

2023 INTT workshop

1st flush report

Nov./8/2023 Misaki Hata (NWU)

dN/deta with cluster method

Misaki Hata
(NWU)

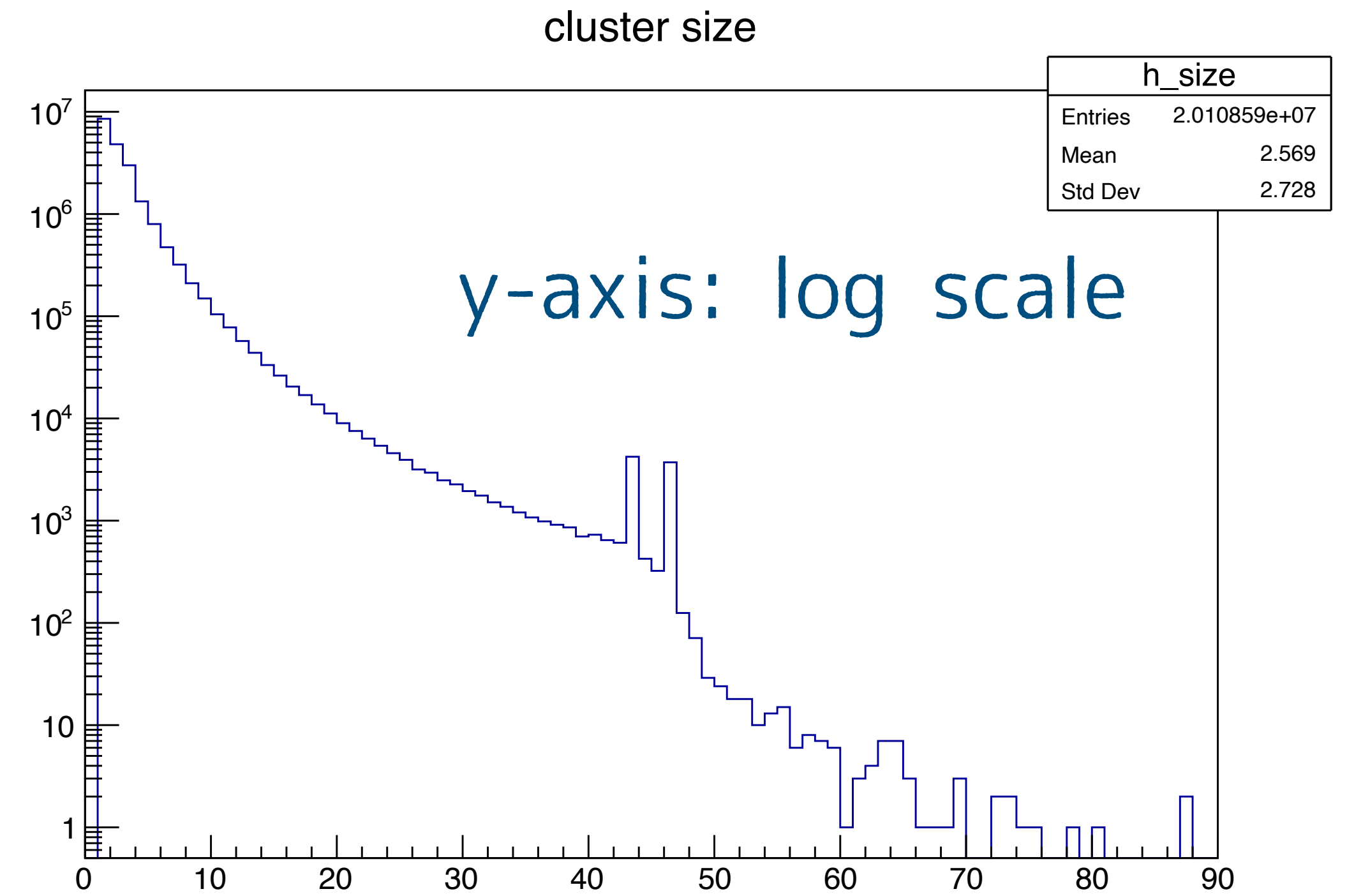
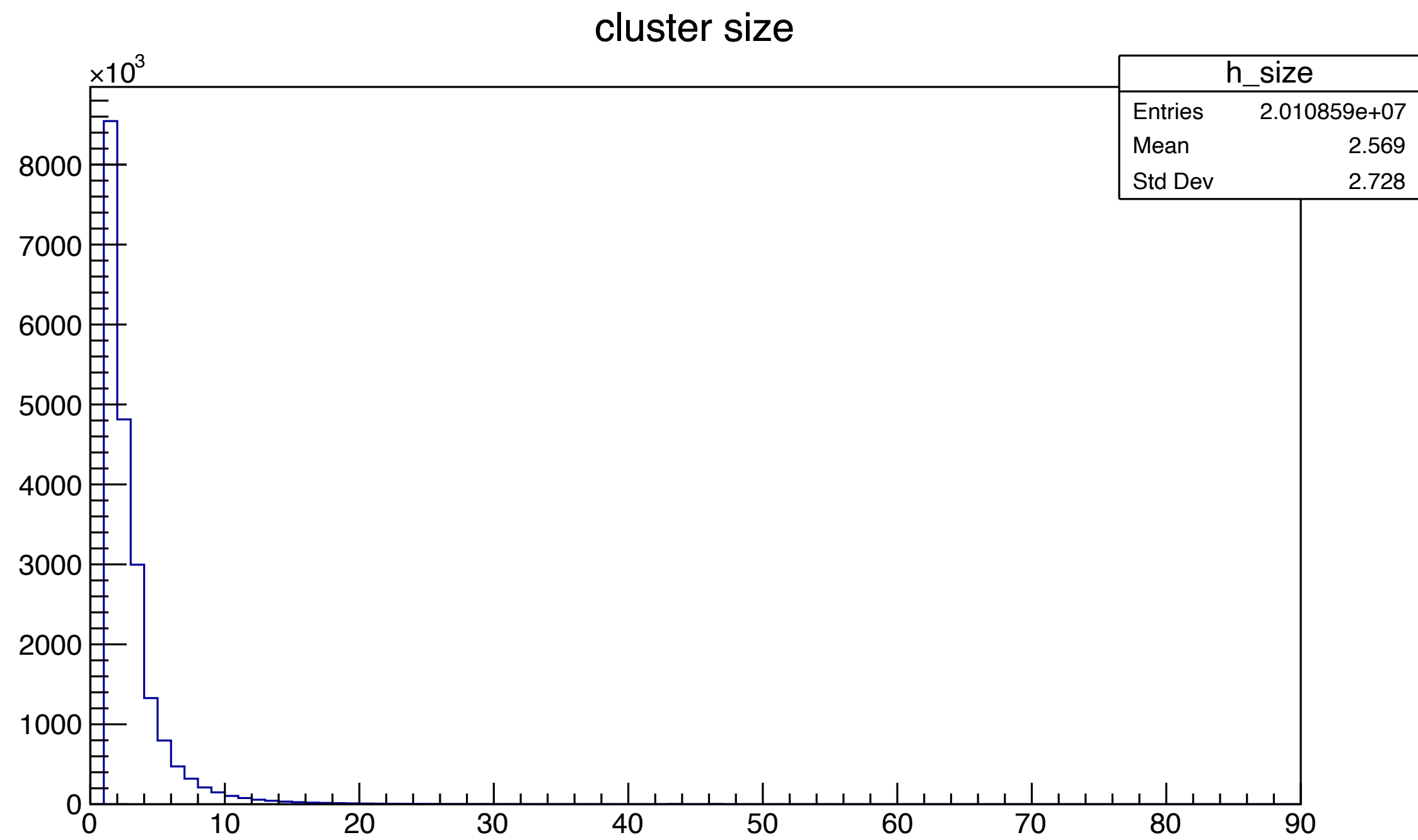
Analyzing dN/Deta using cluster method

Goal in this workshop: Analysis of raw data, Checking Simulation code

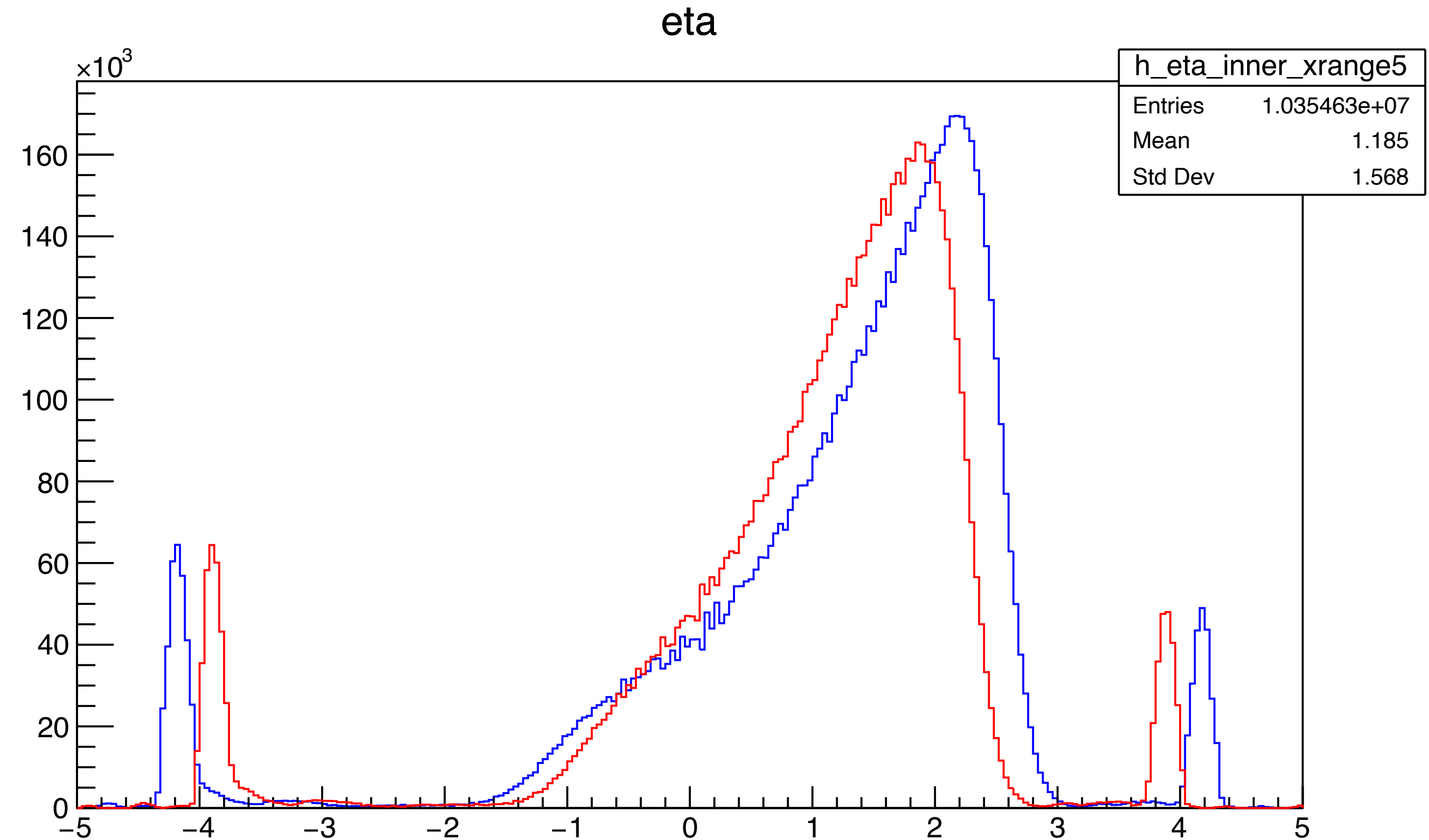
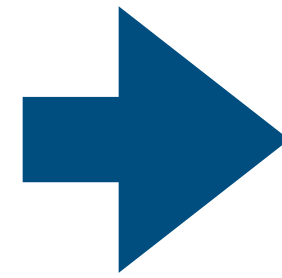
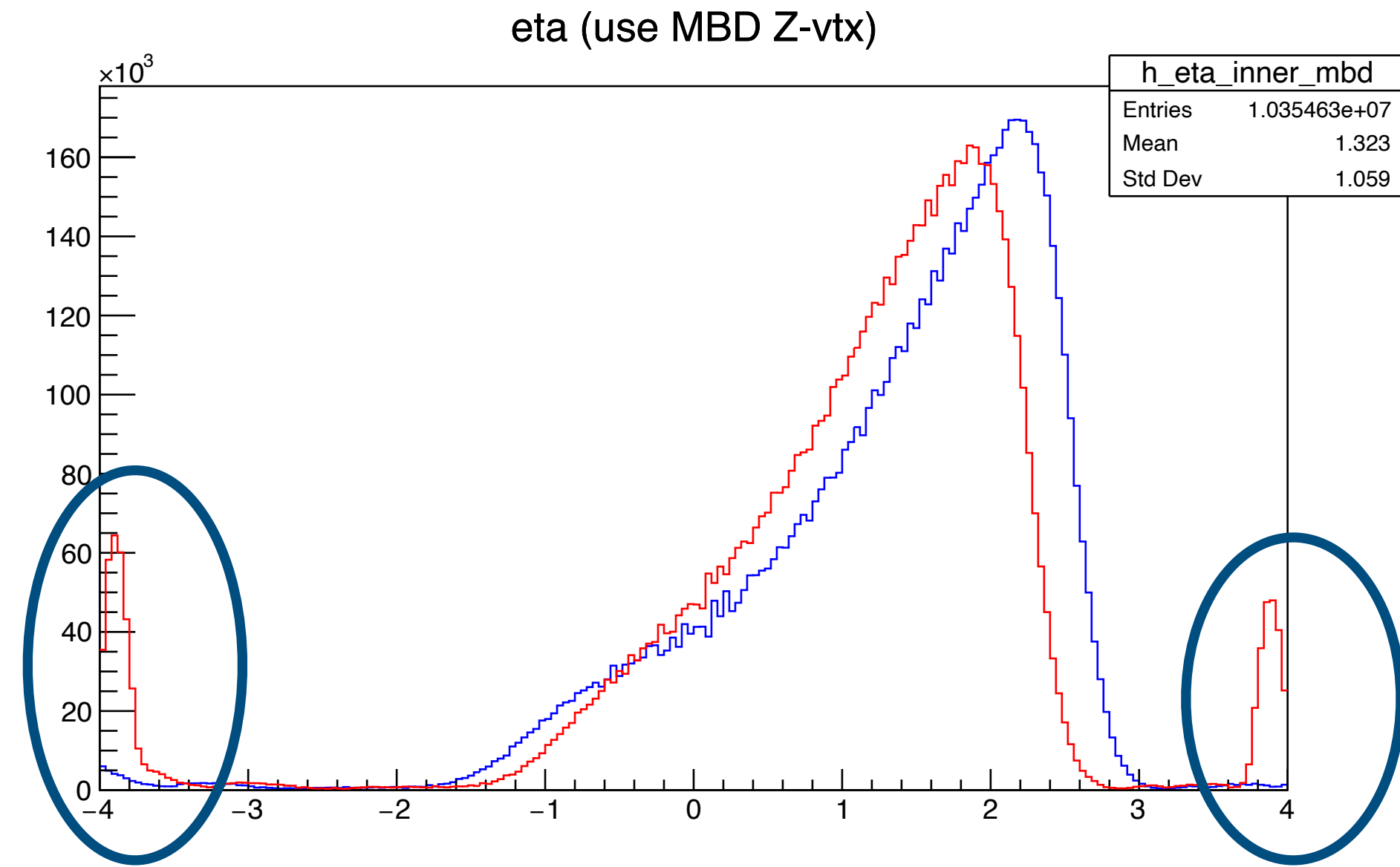
My To-Do List

- Analysis of raw data
 - Checking eta distribution
 - cutting at Zvtx and ADC (change upper range)
 - cutting at Zvtx and ADC (only lower range)
 - changing x-axis range
 - Checking cluster size distribution
 - Checking ADC distribution for each theta range → I haven't drawn it yet
 - Checking MBD charge vs INTT cluster after cutting at Zvtx and ADC
- Checking Simulation code
 - InttClusterizer.cc
 - PHG4InttDigitizer.cc
 - PHG4InttHitReco.cc
 - G4_TrkrSimulation.C
- *Analysis of Simulation data*
 - *Doing same thing with raw data analysis (without distribution using ADC value)*

cluster size distribution



eta distribution (changing x-axis range)



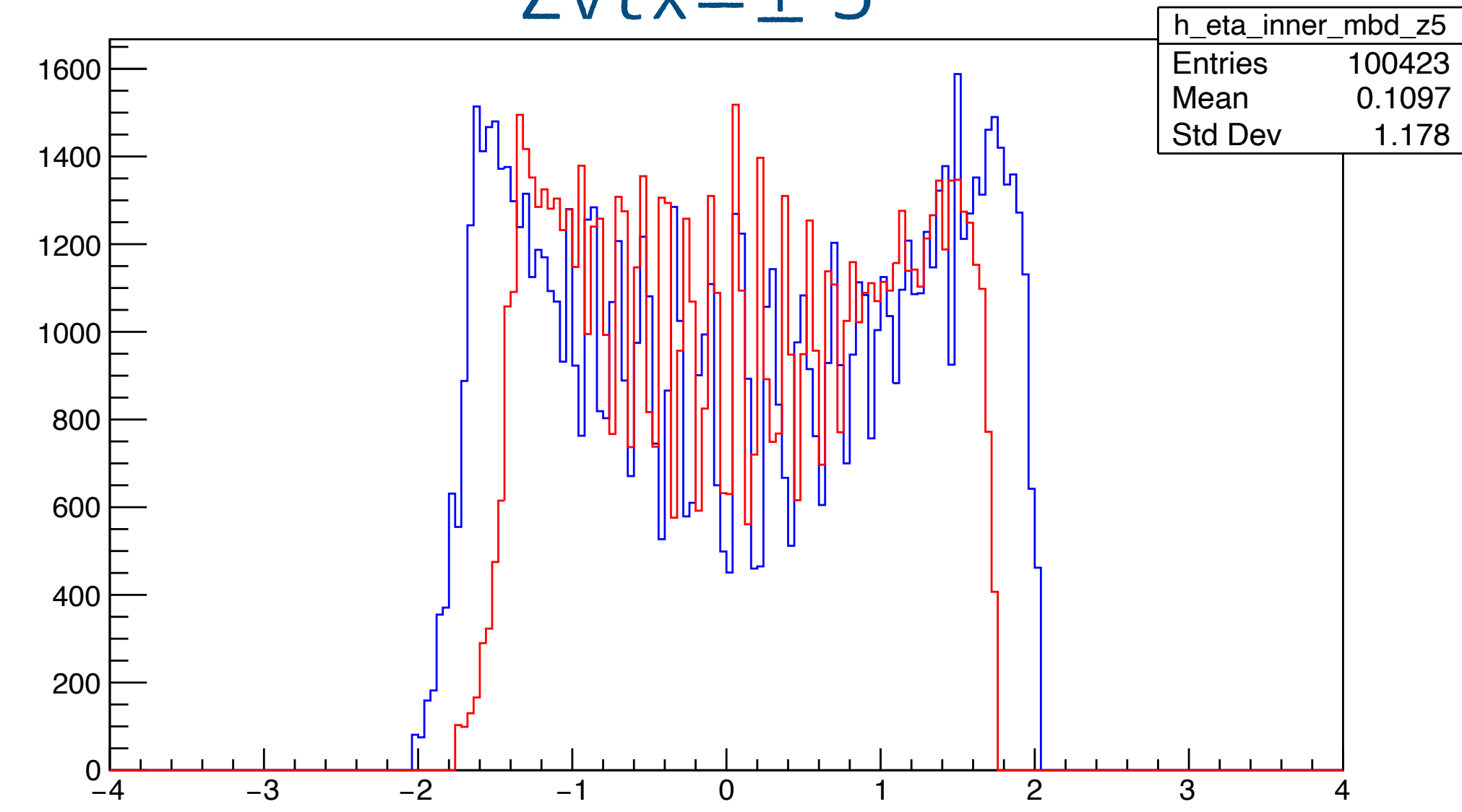
- I tried to change x-axis range.
- ->Signal at the edge can become to see

blue: inner barrel
red: outer barrel

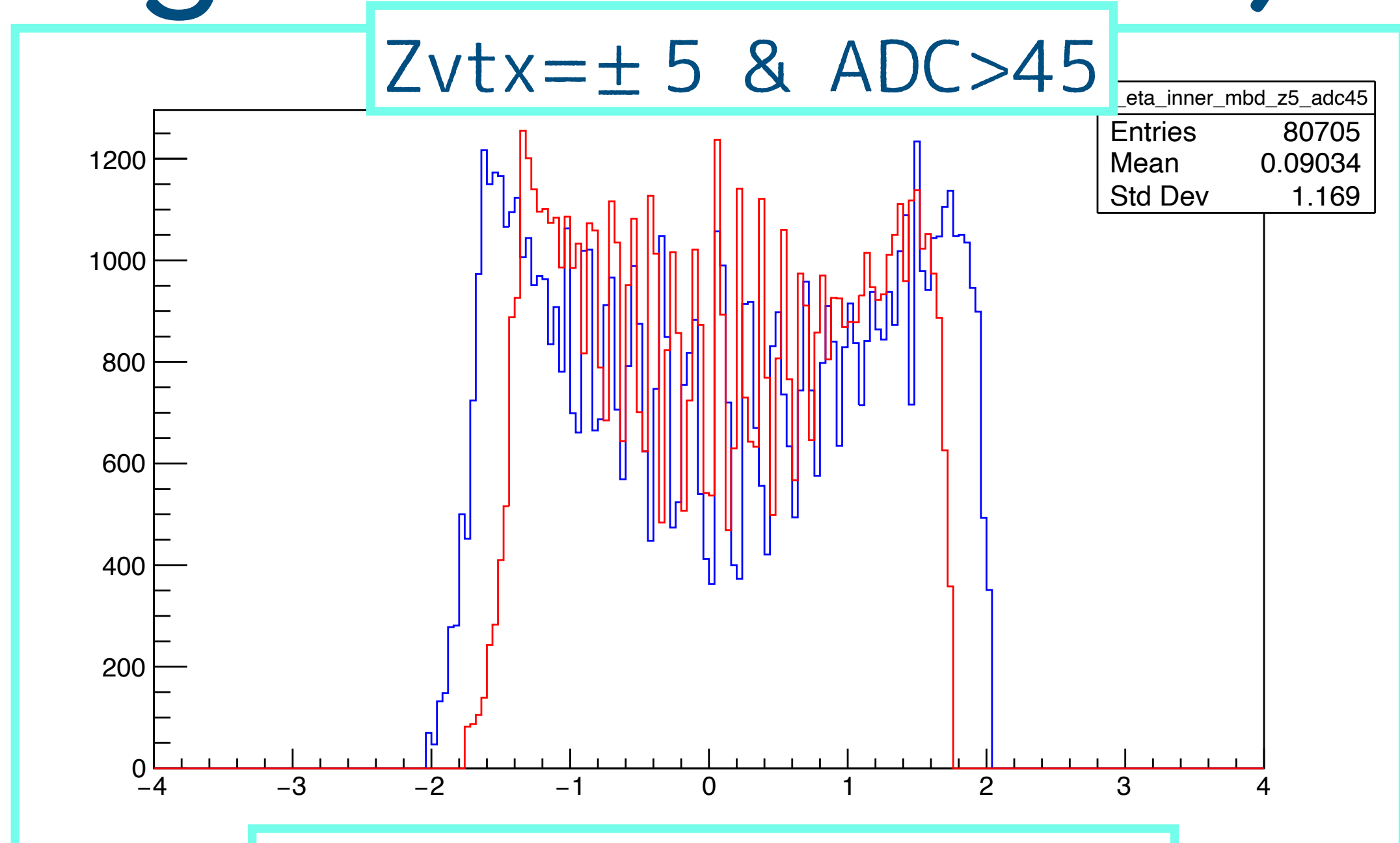
eta distribution (cutting Zvtx and ADC)

