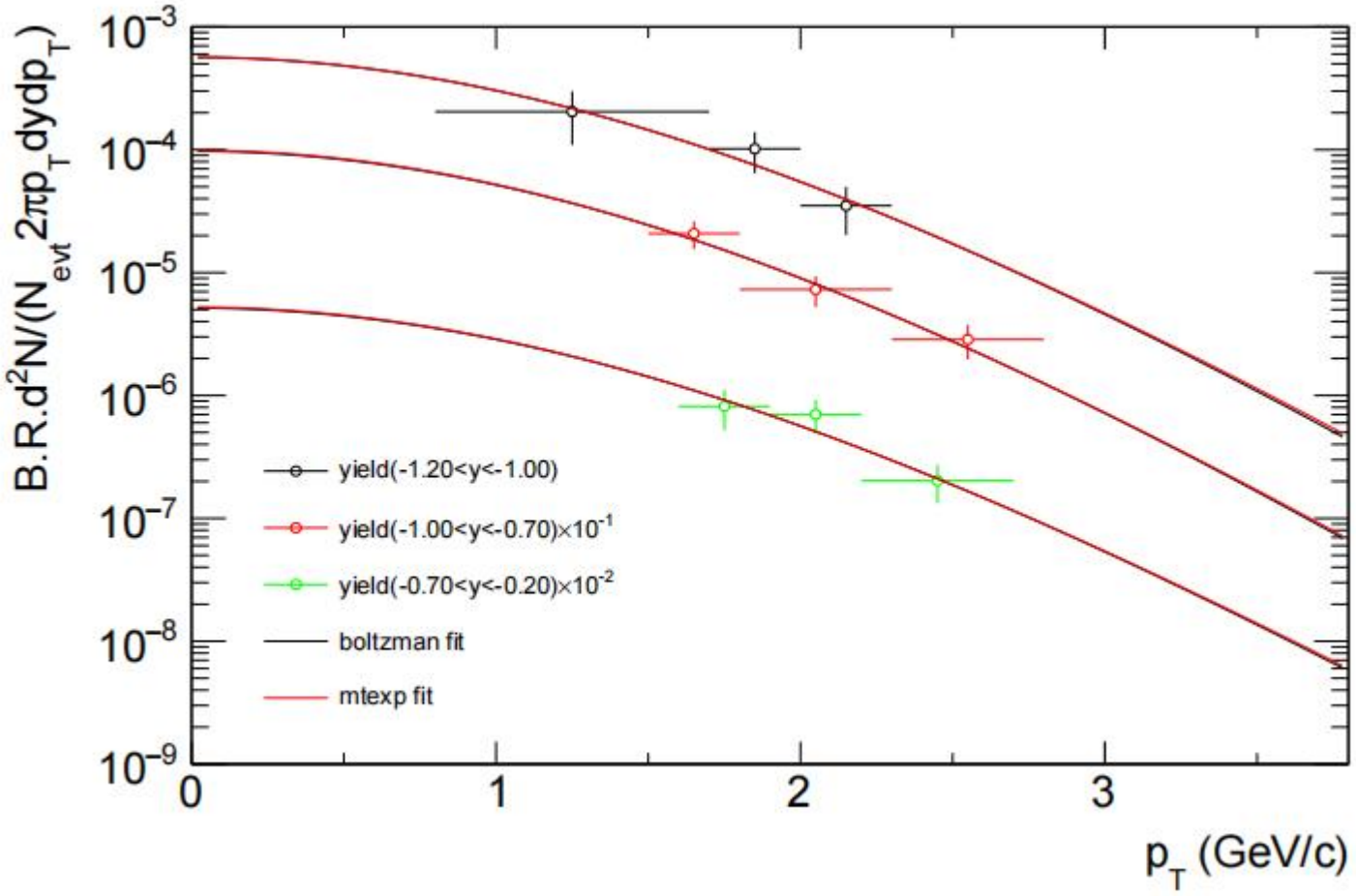






Back up

- Cen:0-10%.
- yield:integral method(fit function's first parameter)



$$\frac{d^2N}{dp_T dy} = \frac{1}{\text{B.R.}} \times \frac{N^{\text{raw}}}{N_{\text{evt}}\Delta(p_T)\Delta(y)} \times \frac{1}{\varepsilon_{\text{TPC}} \times \varepsilon_{\text{PID}}}$$

★spectra:
N_raw:the efficiency corrected signal counts.