blue: inner barrel
red: outer barrel

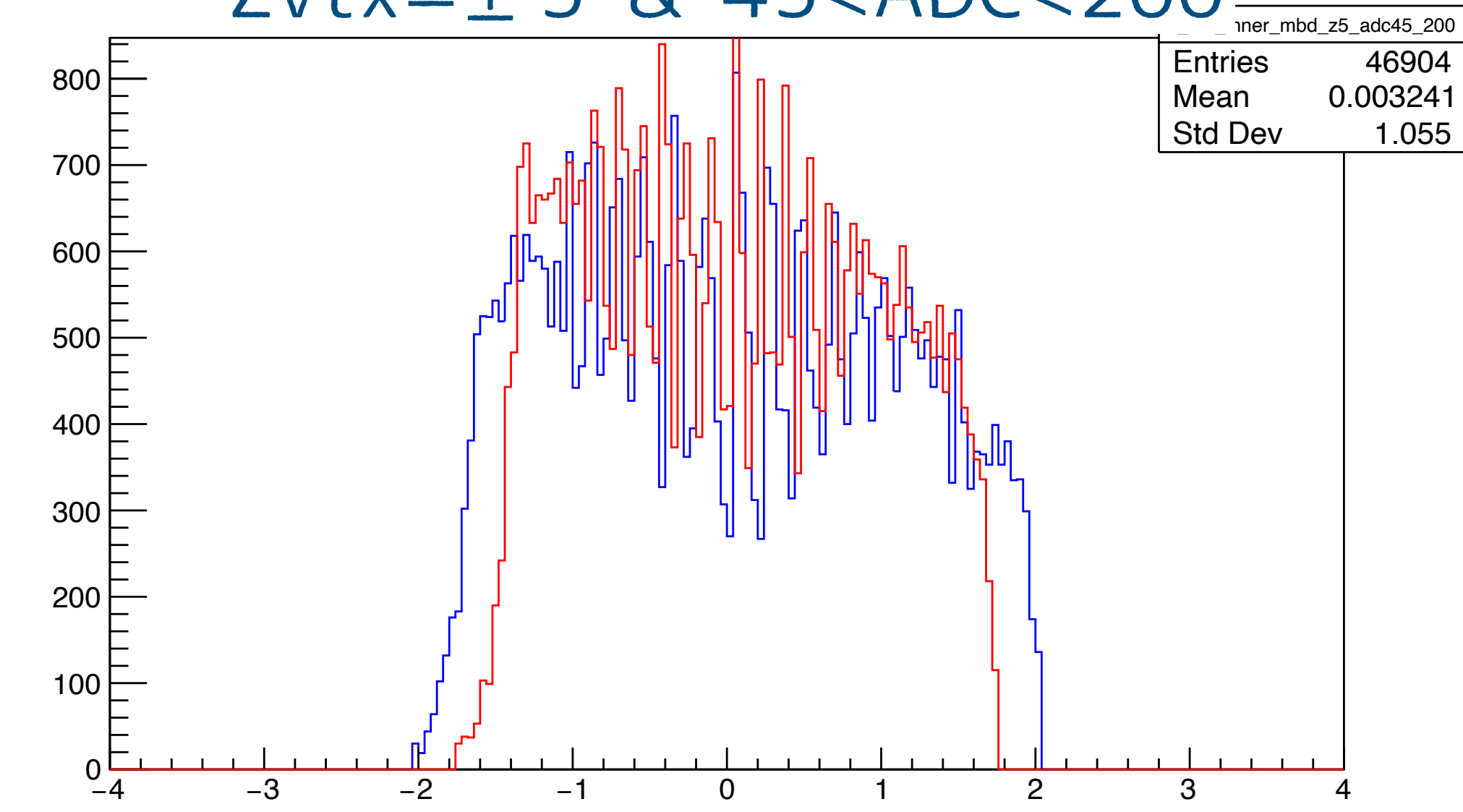
Zvtx = ± 5



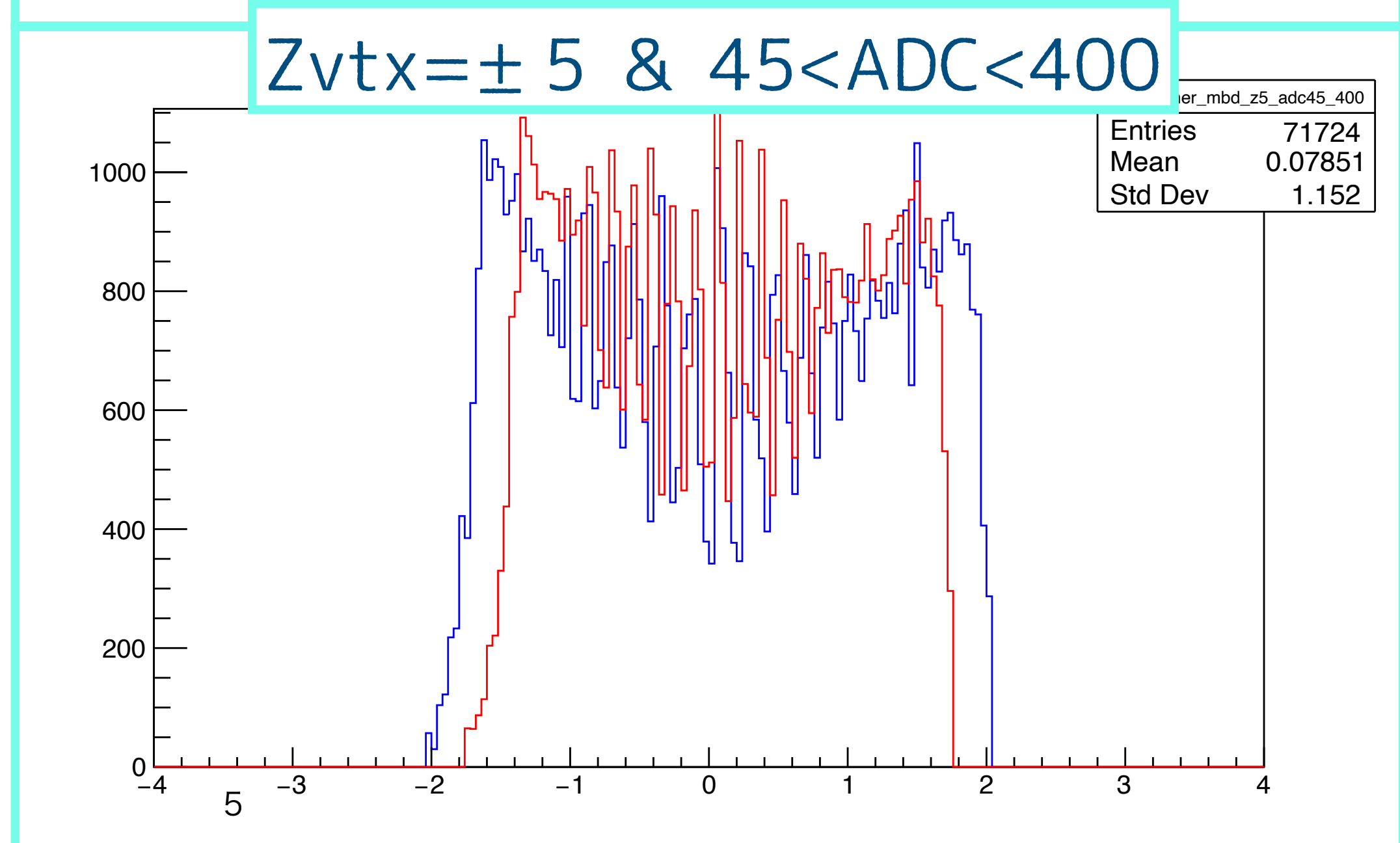
Zvtx = ± 5 & ADC > 45



Zvtx = ± 5 & 45 < ADC < 200

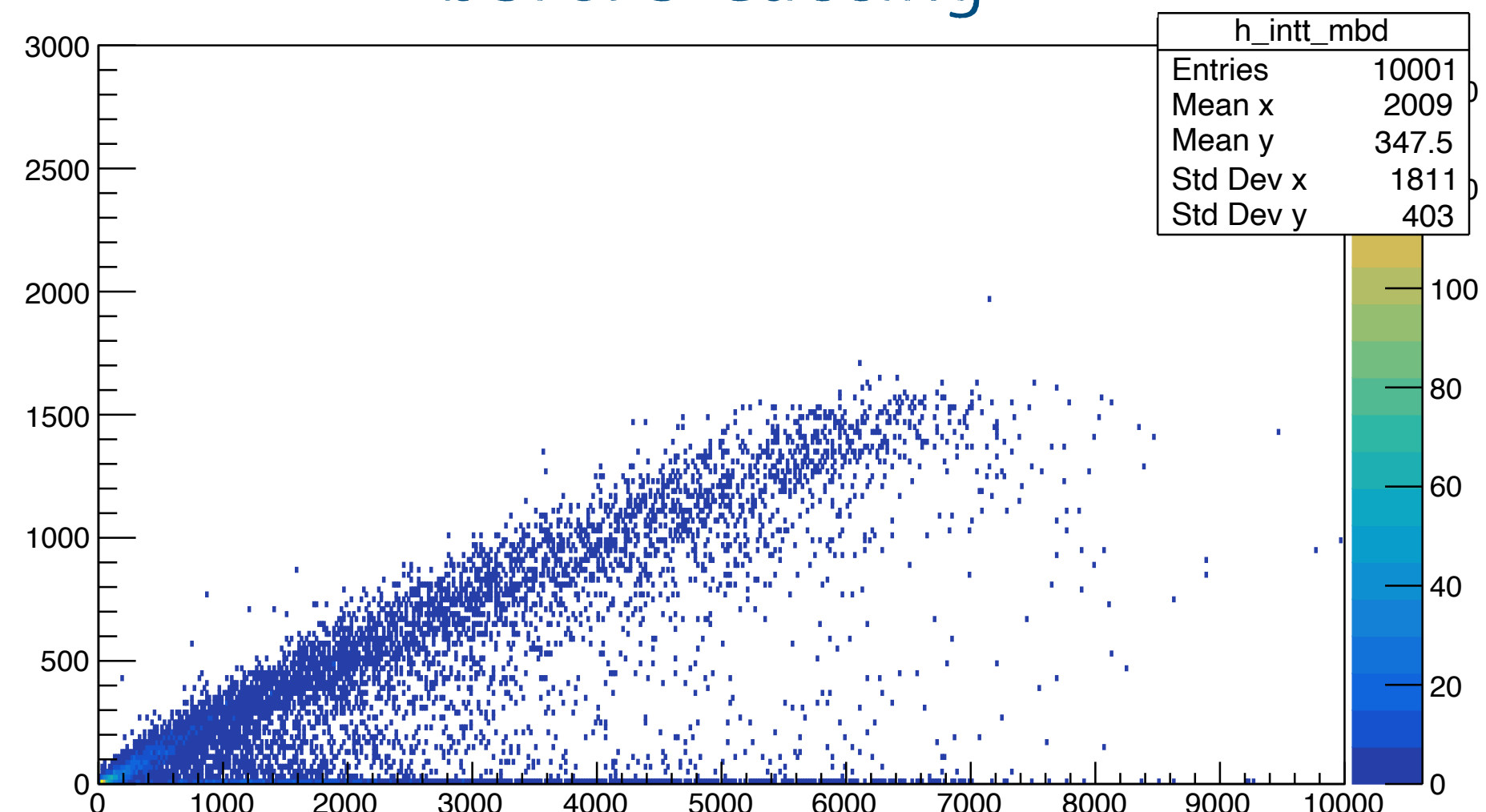


Zvtx = ± 5 & 45 < ADC < 400

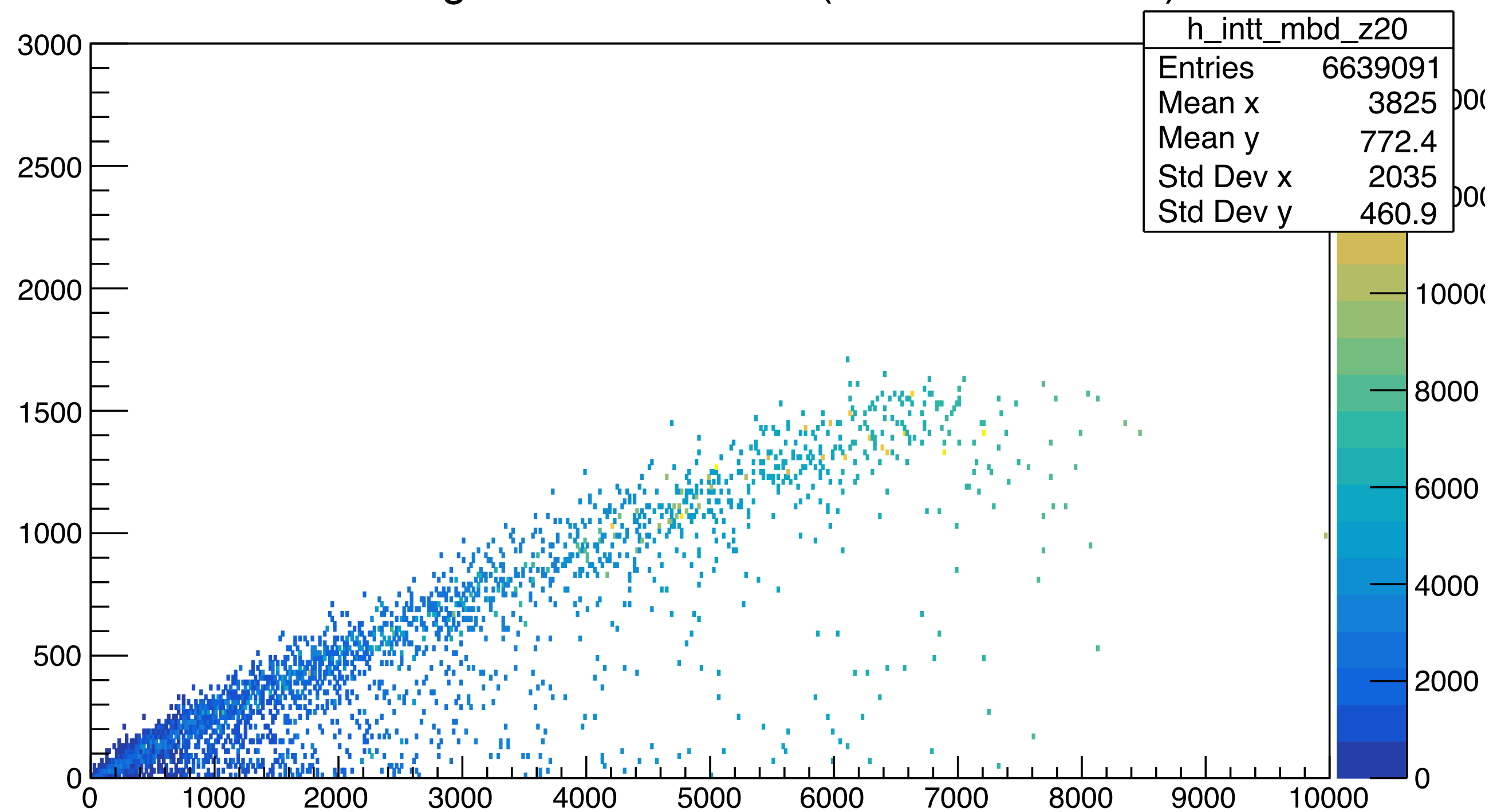


MBD charge vs INTT cluster (cutting Zvtx)

before cutting

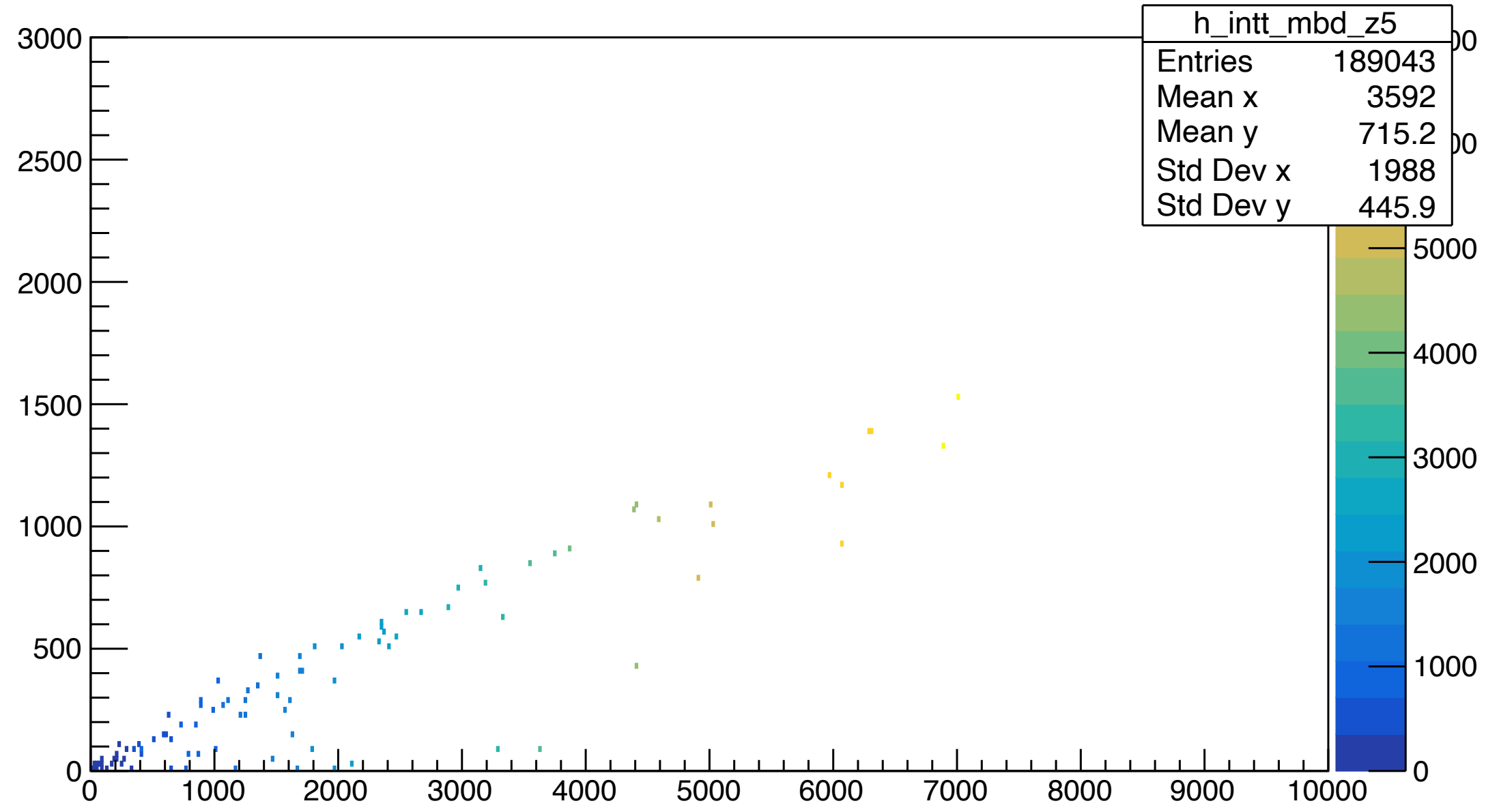


MBD charge vs INTT cluster (mbd zvtx:-20~20)

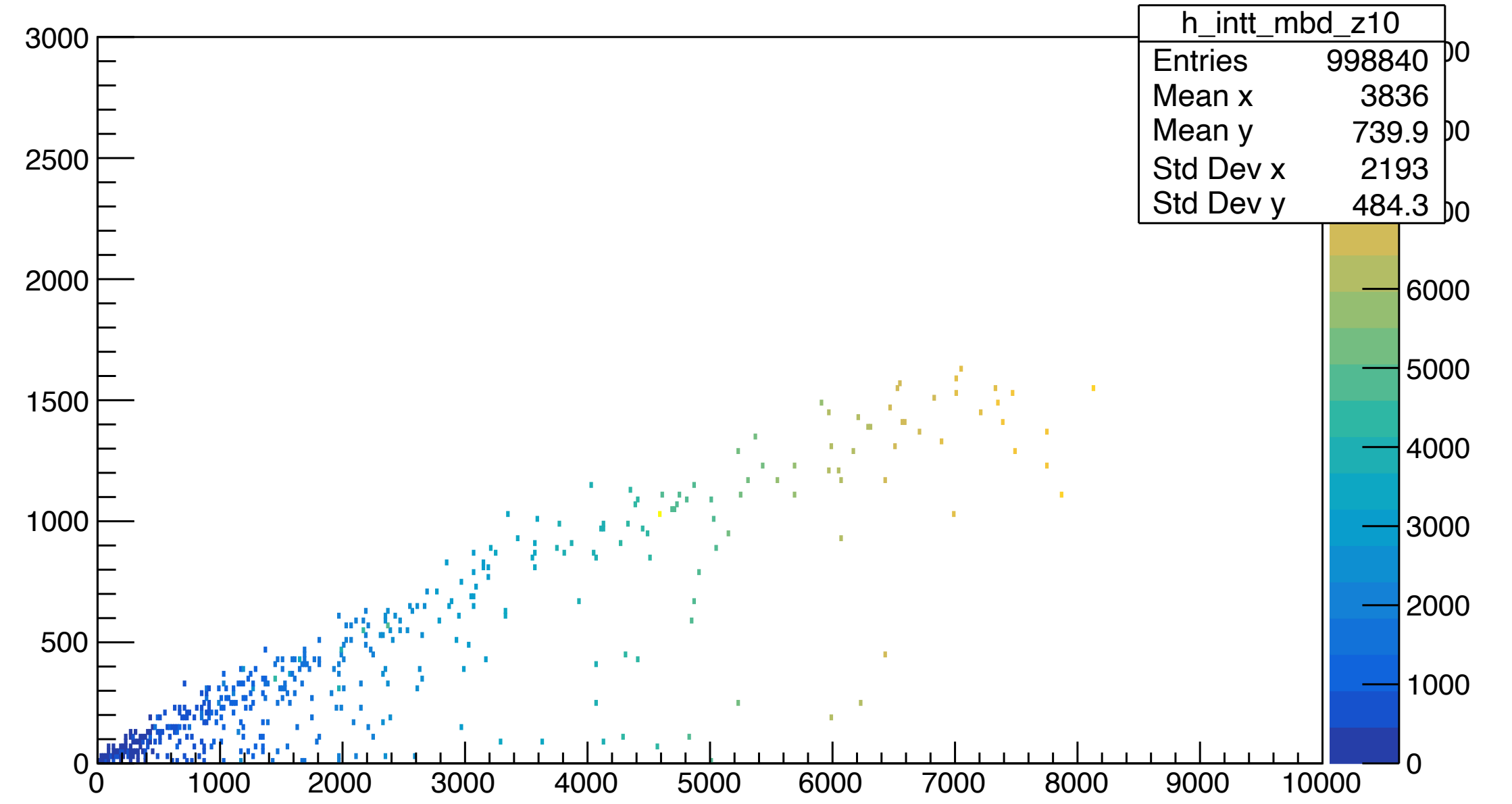


- $Z_{vtx} = -20 \sim 20$

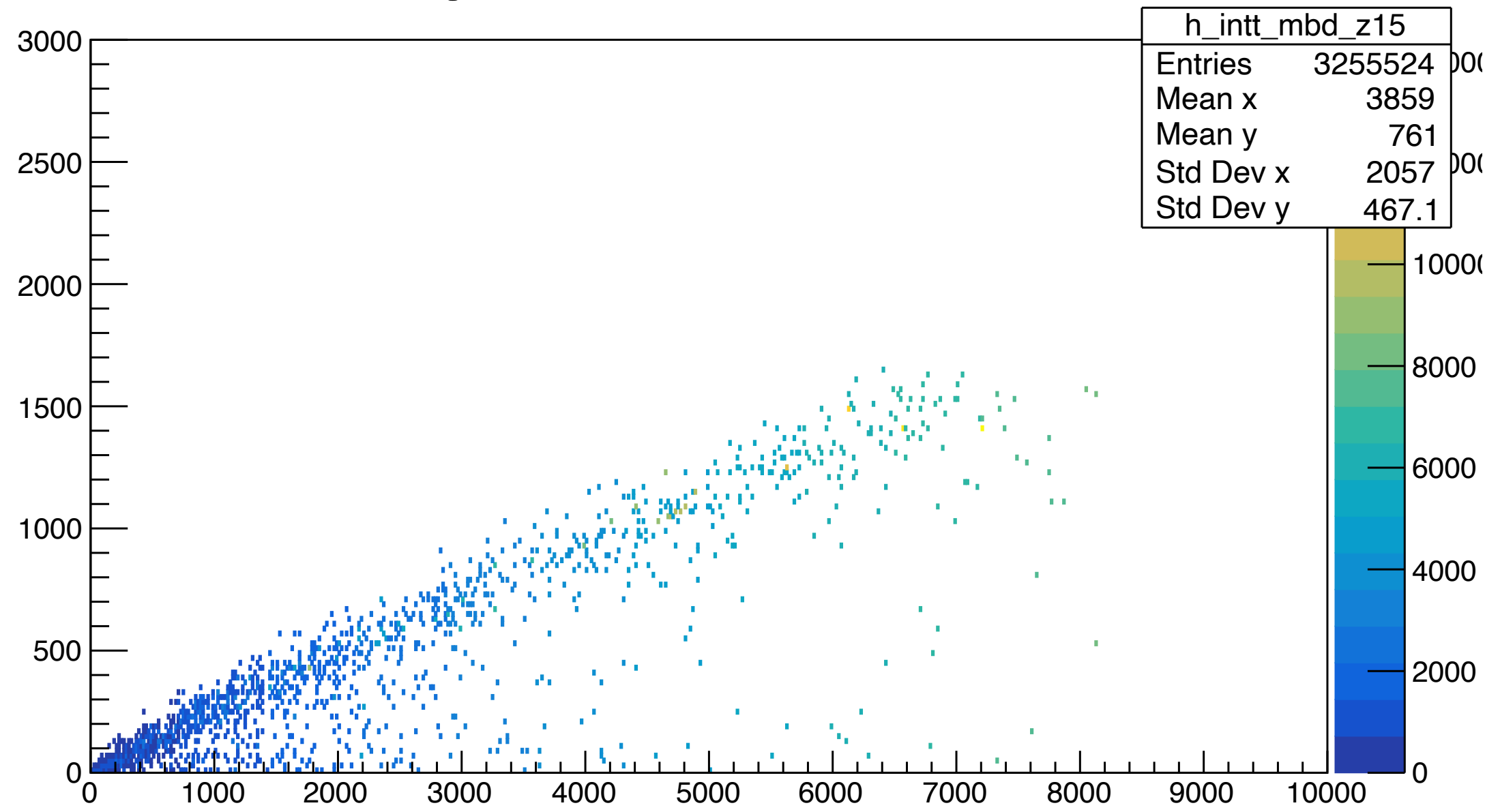
MBD charge vs INTT cluster (mbd zvtx:-5~5)