★ there are many TH1F corresponding to diefferent y range filled with the caculated values whose X-axis is Pt.

Back up （three y ranges）

- Cen:0-10%.
- the mass window in each y_pt bin :fitmean-3*fitsigma<particlemass<fitmean+3*fitsigma(bin by bin counting)
- fit function:gaus+line

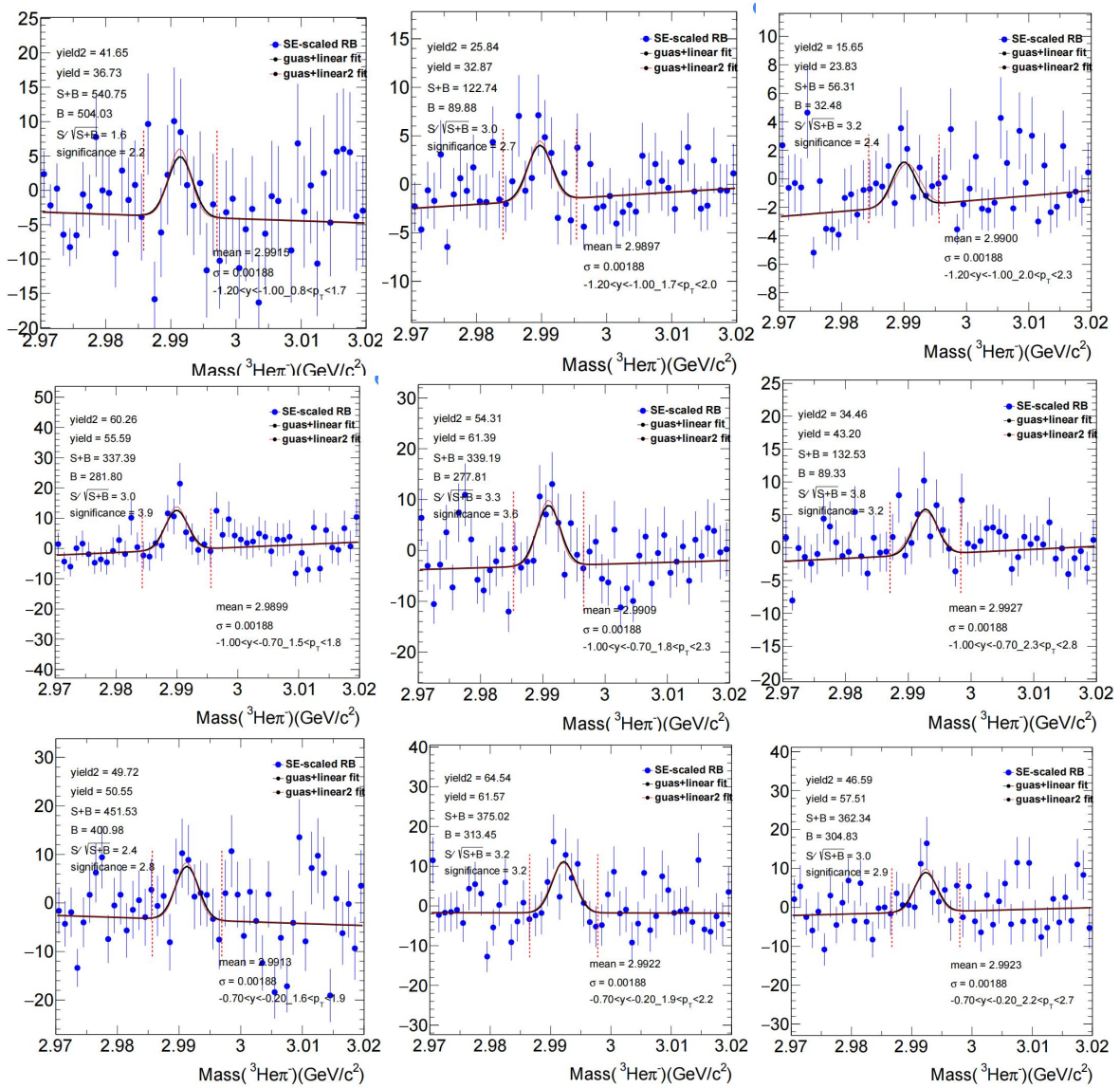
- bin by bin counting(black line)
  - Fix fitmean range(guided by 0-40%) (mean-sigma,mean+sigma)
  - Fix fitsigma(guided by 0-40%)