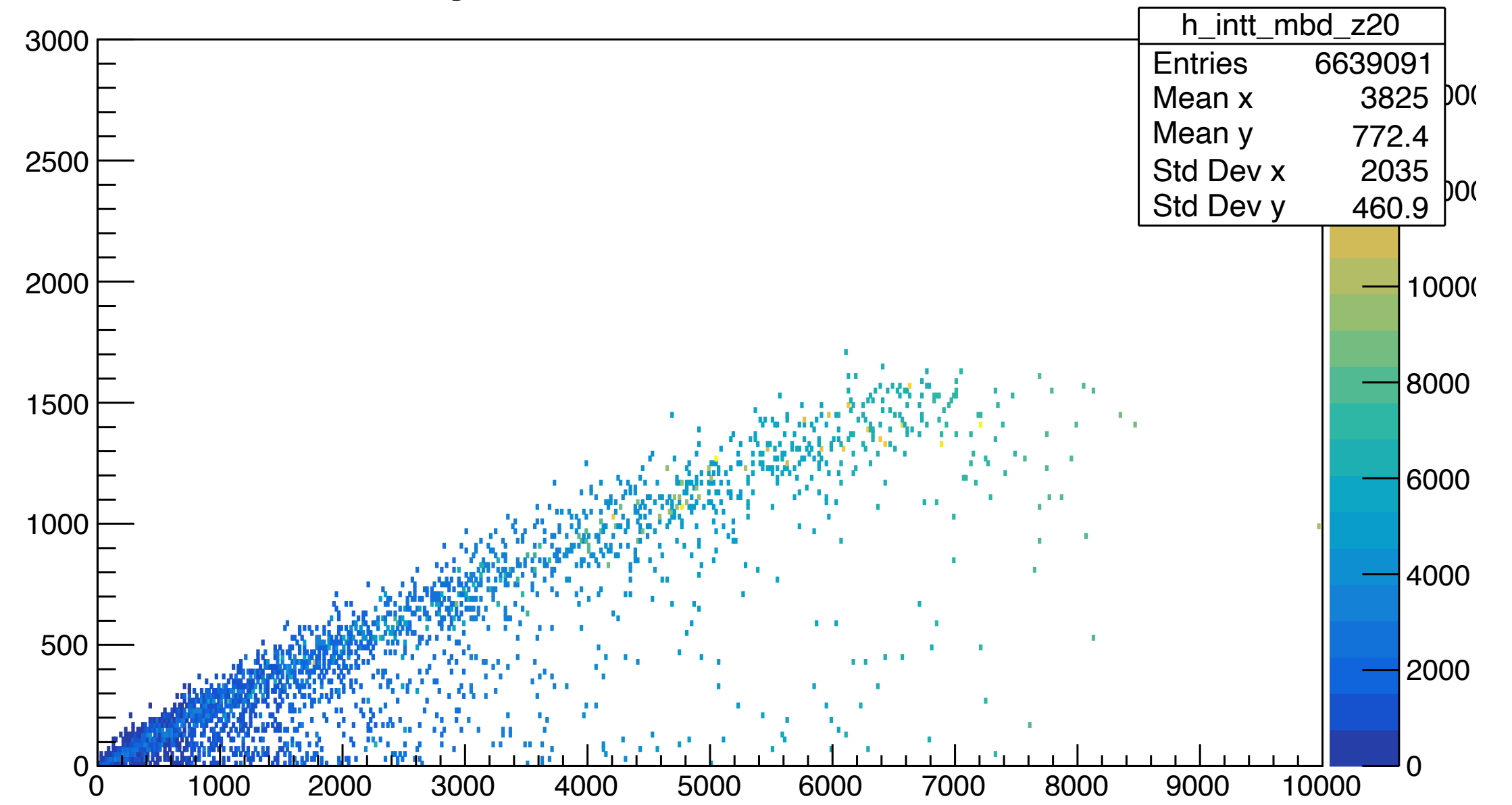
MBD charge vs INTT cluster (mbd zvtx:-10~10)



MBD charge vs INTT cluster (mbd zvtx:-15~15)

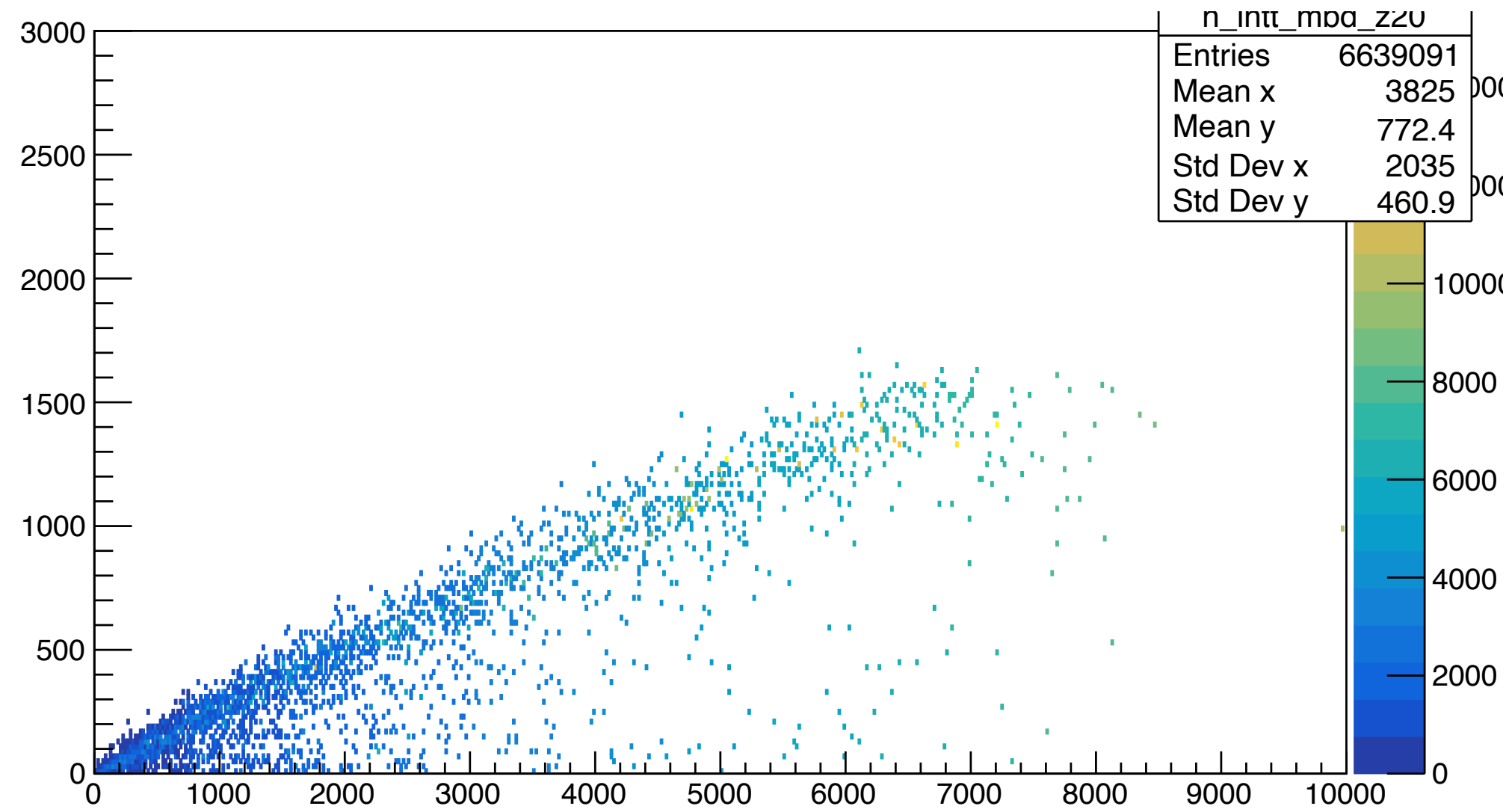


MBD charge vs INTT cluster (mbd zvtx:-20~20)

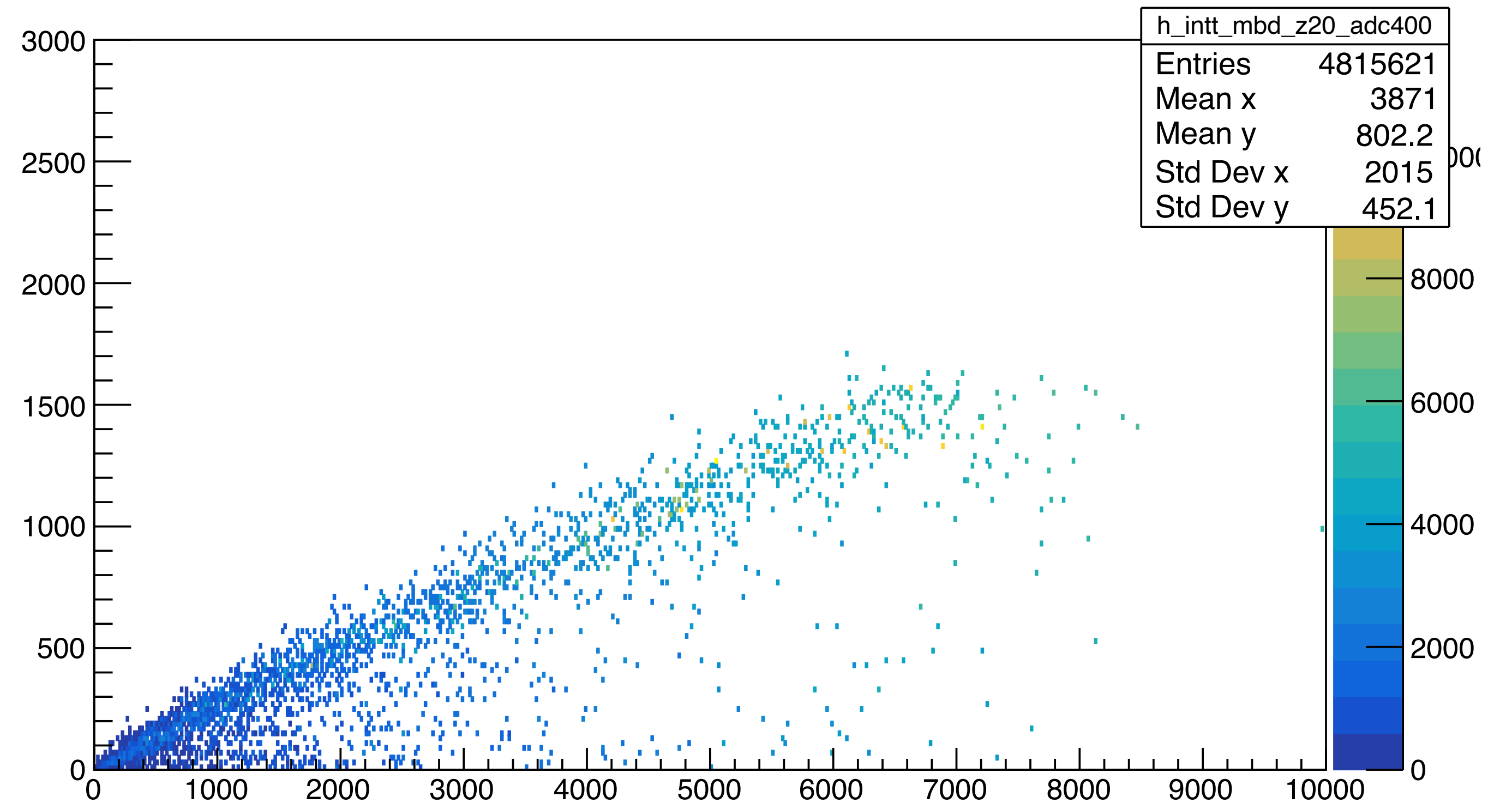


MBD charge vs INTT cluster (cutting Zvtx and ADC)