- integral method(red line)
  - Fix fitmean range(guided by 0-40%) (mean-sigma,mean+sigma)
  - Fix fitsigma range(guided by 0-40%) (sigma-0.0002,sigma+0.0002)

-1.2<y<-1.0

-1.0<y<-0.7

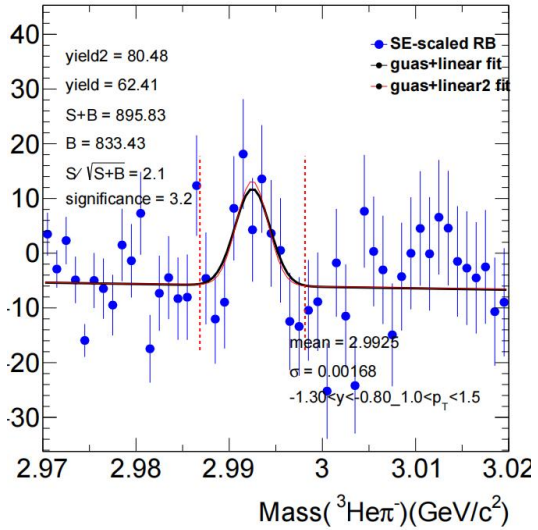
-0.7<y<-0.2

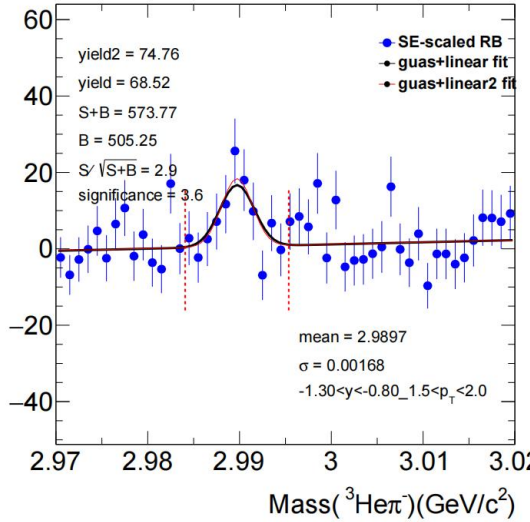


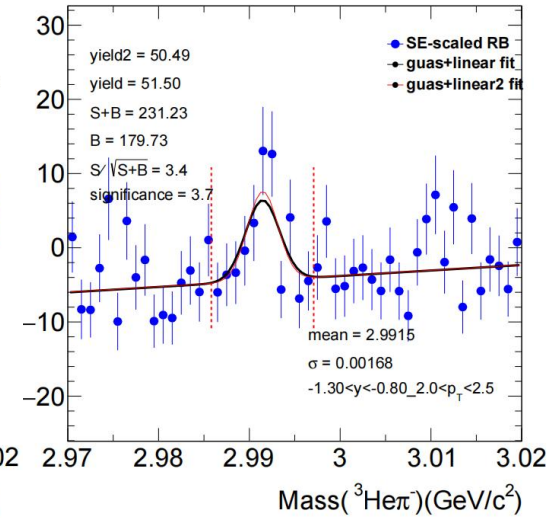
Back up

- Cen:0-10%.
- the mass window in each y_pt bin :fitmean-3*fitsigma<particlemass<fitmean+3*fitsigma(bin by bin counting)
- fit function:gaus+line

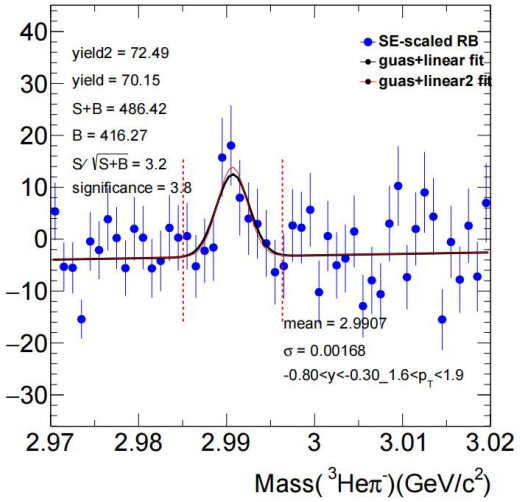
- bin by bin counting(black line)
  - Fix fitmean range(guided by 0-40%) (mean-sigma,mean+sigma)
  - Fix fitsigma(guided by 0-40%)