$Z_{vtx} = \pm 20$

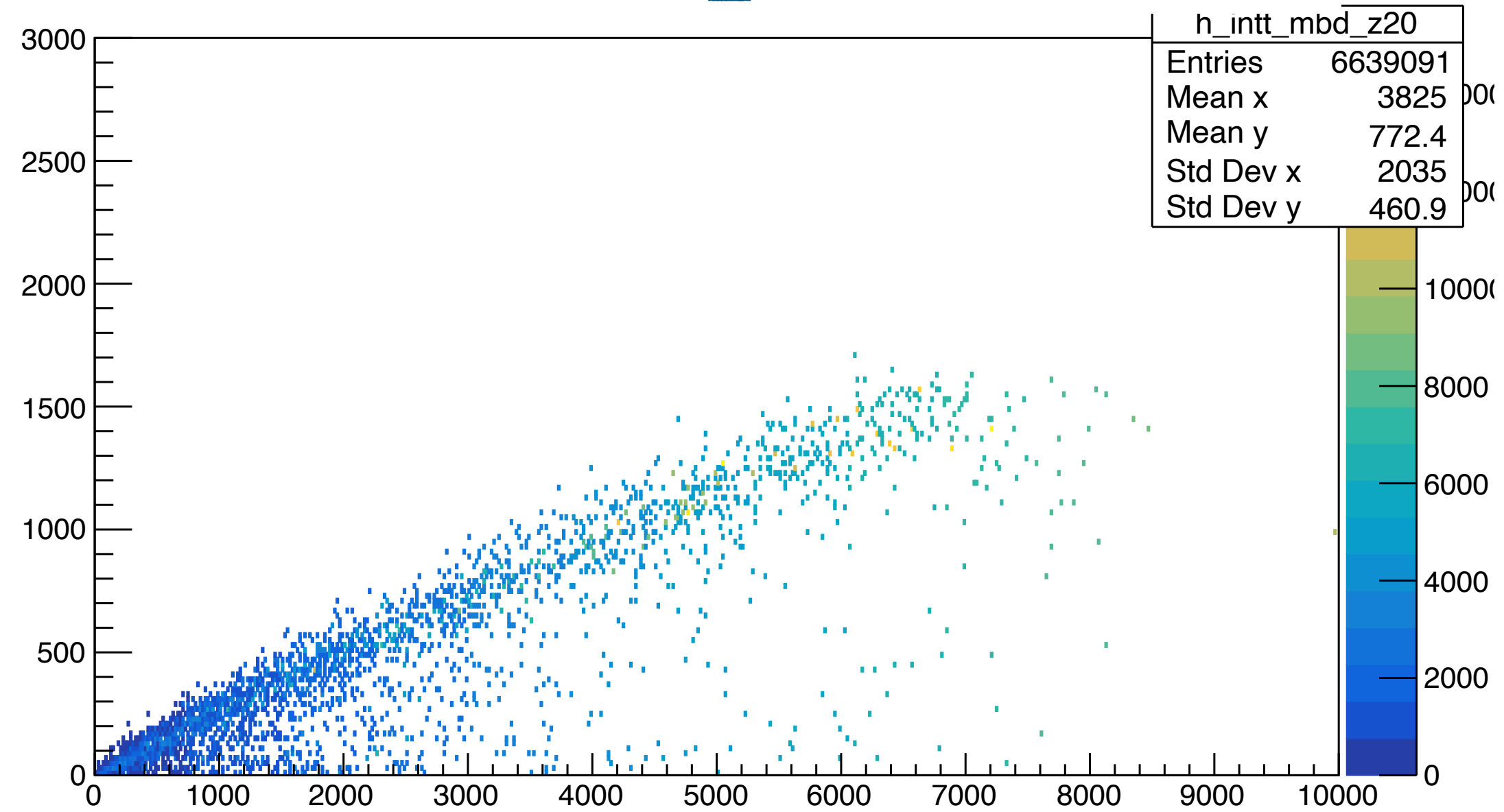


$Z_{vtx} = \pm 20$ & $45 < ADC < 400$

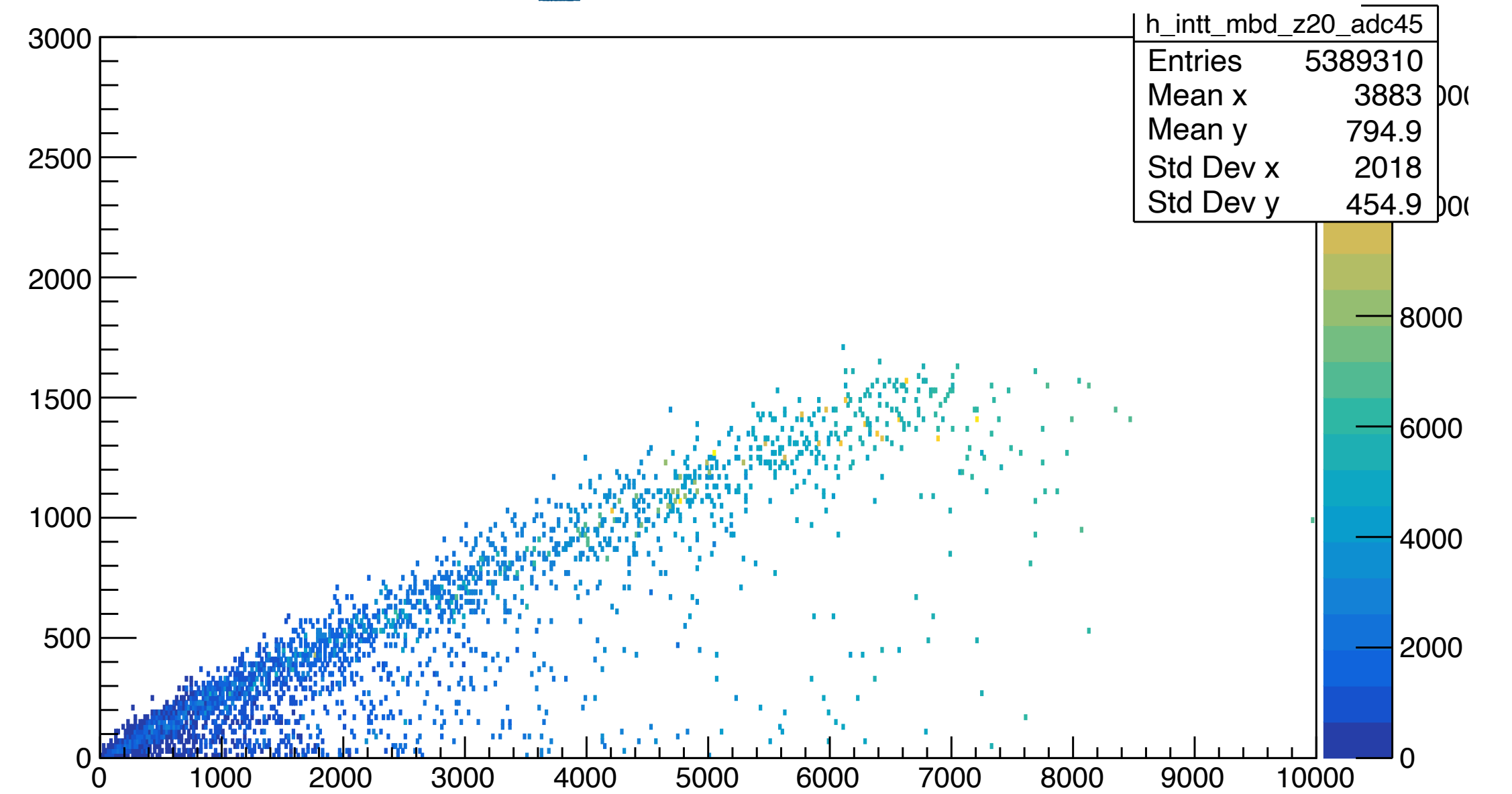


- $Z_{vtx} = \pm 20$ & $45 < ADC < 400$

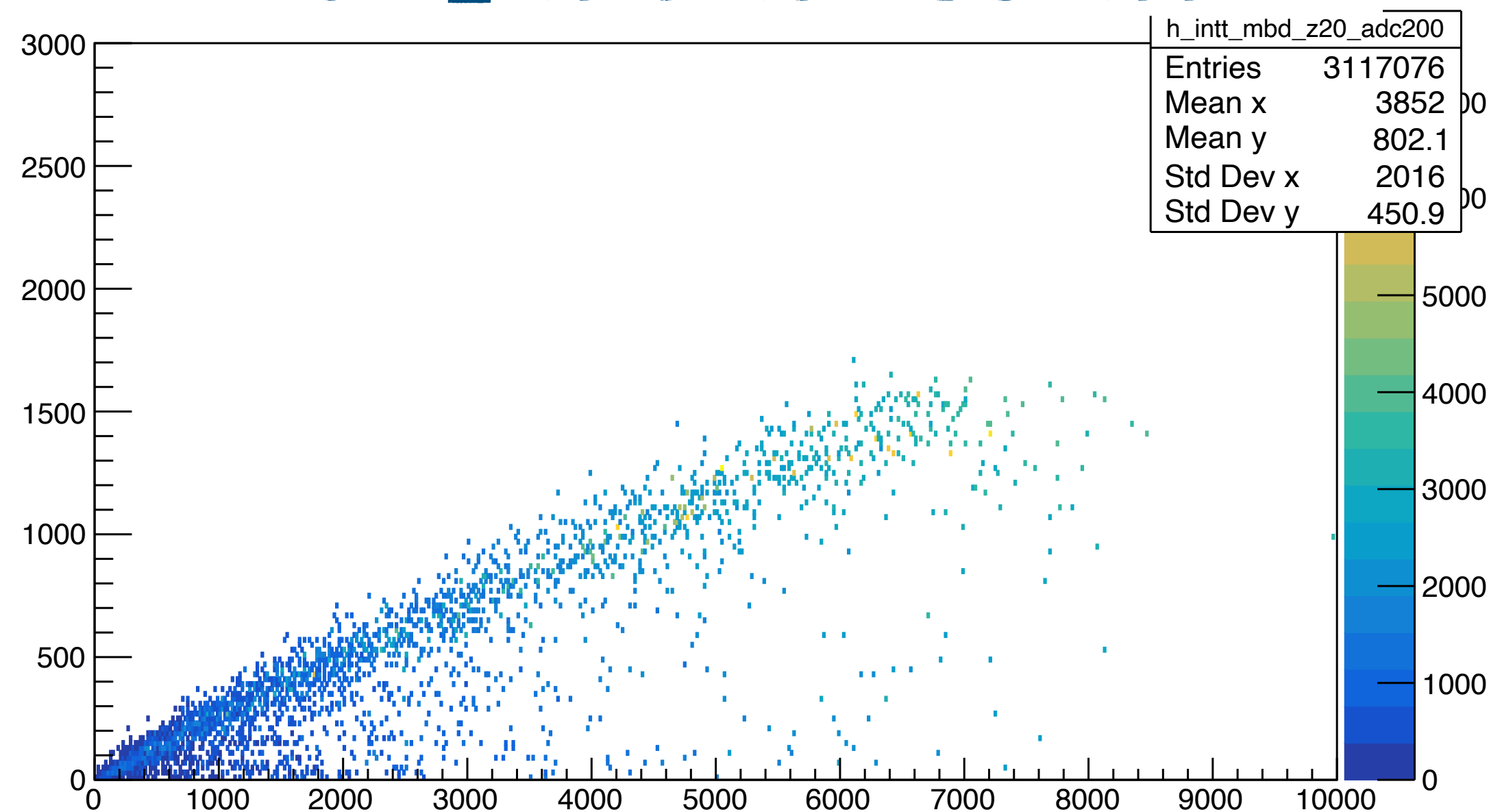
Zvtx=± 20



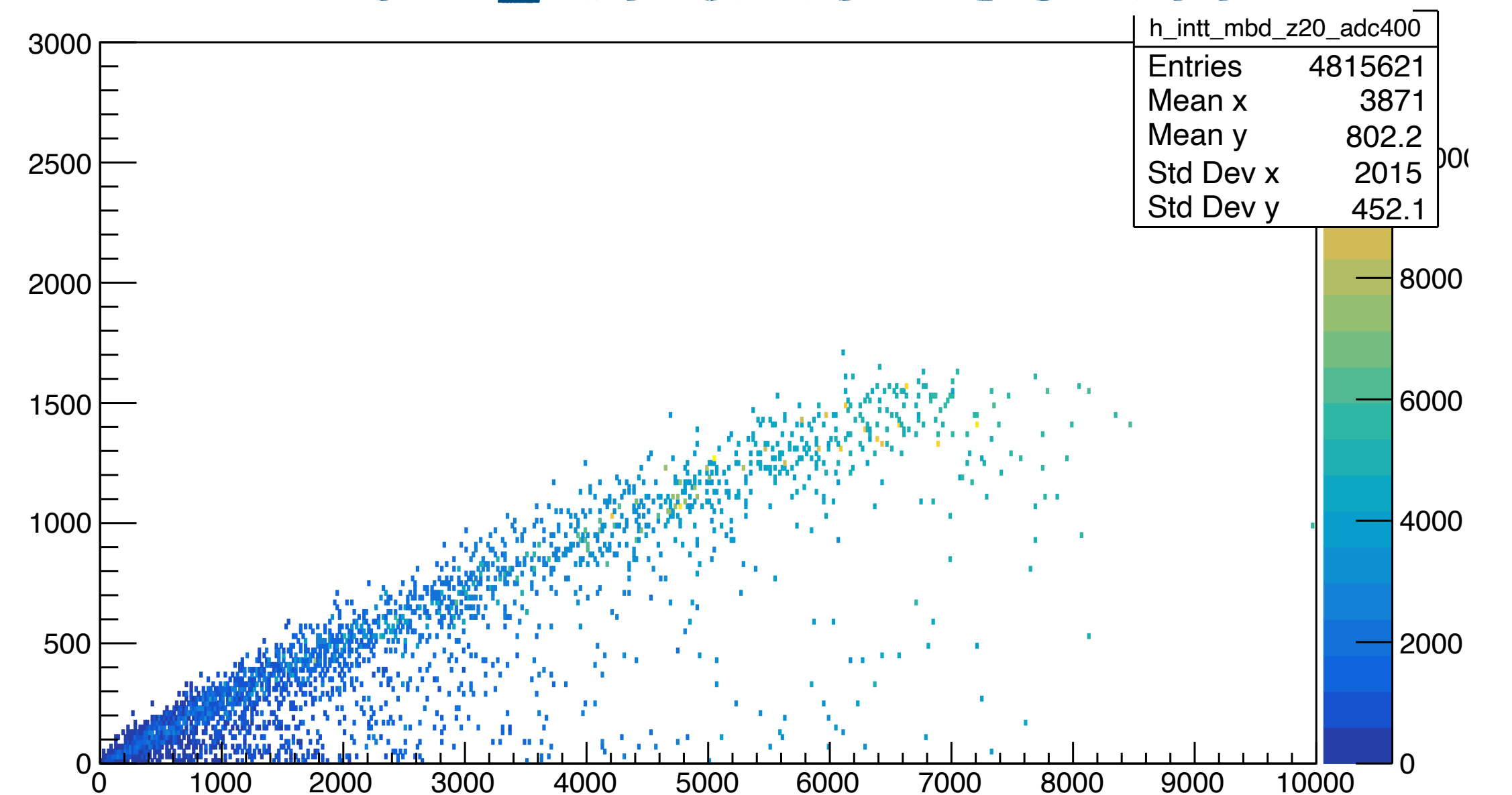
Zvtx=± 20 & ADC>45



Zvtx=± 20 & 45<ADC<200



Zvtx=± 20 & 45<ADC<400



dN/deta with cluster method

Misaki Hata
(NWU)

Analyzing dN/Deta using cluster method

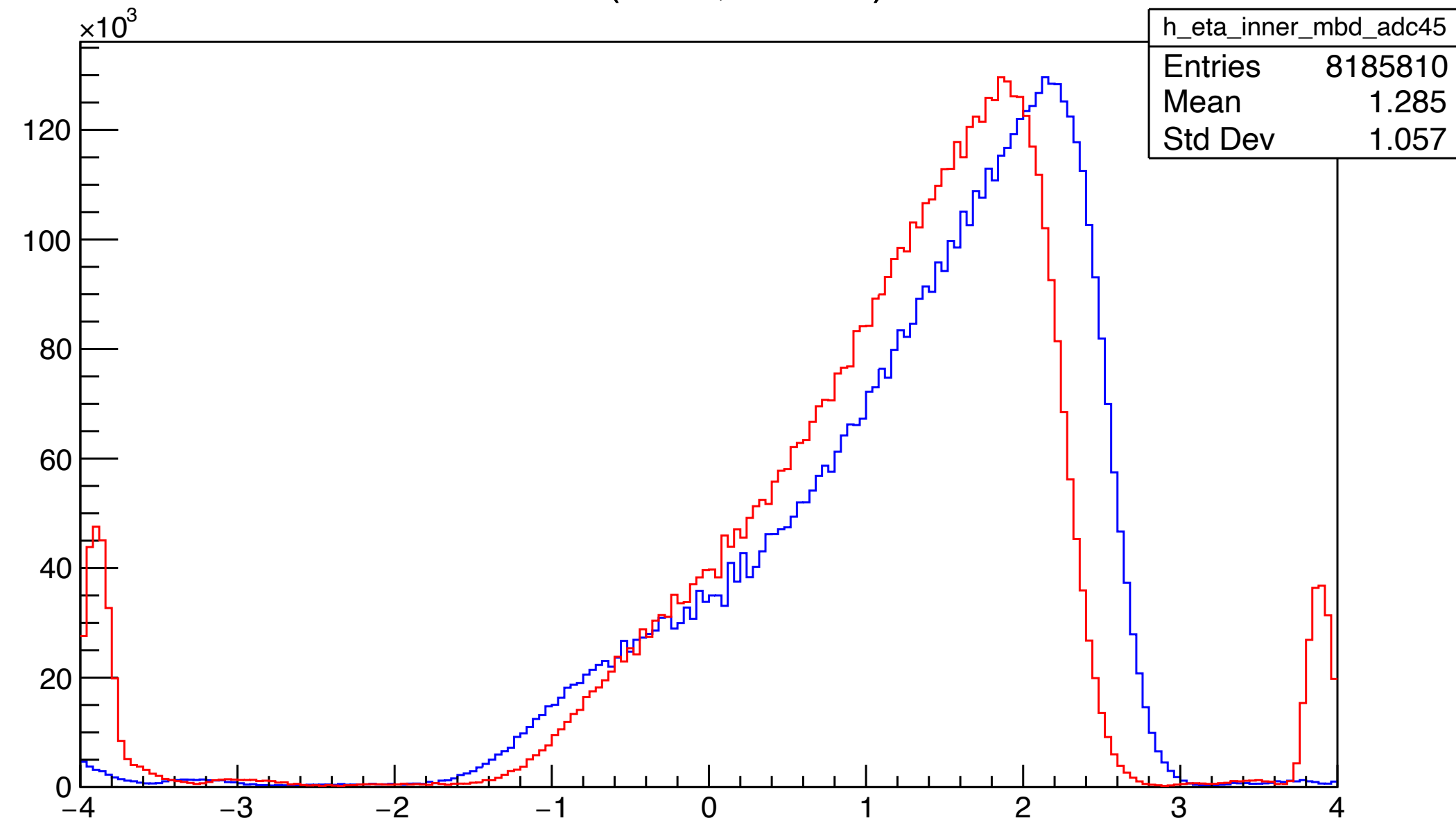
Goal in this workshop: Analysis of raw data, Checking Simulation code

My To-Do List (new)

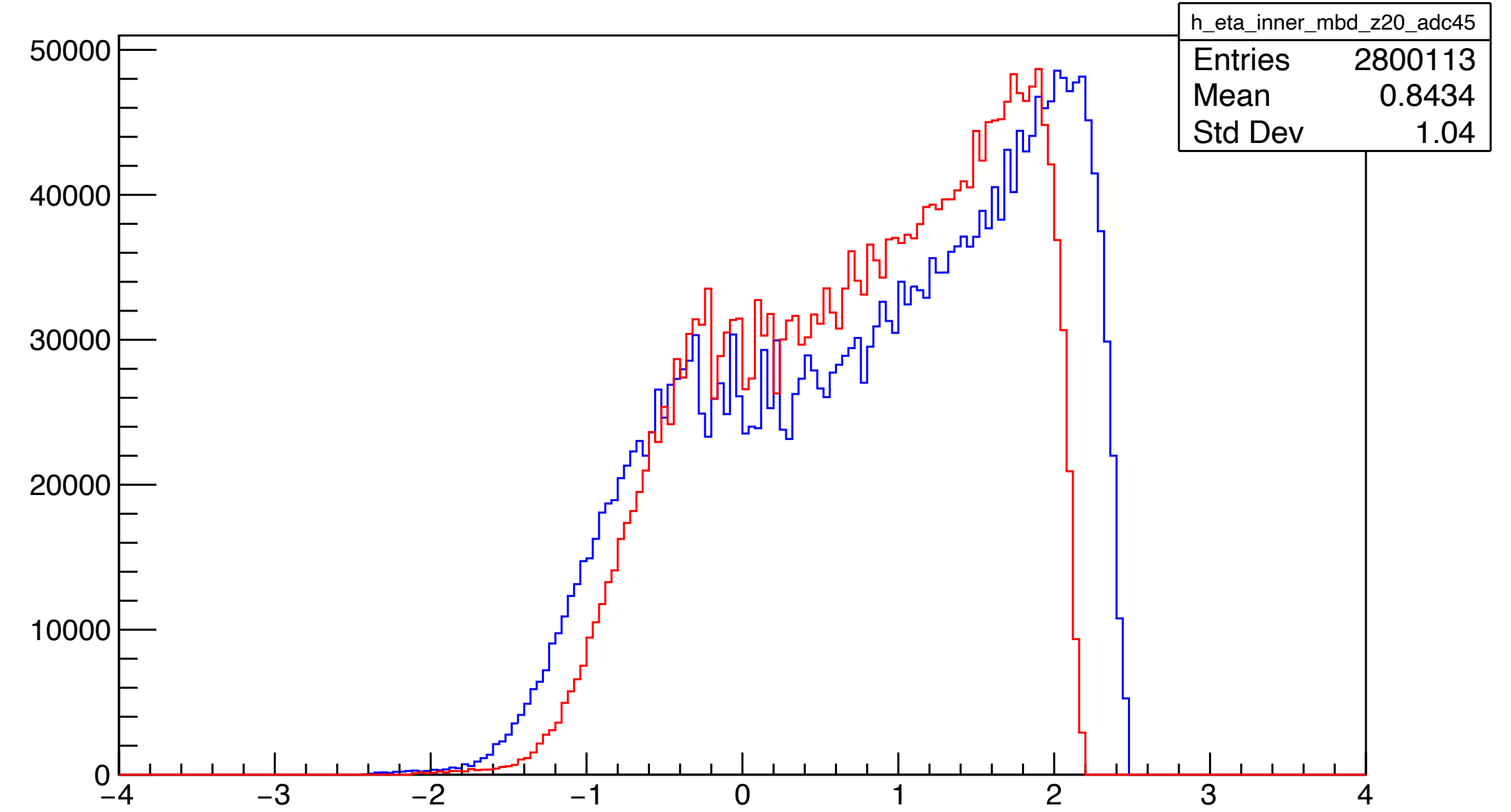
- Analysis of raw data
 - Checking ADC distribution for each theta range (Draw)
 - Checking theta distribution cutting at Zvtx and ADC. <- Hachiya sensei gave me instructions.
- Checking Simulation code
 - InttClusterizer.cc
 - PHG4InttDigitizer.cc
 - PHG4InttHitReco.cc
 - G4_TrkrSimulation.C
- Analysis of Simulation data
 - Doing same thing with raw data analysis (without distribution using ADC value)

backup

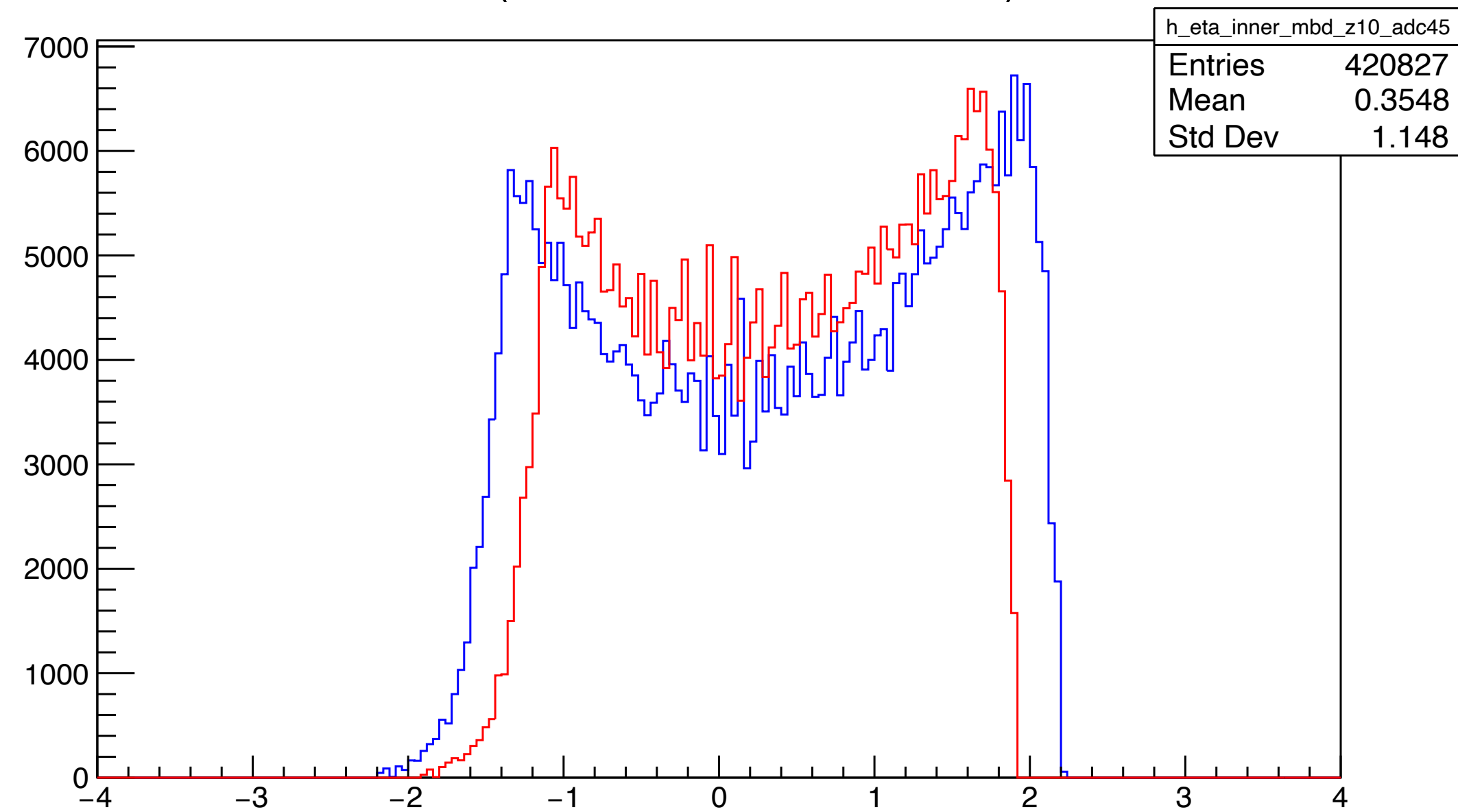
eta (MBD,45<adc)



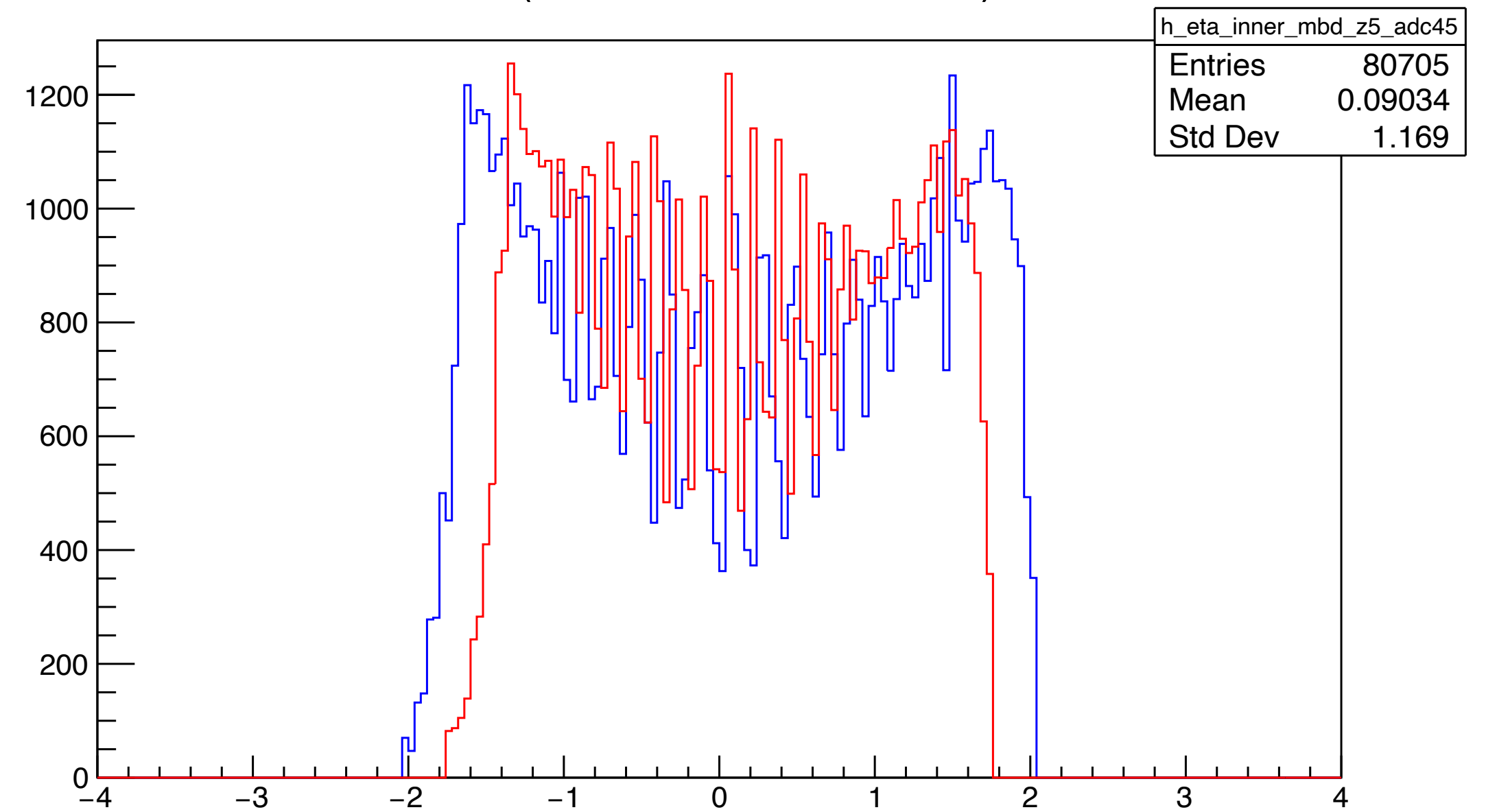
eta (MBD, zvtx:-20~20,45<adc)



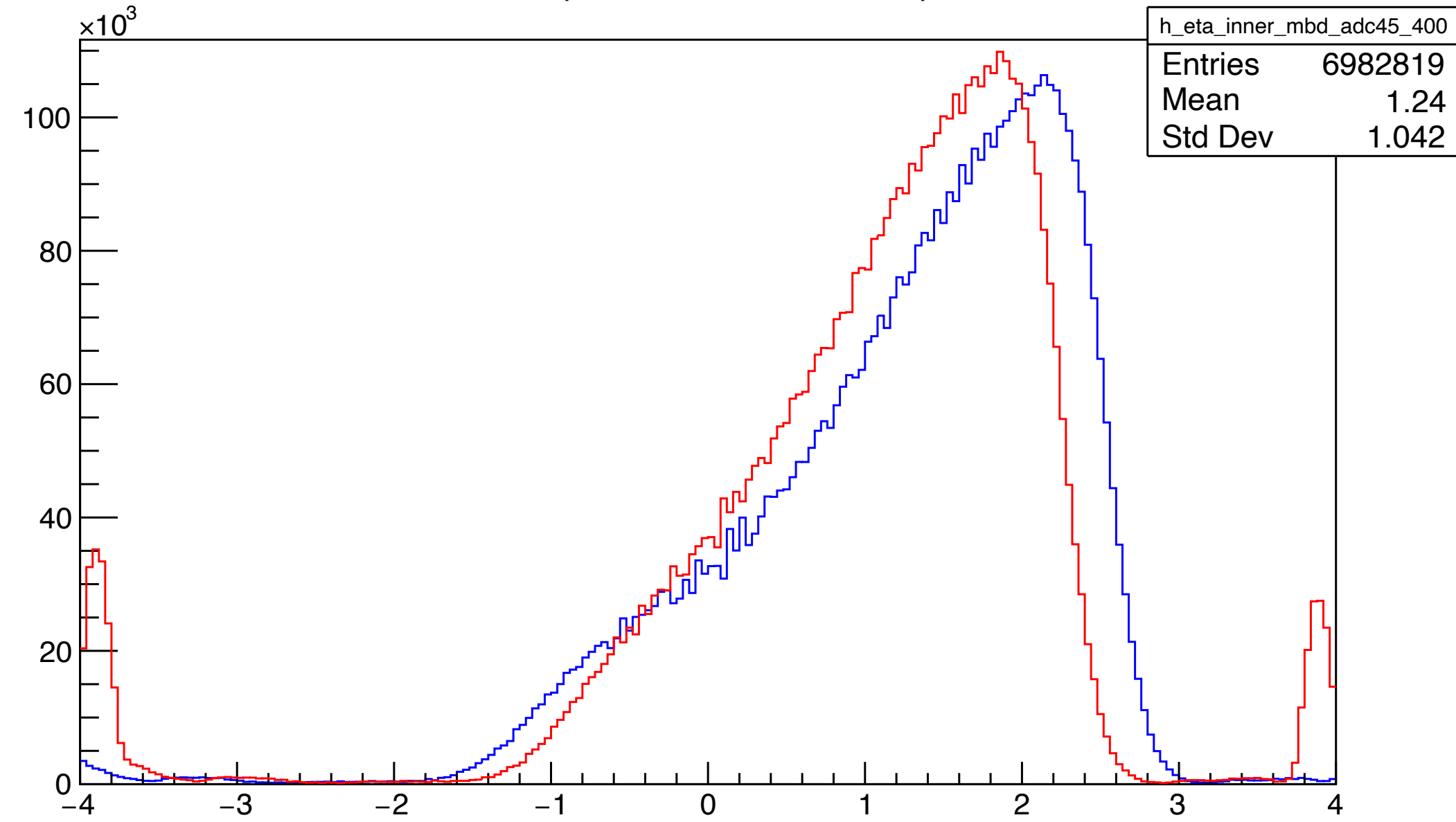
eta (MBD, zvtx:-10~10,45<adc)