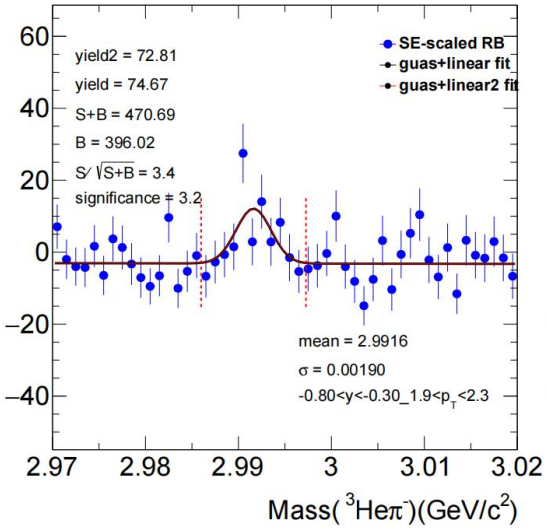


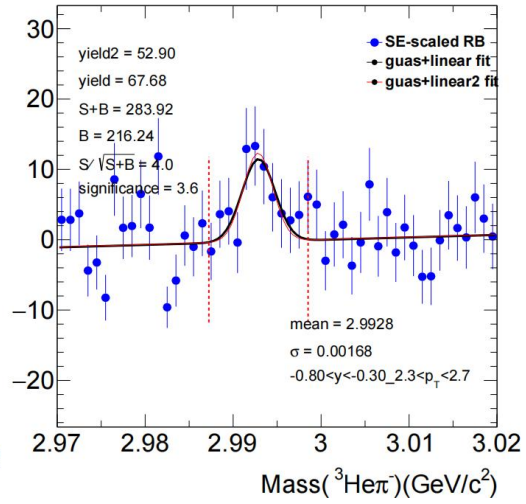




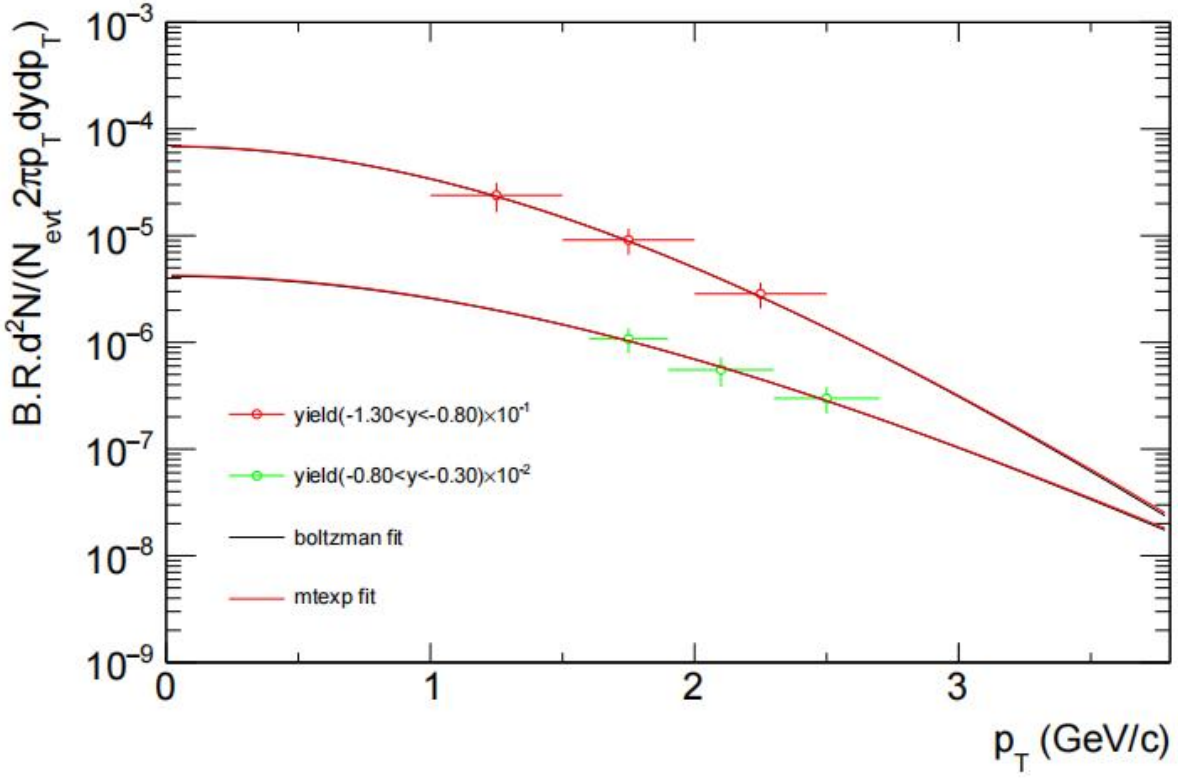
- integral method(red line)
  - Fix fitmean range(guided by 0-40%) (mean-sigma,mean+sigma)
  - Fix fitsigma(guided by 0-40%) (sigma-0.0002,sigma+0.0002)