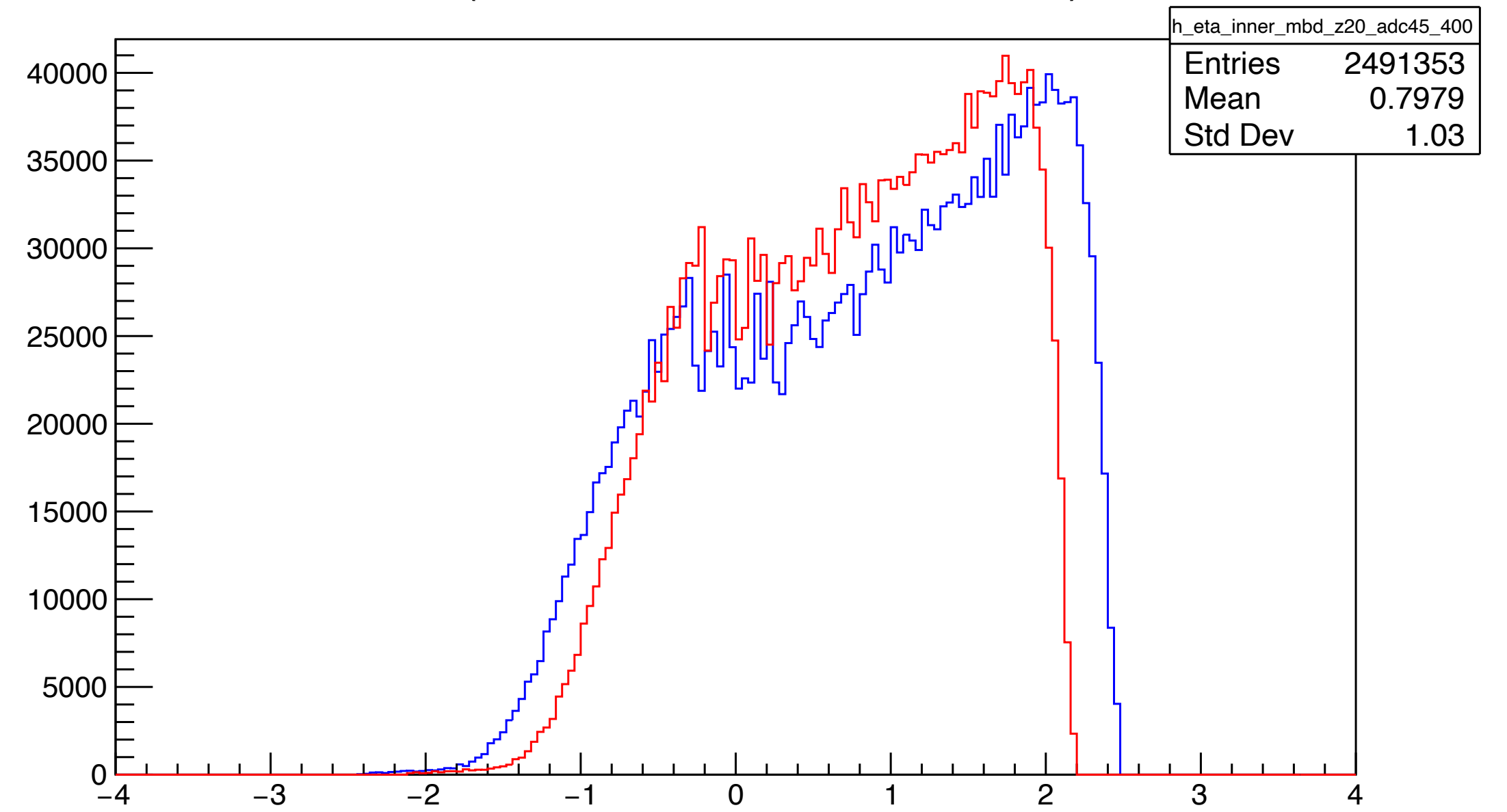
eta (MBD, zvtx:-5~5,45<adc)



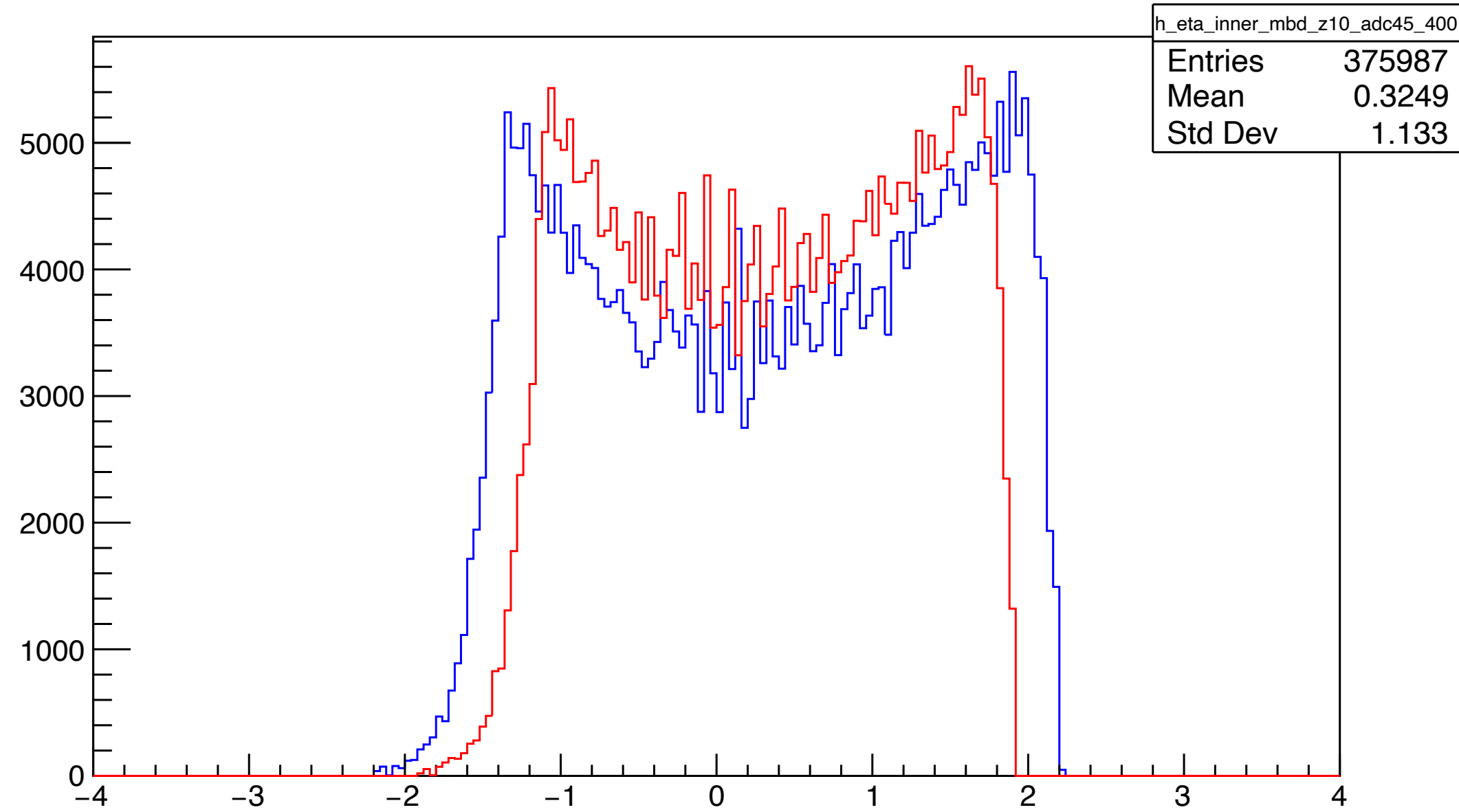
eta (MBD,45<adc<400)



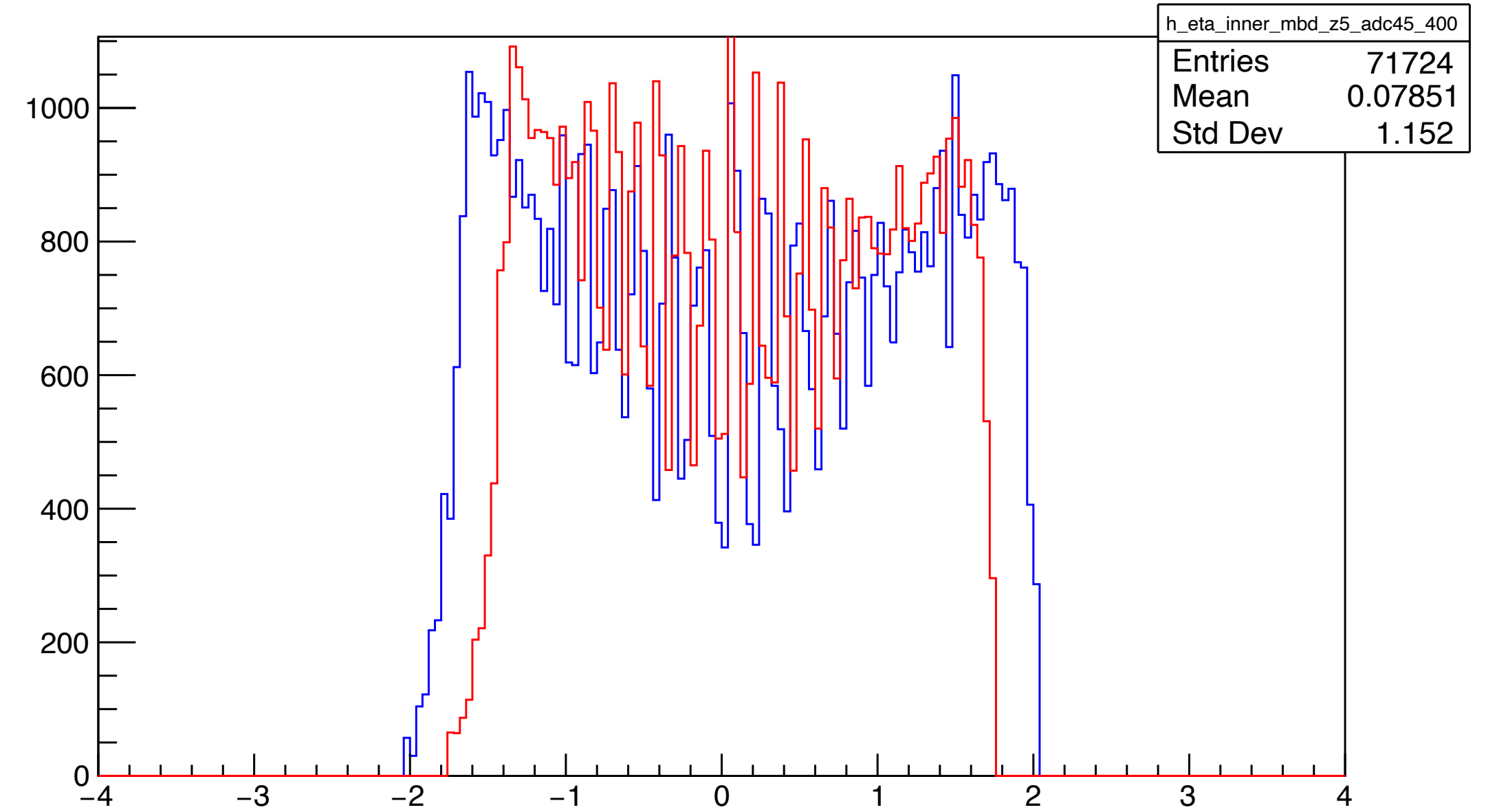
eta (MBD, zvtx:-20~20,45<adc<400)



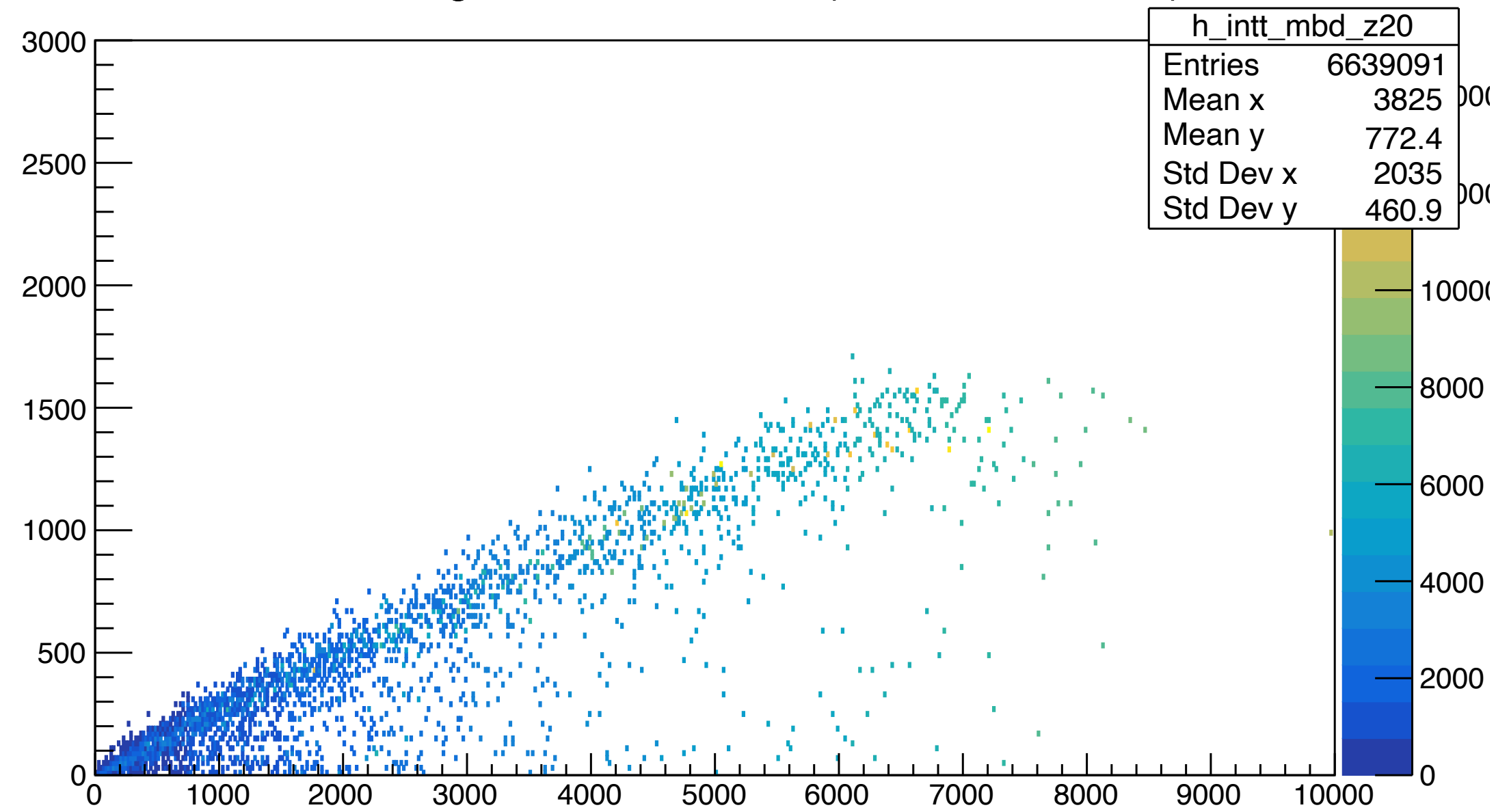
eta (MBD, zvtx:-10~10,45<adc<400)



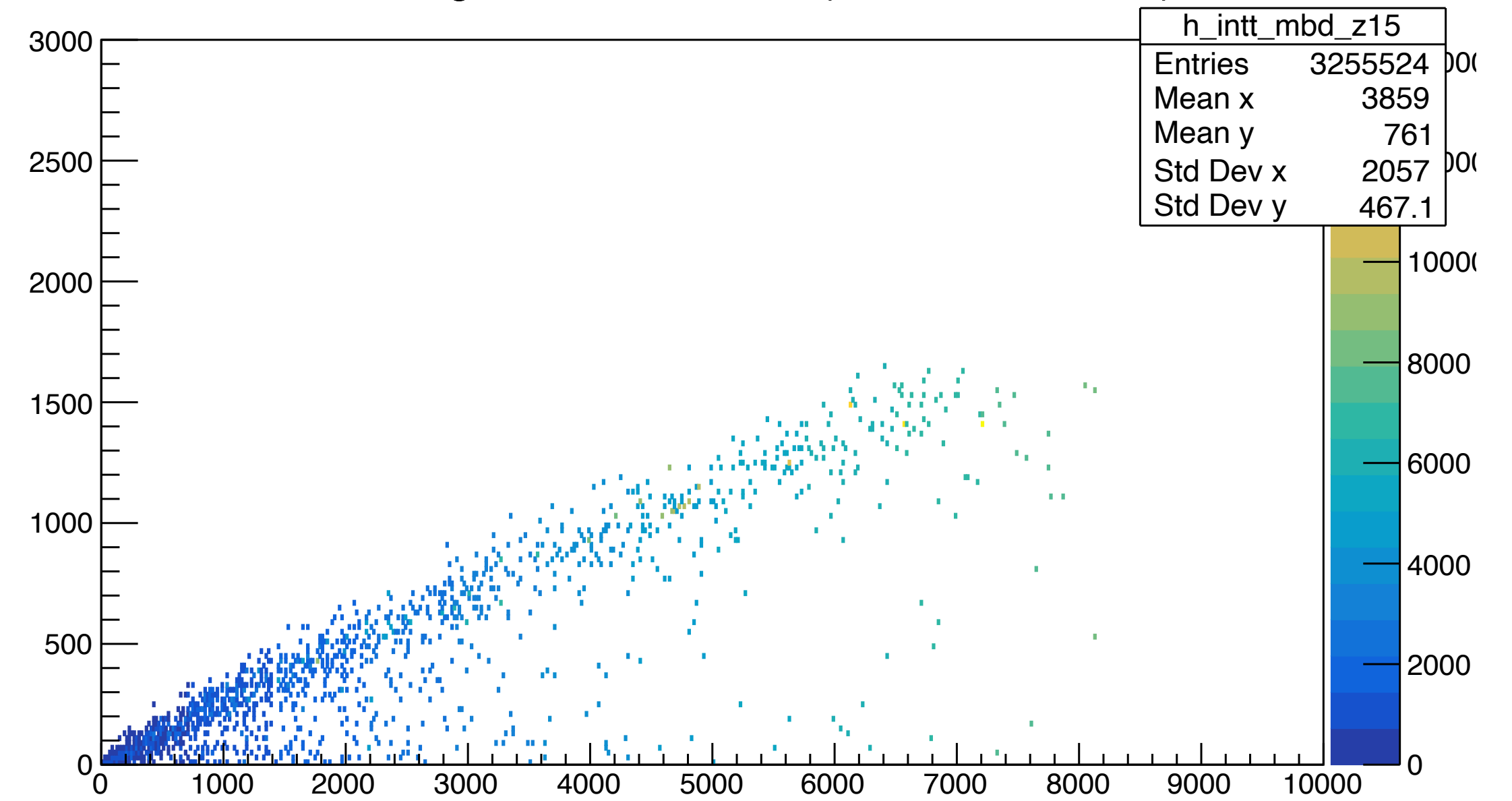
eta (MBD, zvtx:-5~5,45<adc<400)



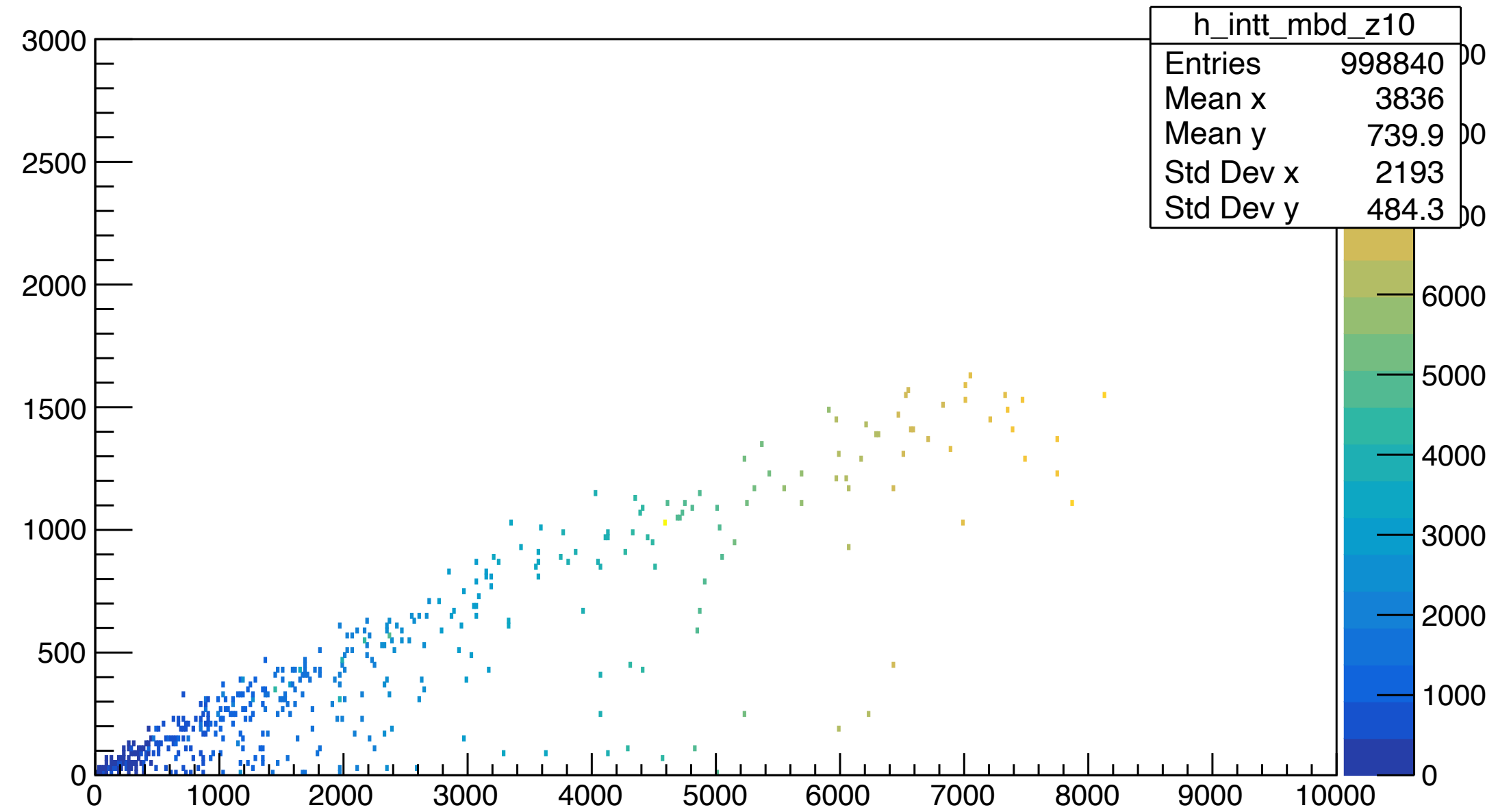
MBD charge vs INTT cluster (mbd zvtx:-20~20)



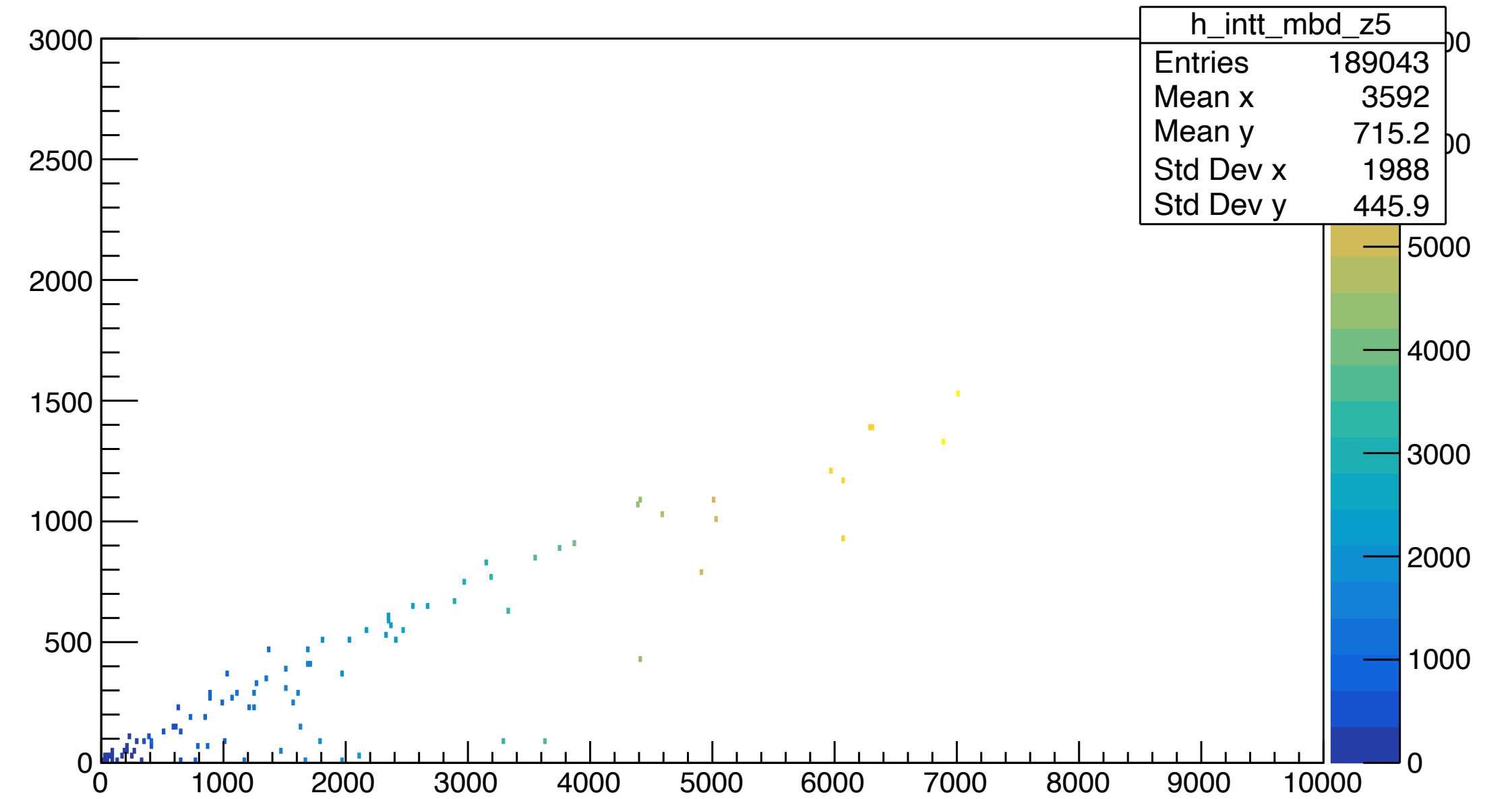
MBD charge vs INTT cluster (mbd zvtx:-15~15)



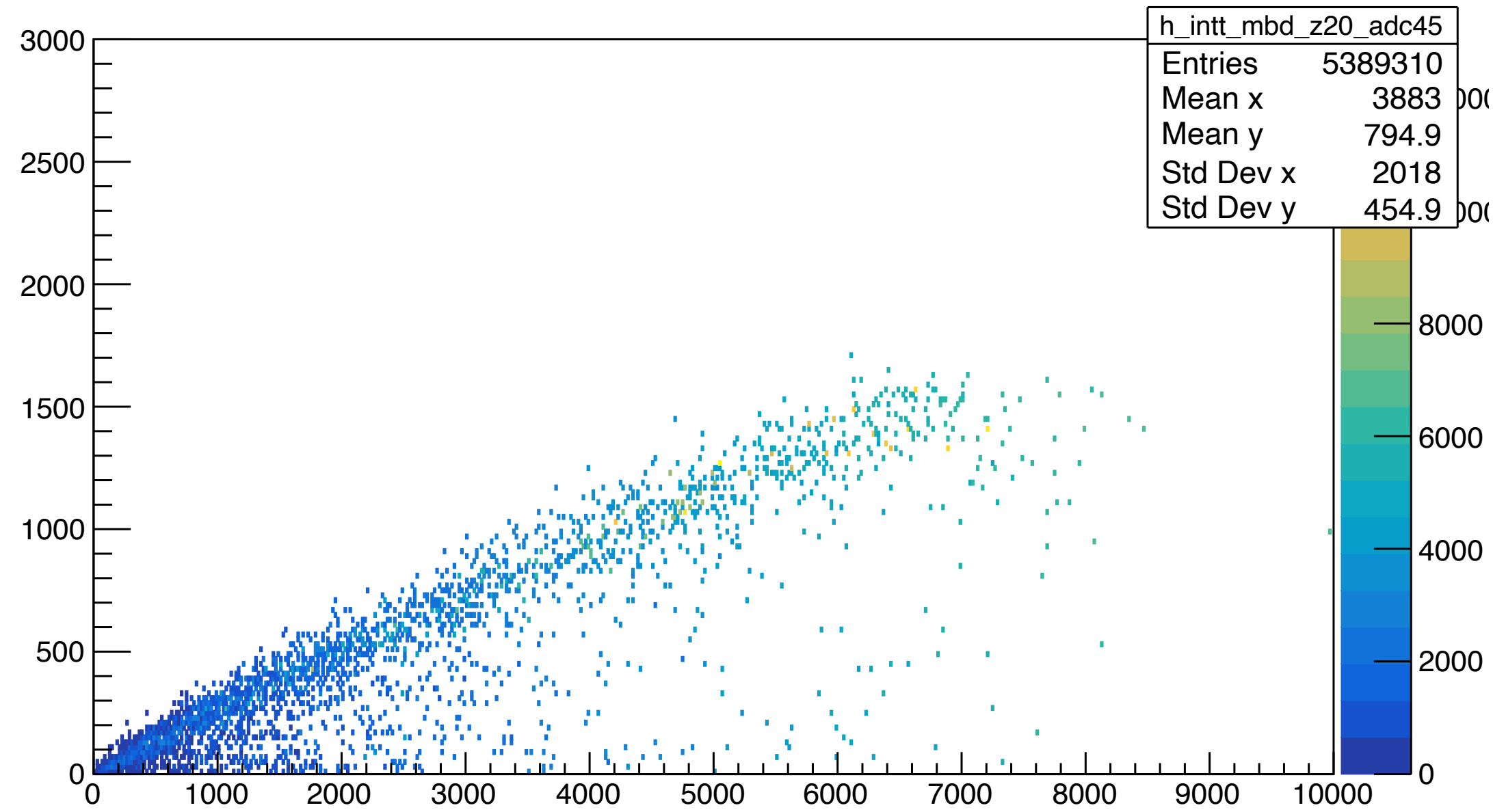
MBD charge vs INTT cluster (mbd zvtx:-10~10)



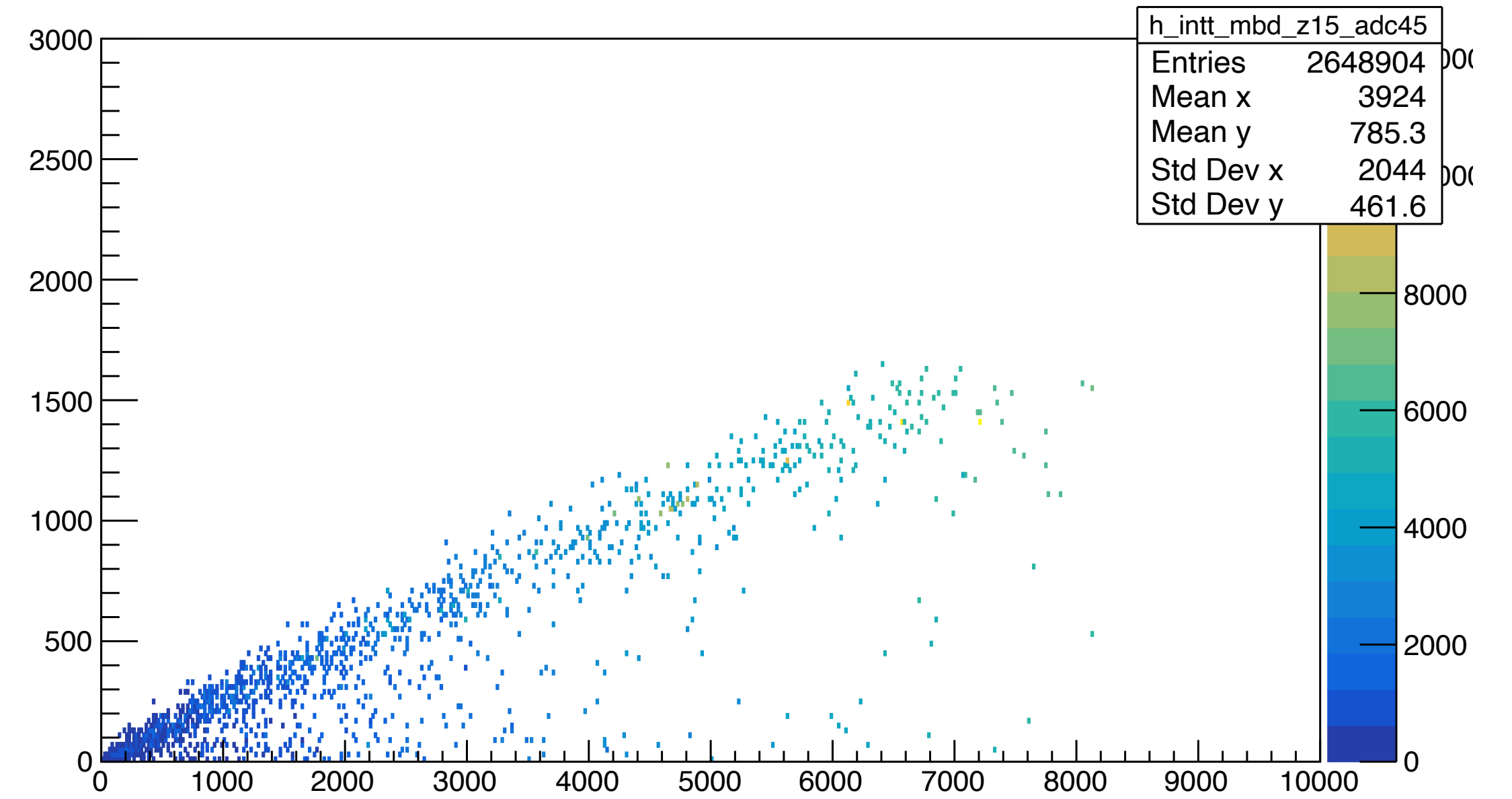
MBD charge vs INTT cluster (mbd zvtx:-5~5)



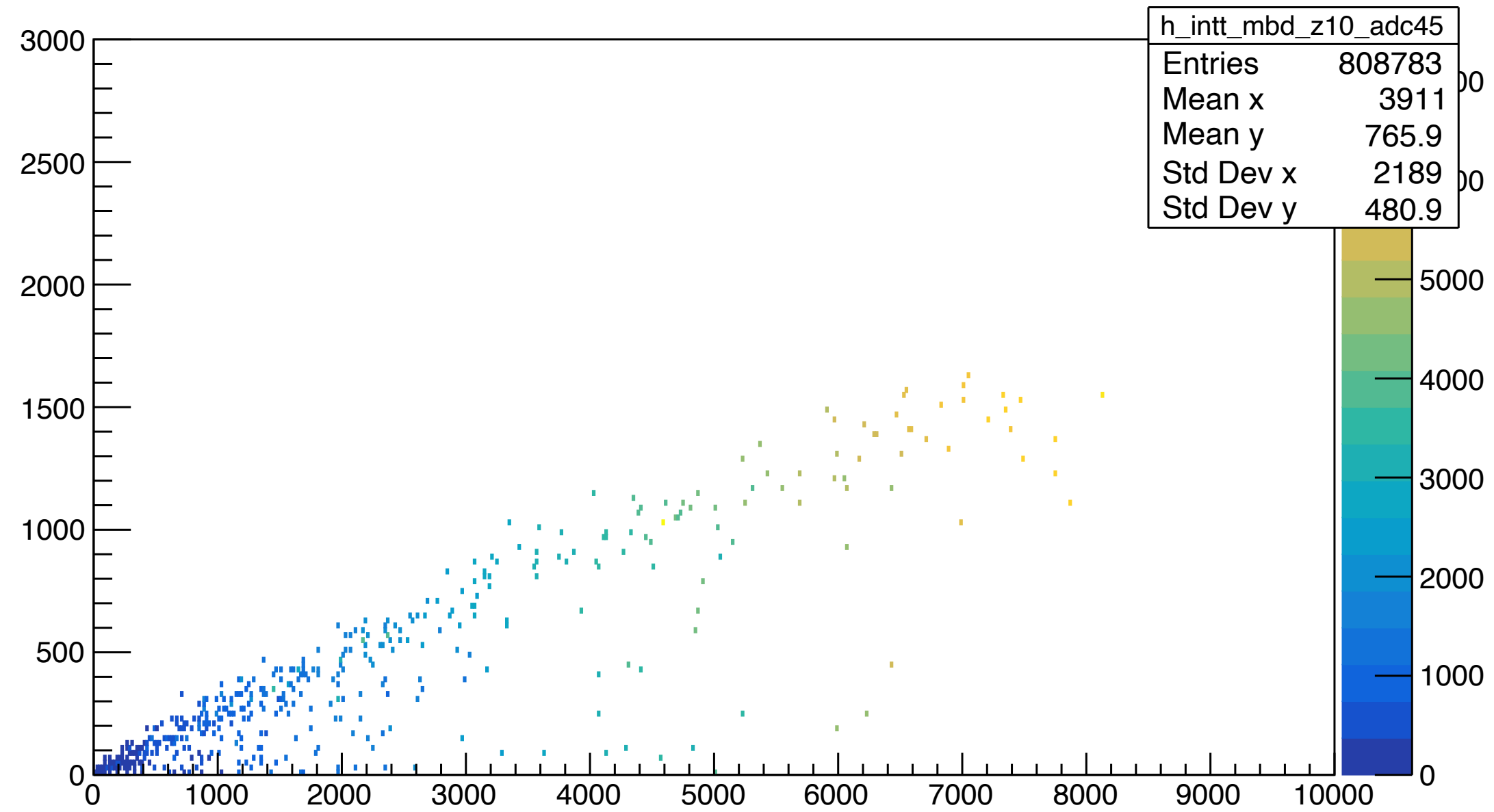
MBD charge vs INTT cluster (mbd zvtx:-20~20, adc>45)



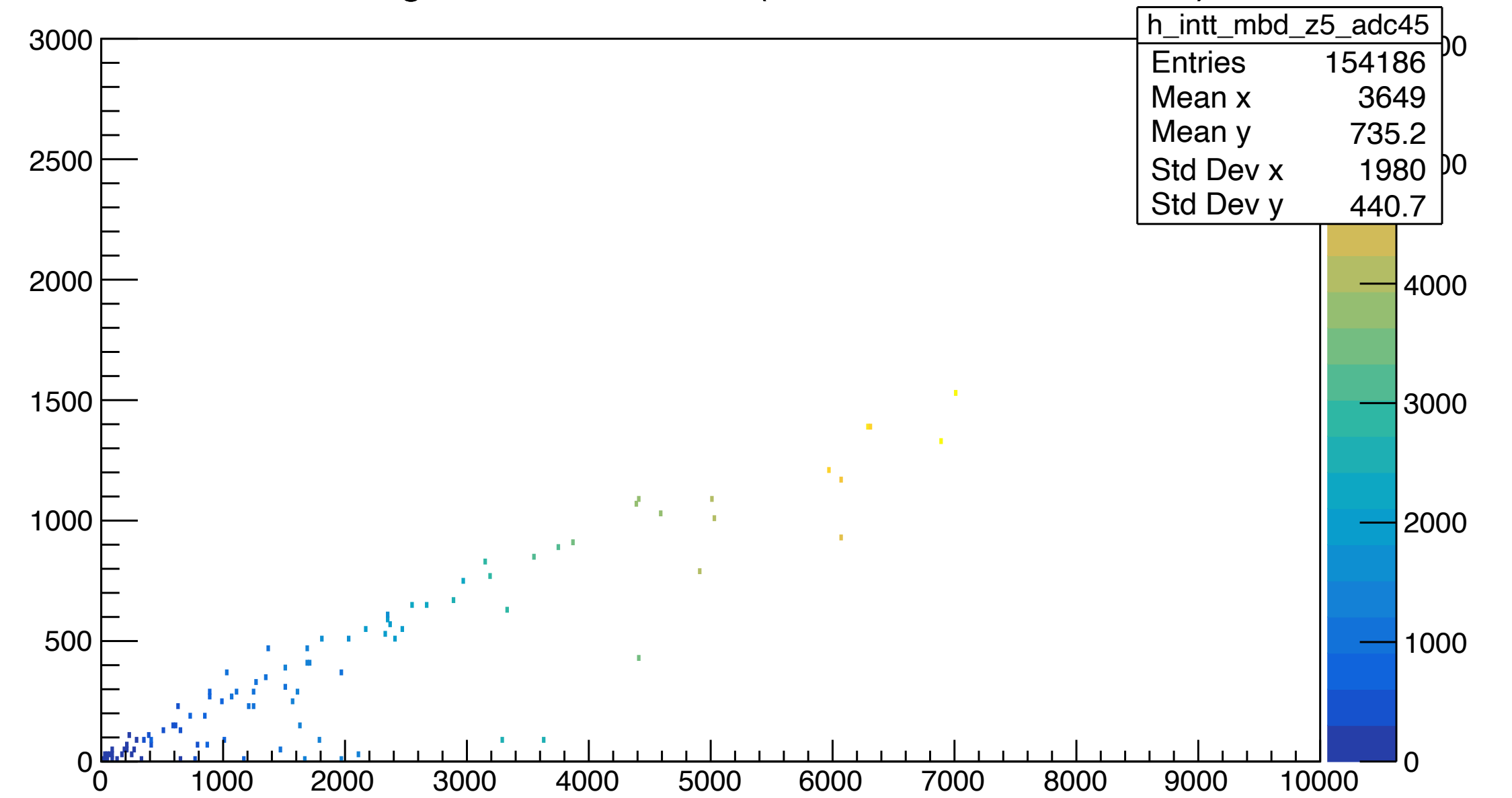
MBD charge vs INTT cluster (mbd zvtx:-15~15, adc>45)



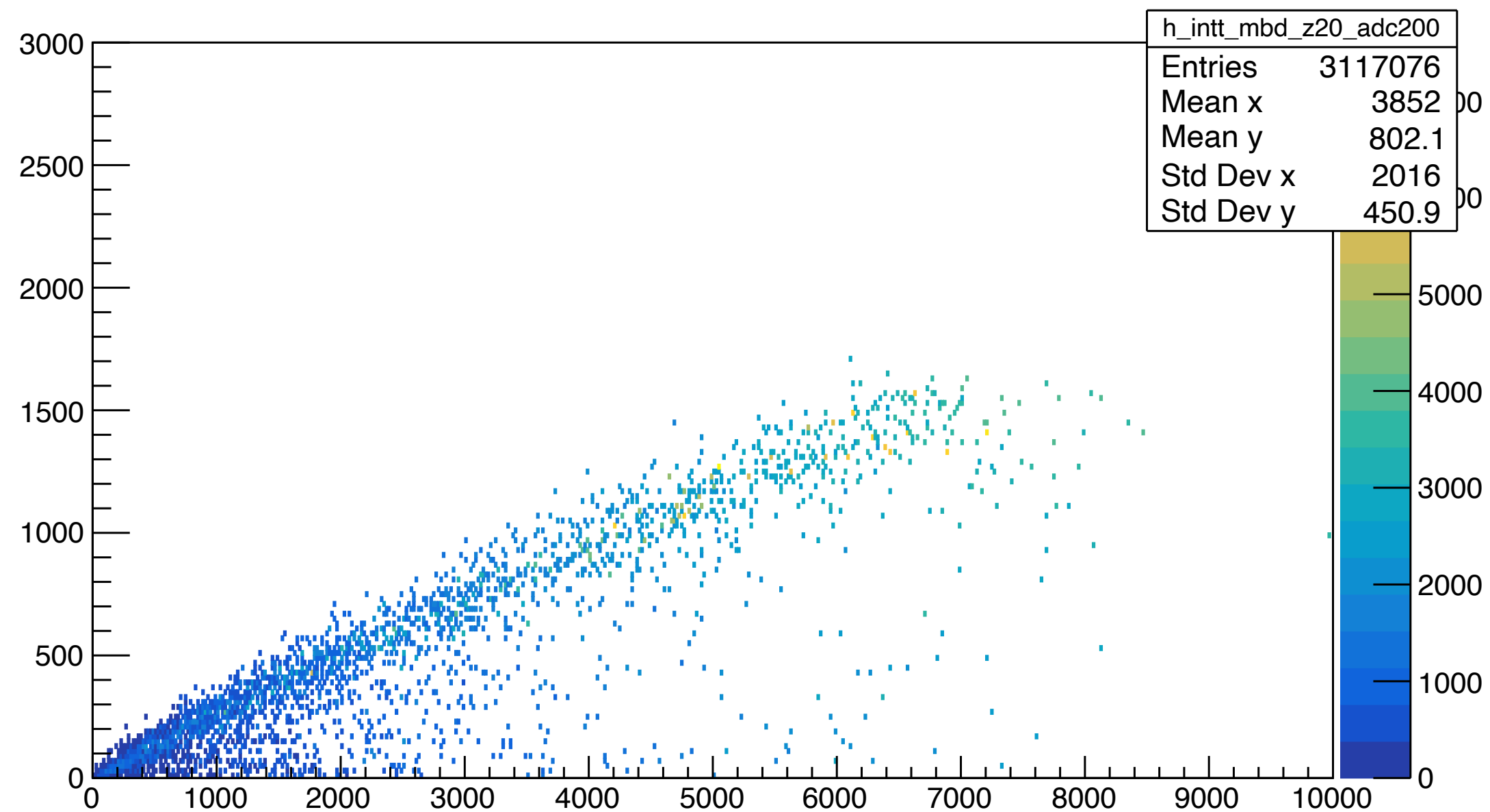
MBD charge vs INTT cluster (mbd zvtx:-10~10, adc>45)



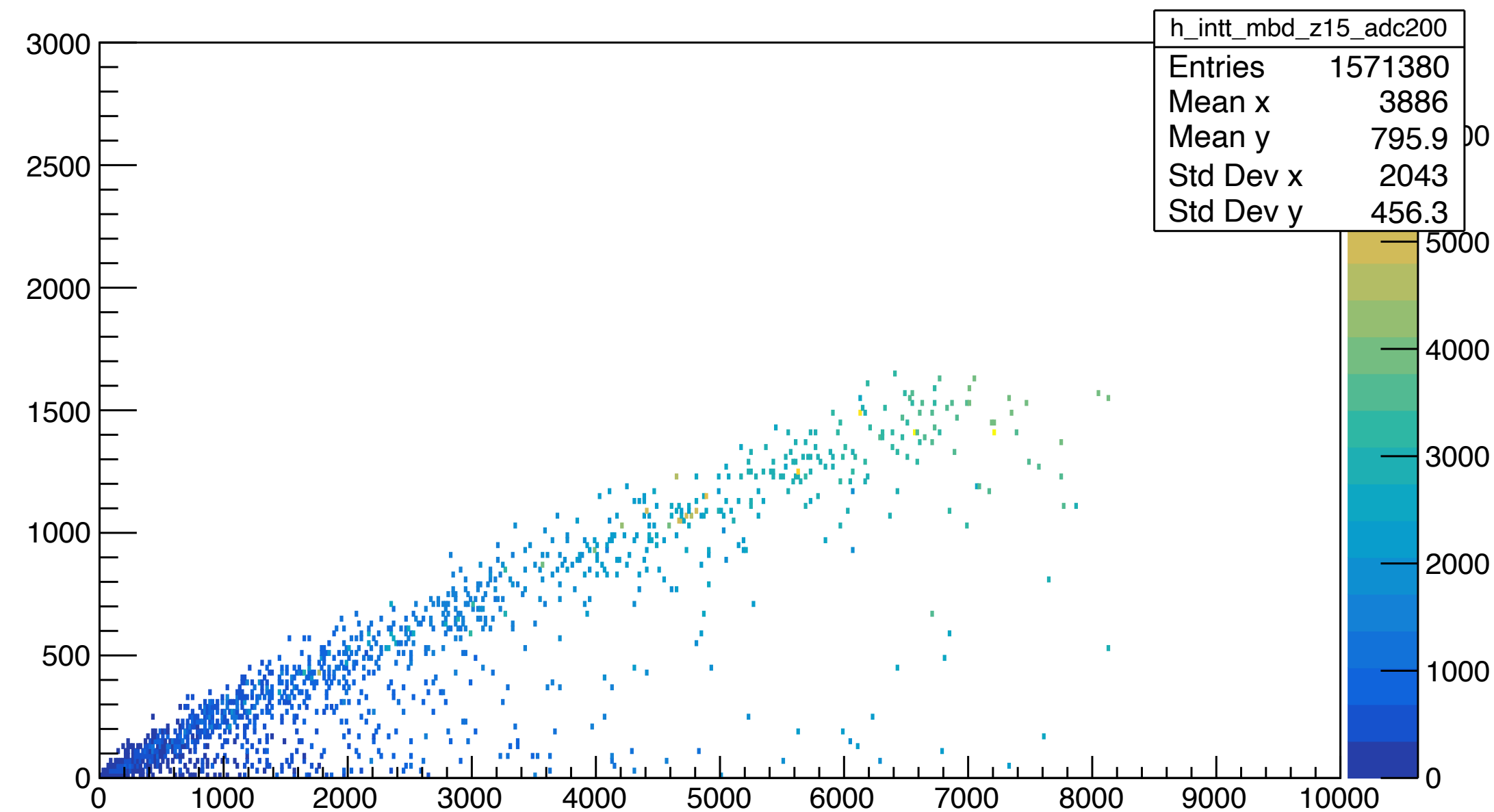
MBD charge vs INTT cluster (mbd zvtx:-5~5, adc>45)