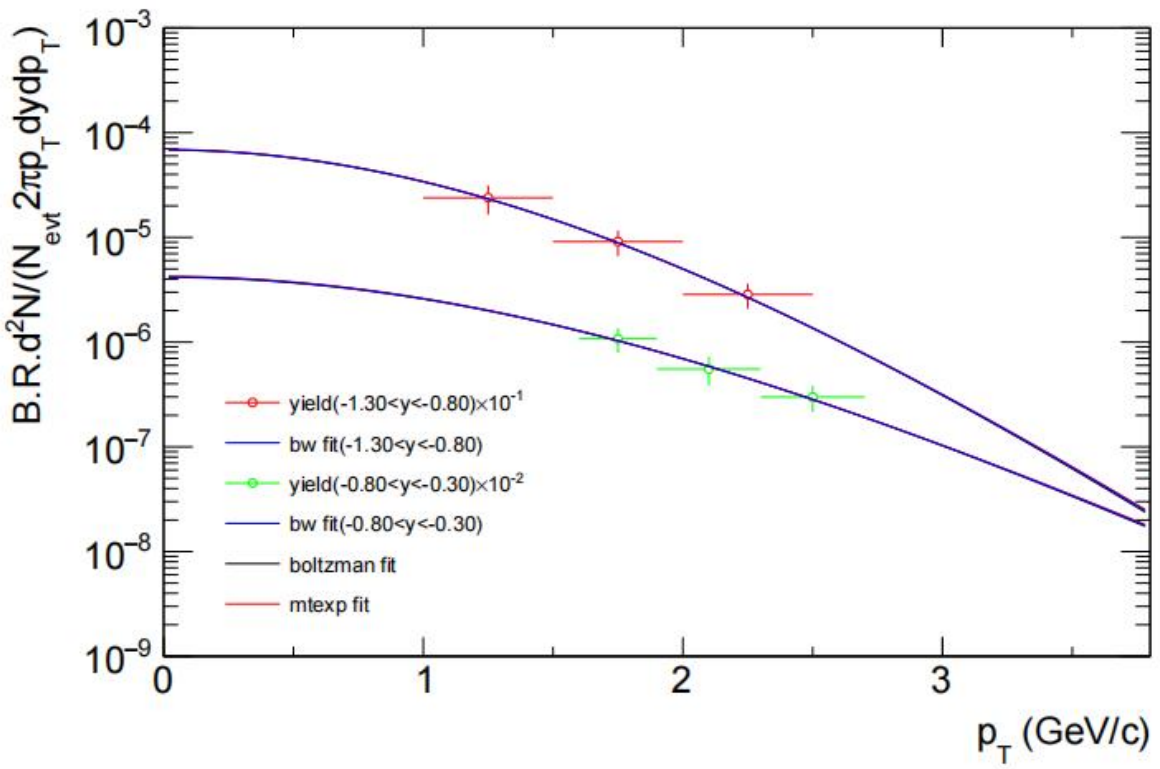






- Cen:0-10%.
- yield:integral method (fit function's first parameter)





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Back up

- Cen:0-10%.
- yield:integral method(fit function's first parameter)