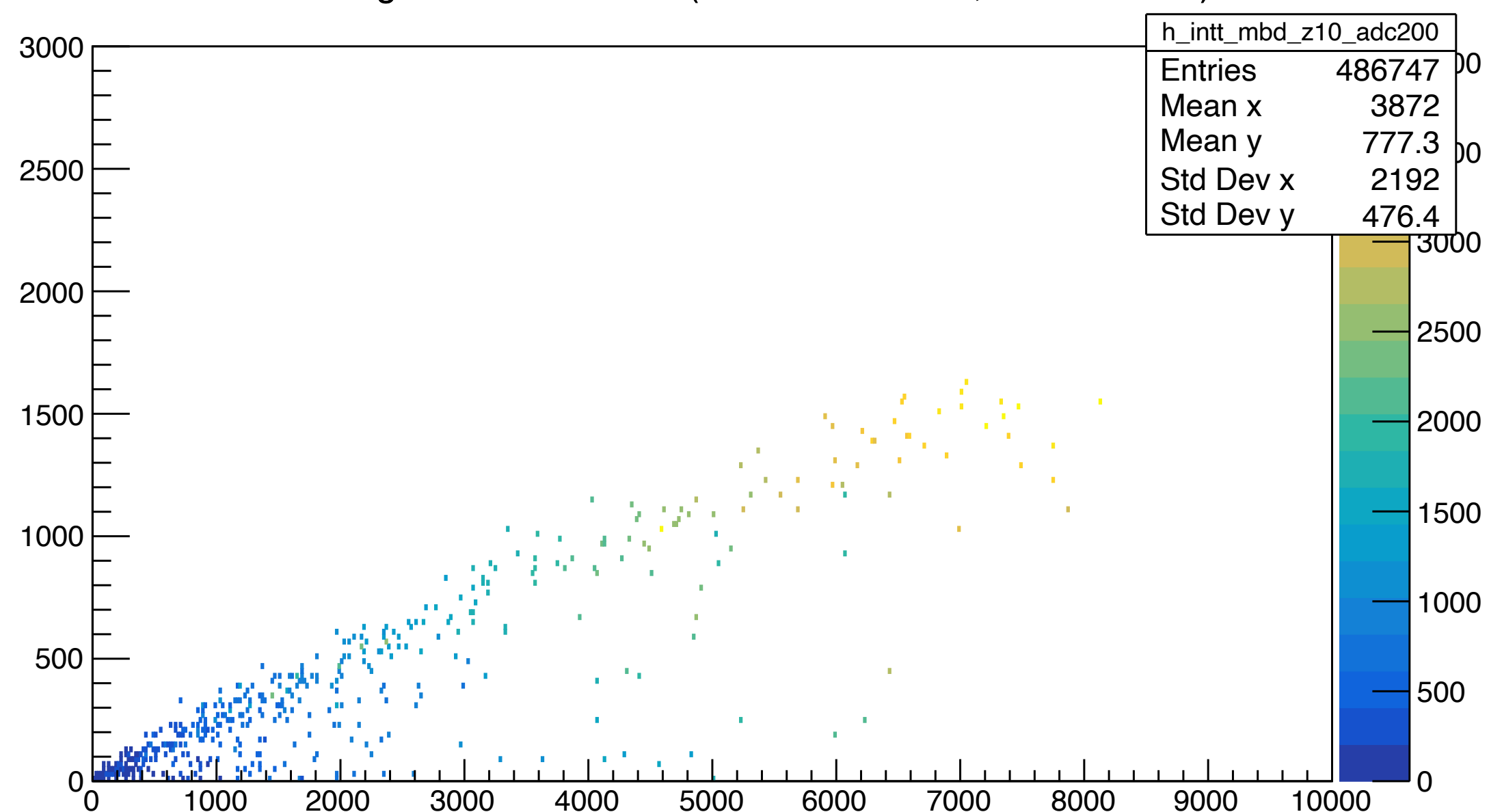
MBD charge vs INTT cluster (mbd zvtx:-20~20, 45<adc<200)



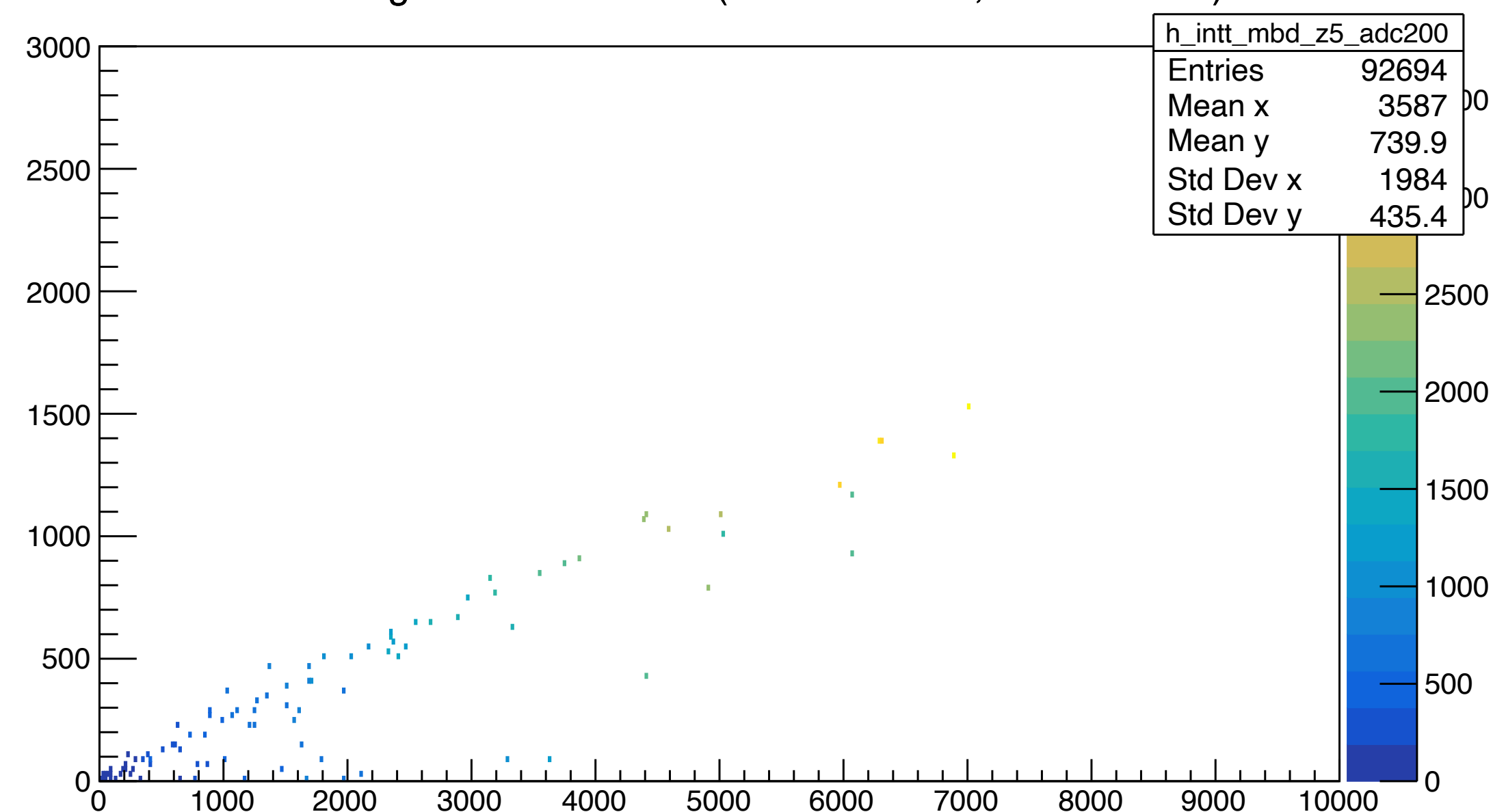
MBD charge vs INTT cluster (mbd zvtx:-15~15, 45<adc<200)



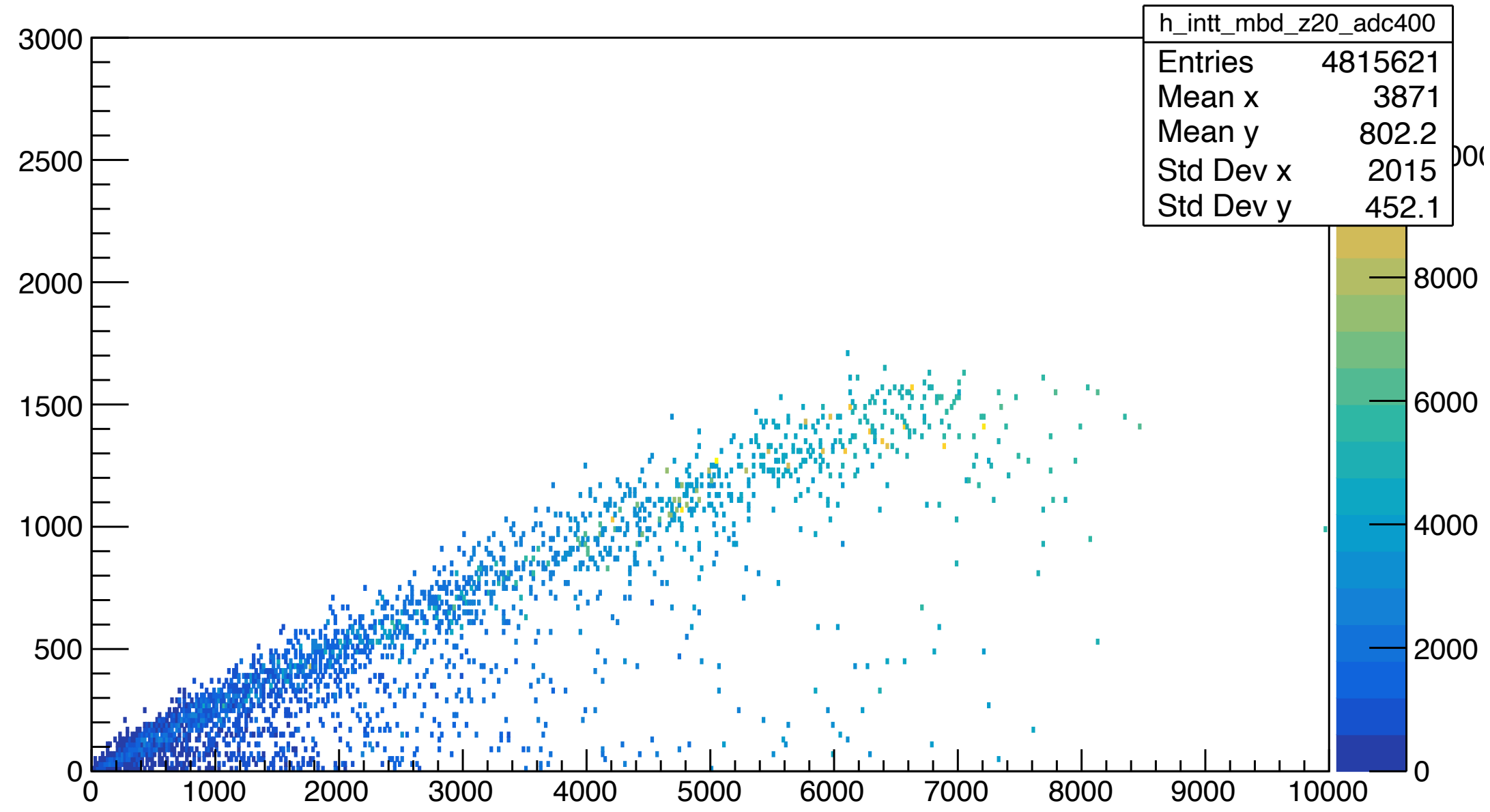
MBD charge vs INTT cluster (mbd zvtx:-10~10, 45<adc<200)



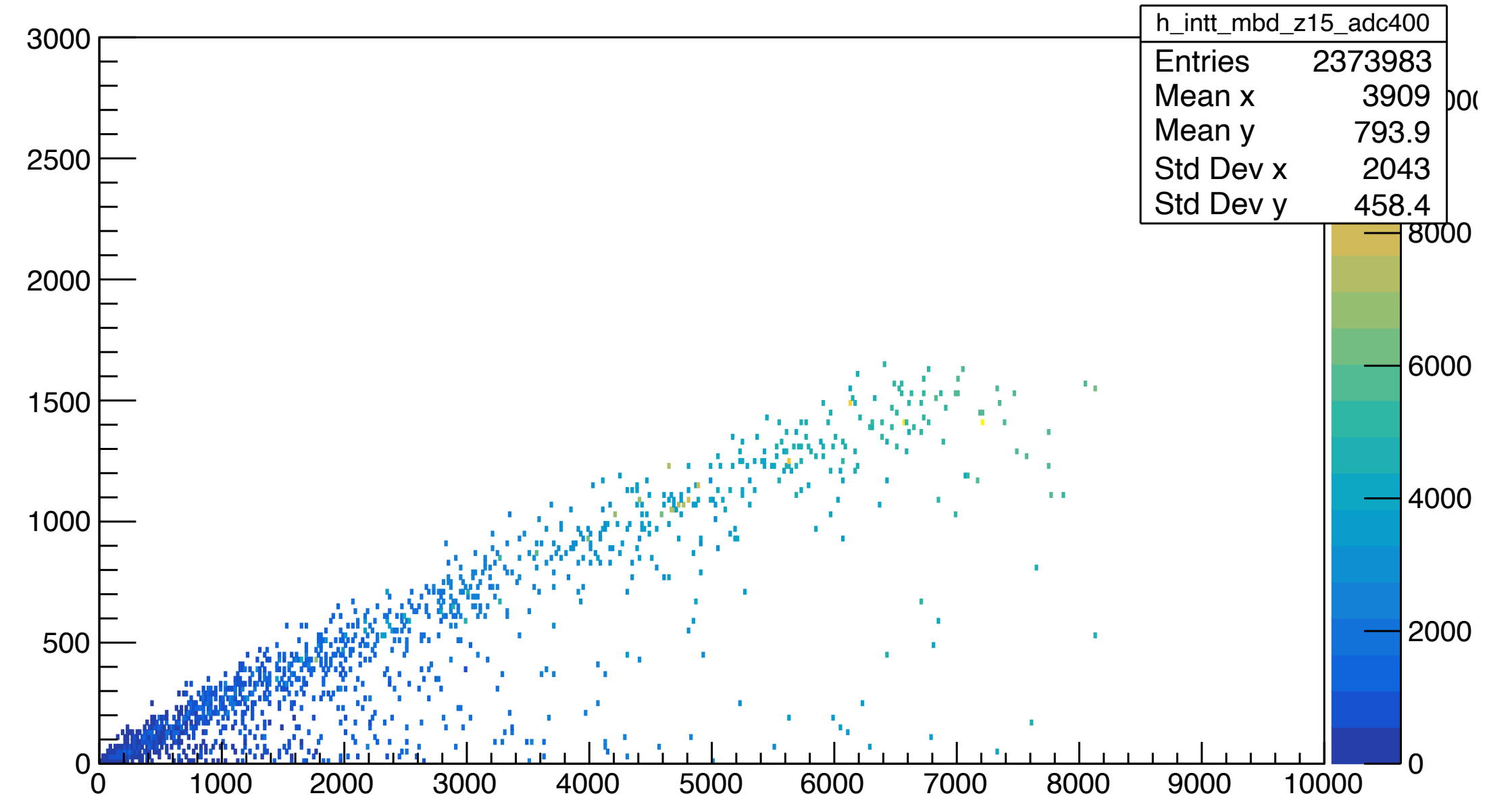
MBD charge vs INTT cluster (mbd zvtx:-5~5, 45<adc<200)



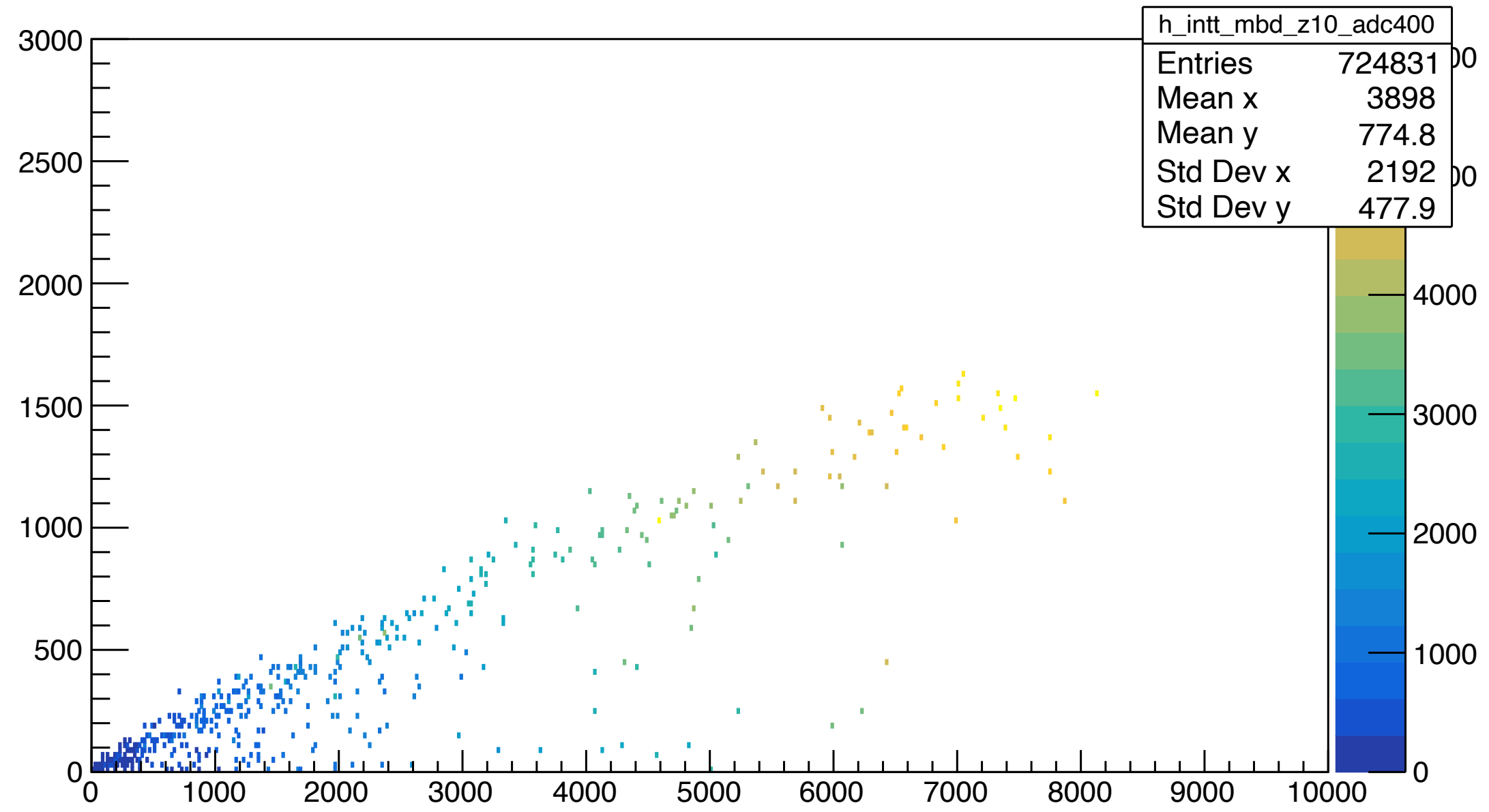
MBD charge vs INTT cluster (mbd zvtx:-20~20, 45<adc<400)



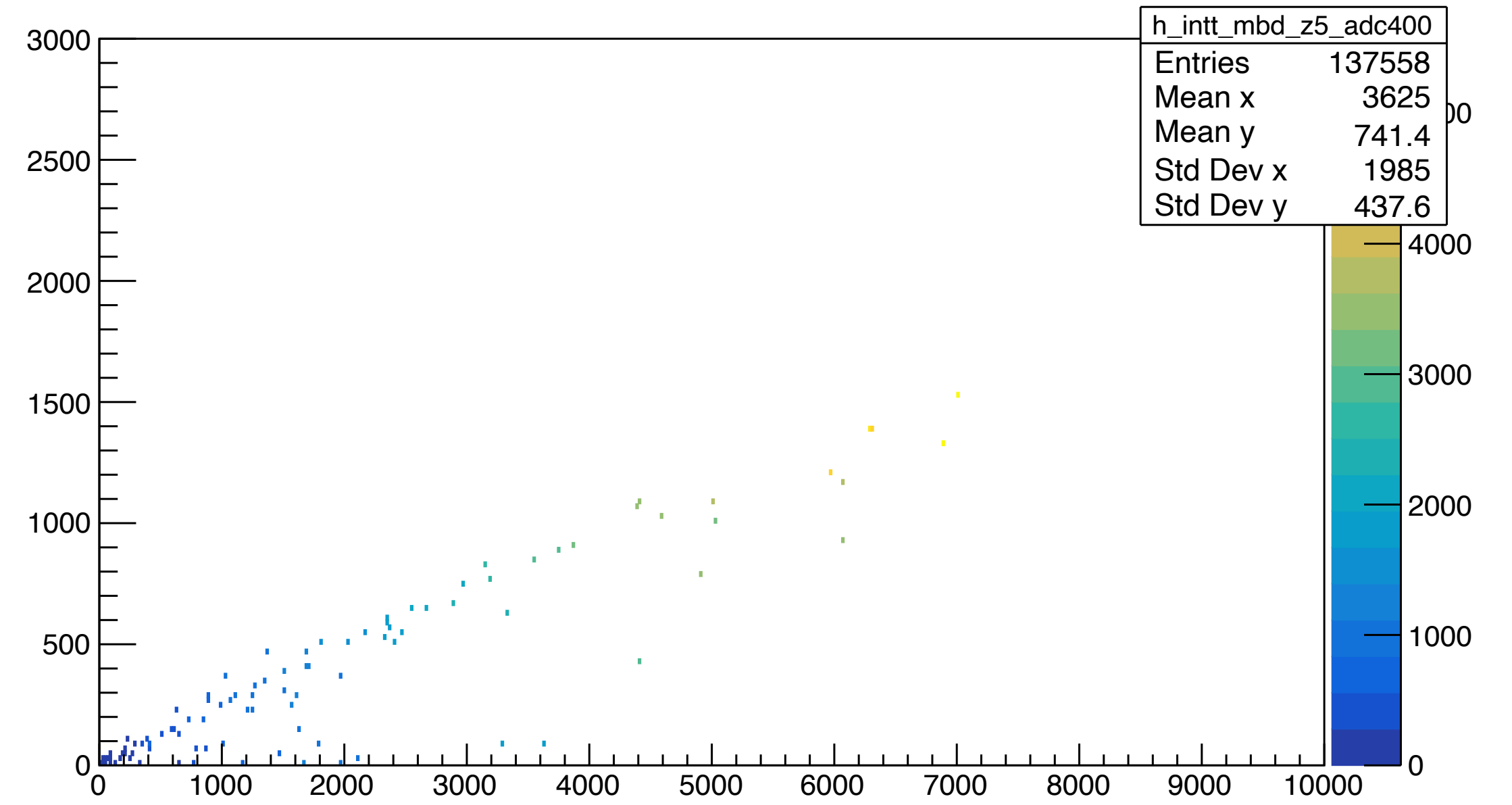
MBD charge vs INTT cluster (mbd zvtx:-15~15, 45<adc<400)



MBD charge vs INTT cluster (mbd zvtx:-10~10, 45<adc<400)



MBD charge vs INTT cluster (mbd zvtx:-5~5, 45<adc<400)

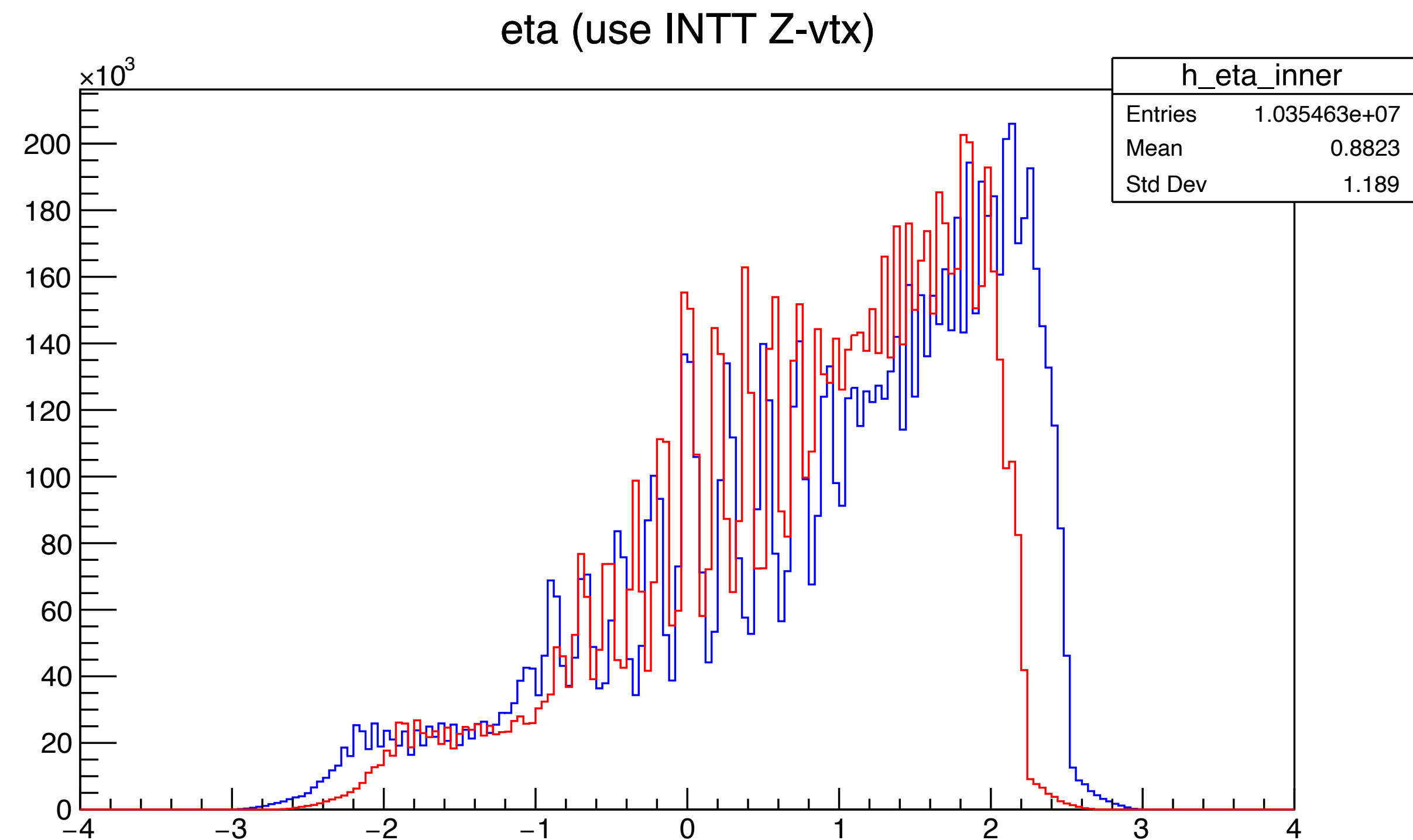
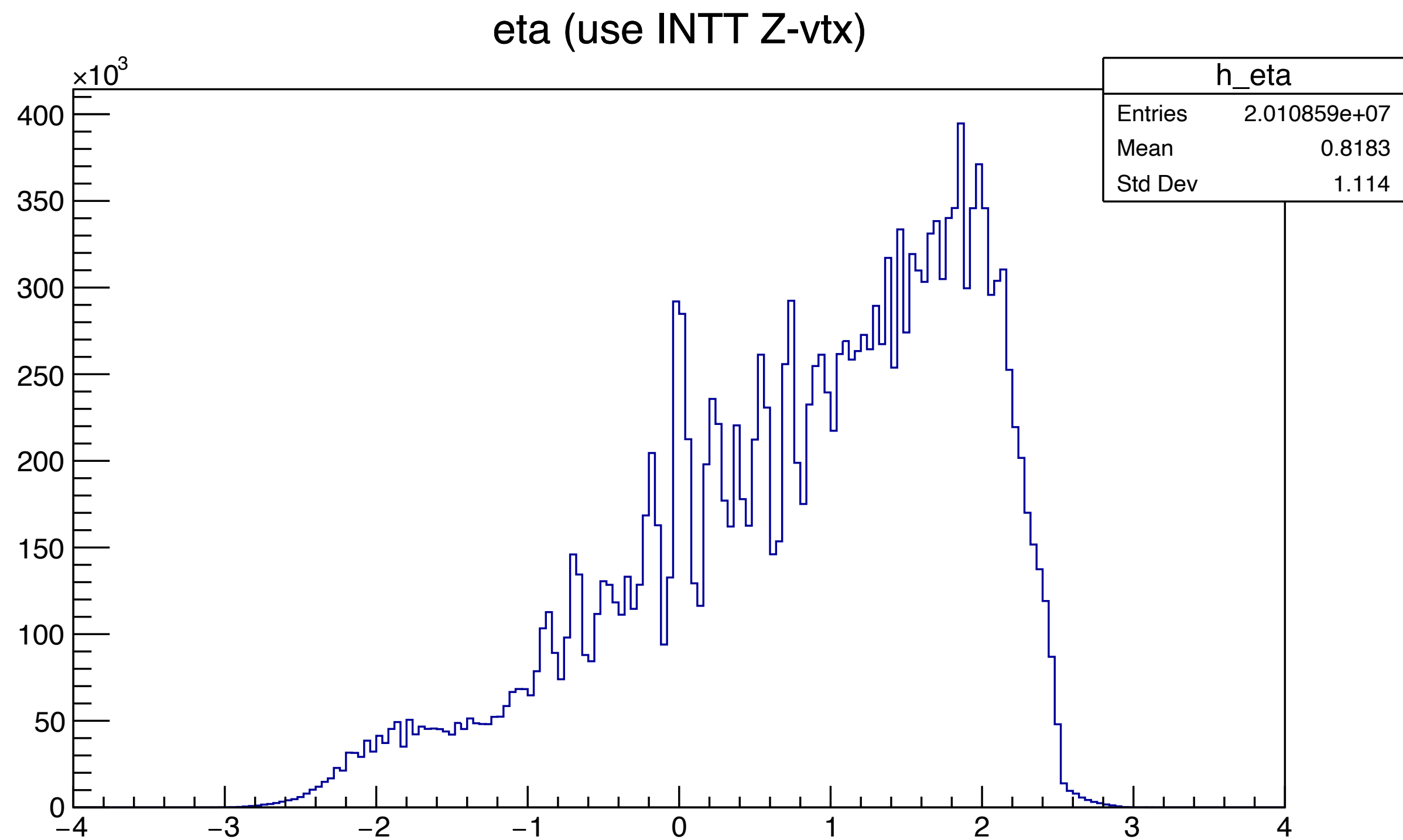


Before this workshop

eta distribution (use INTT Zvxt)

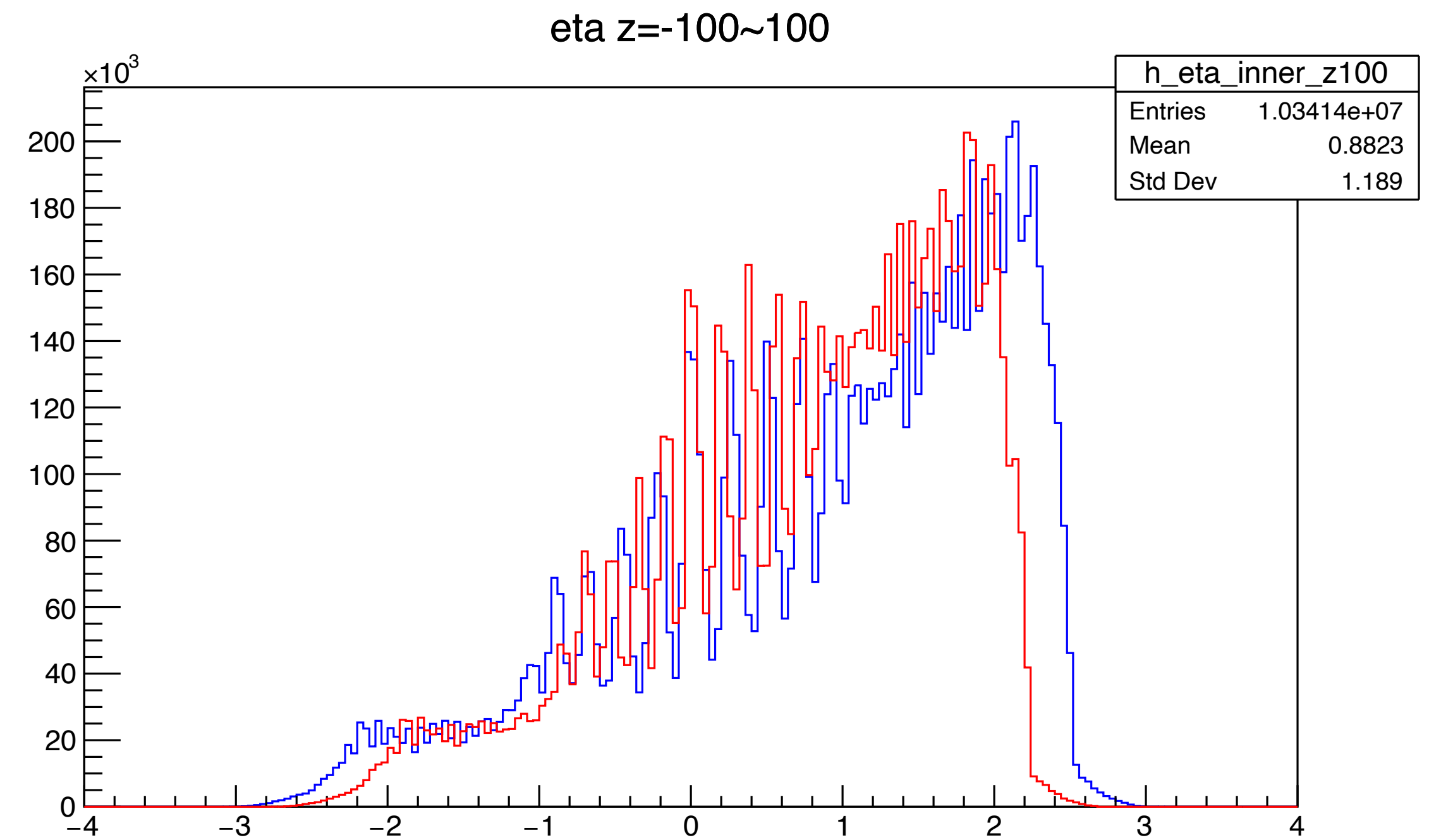
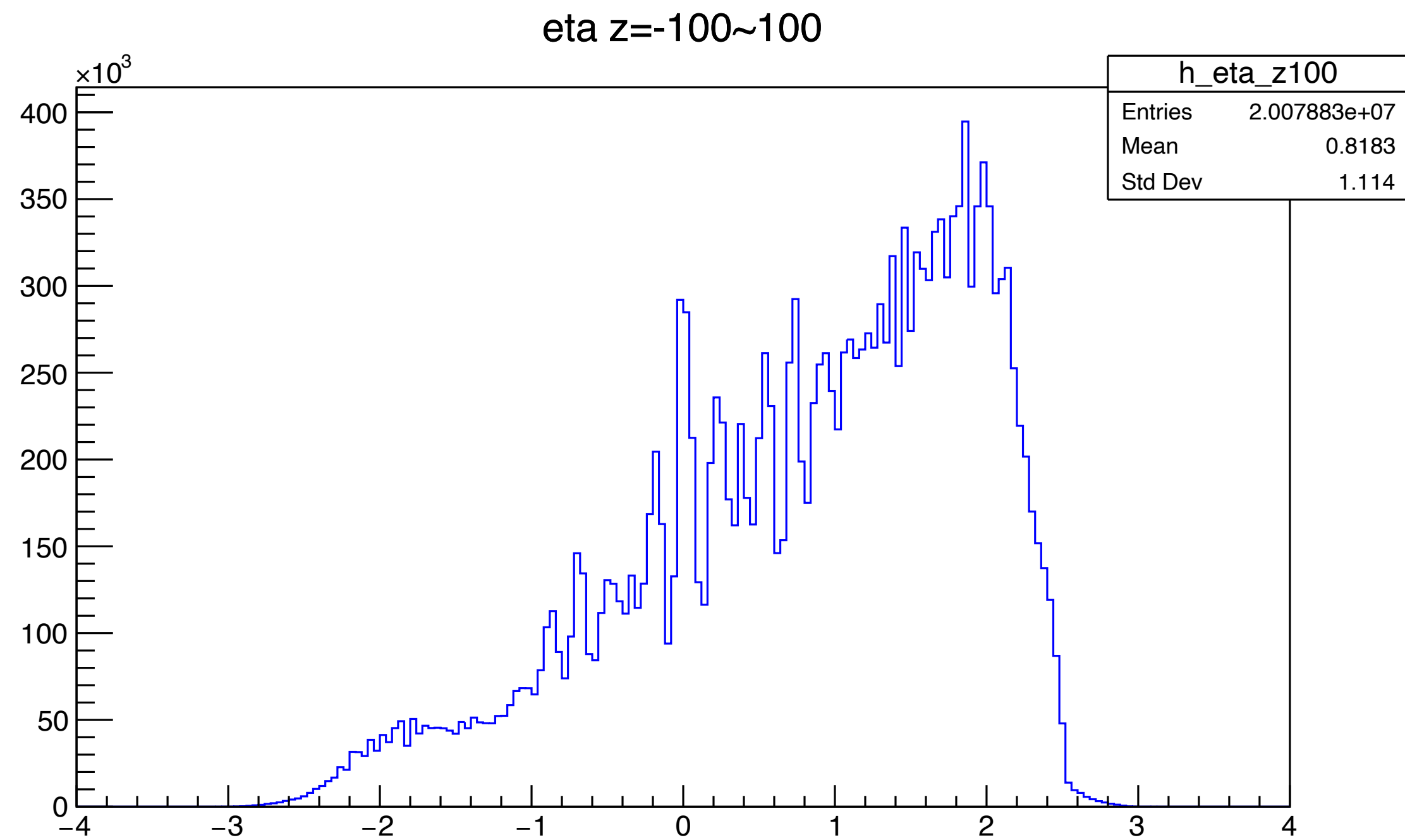
eta (no cut)

left: All, right: blue->inner barrel, red->outer barrel



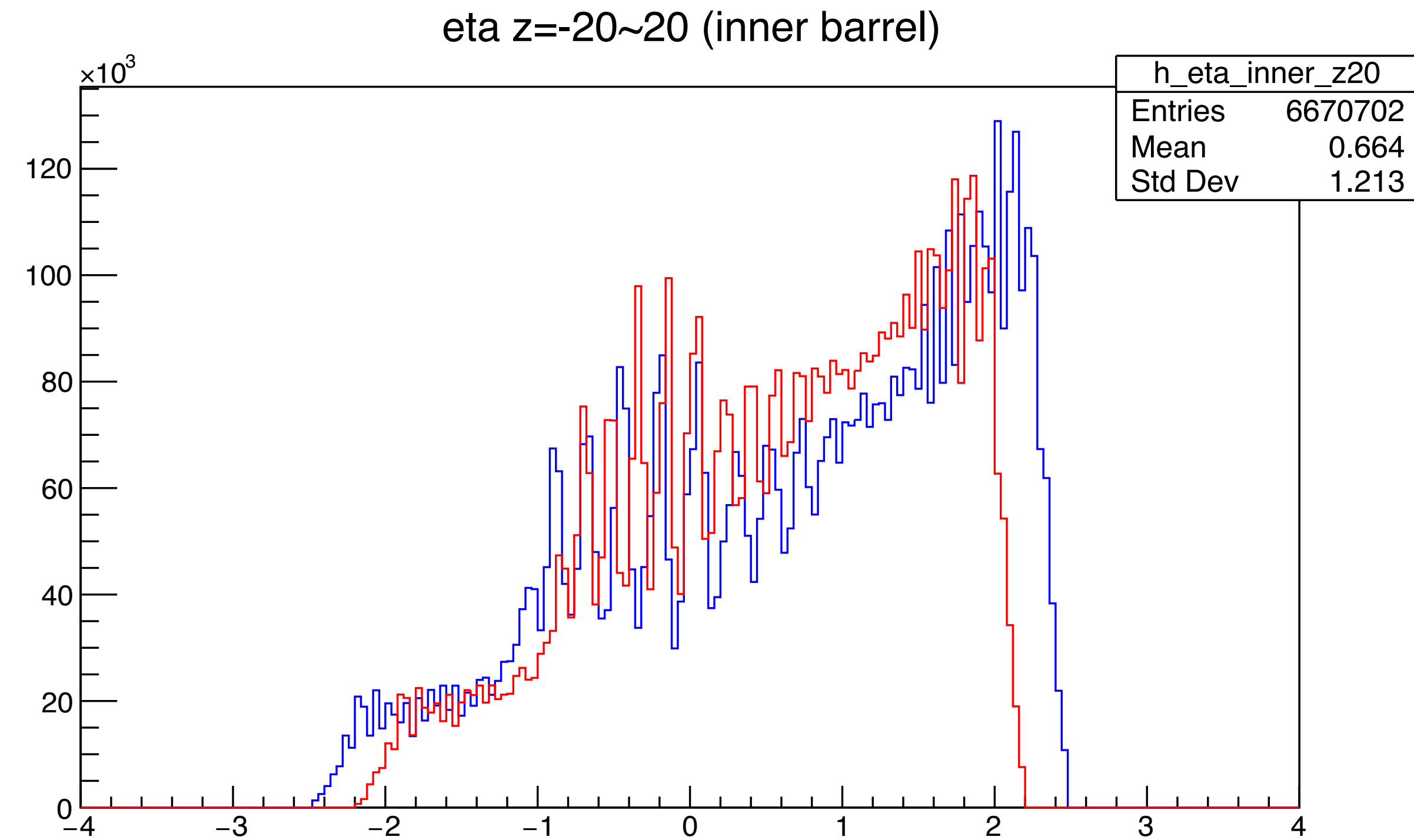
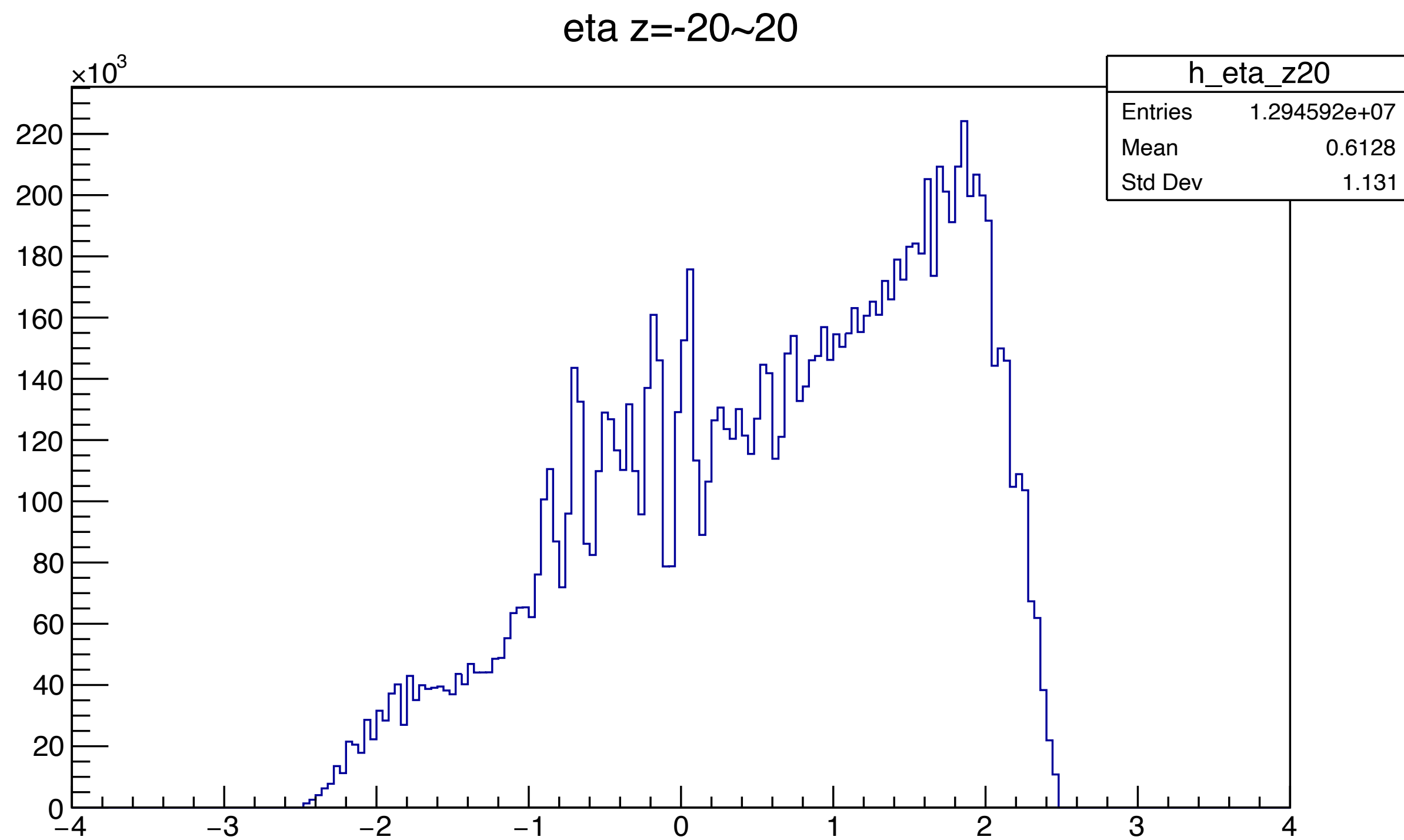
eta ($Z_{vtx}=\pm 100\text{cm}$)

left: All, right: blue->inner barrel, red->outer barrel



eta ($Z_{vtx}=\pm 20\text{cm}$)

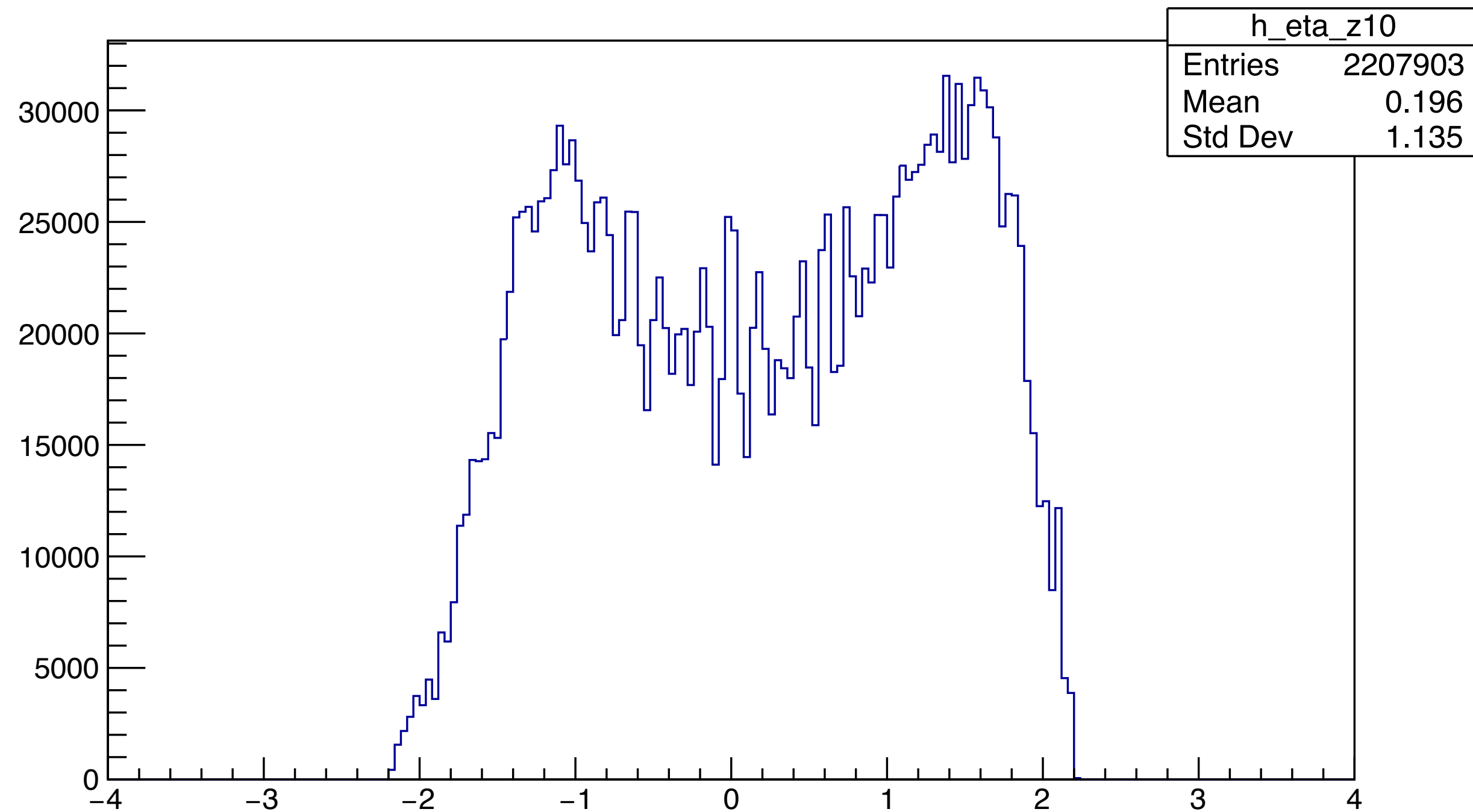
left: All, right: blue->inner barrel, red->outer barrel



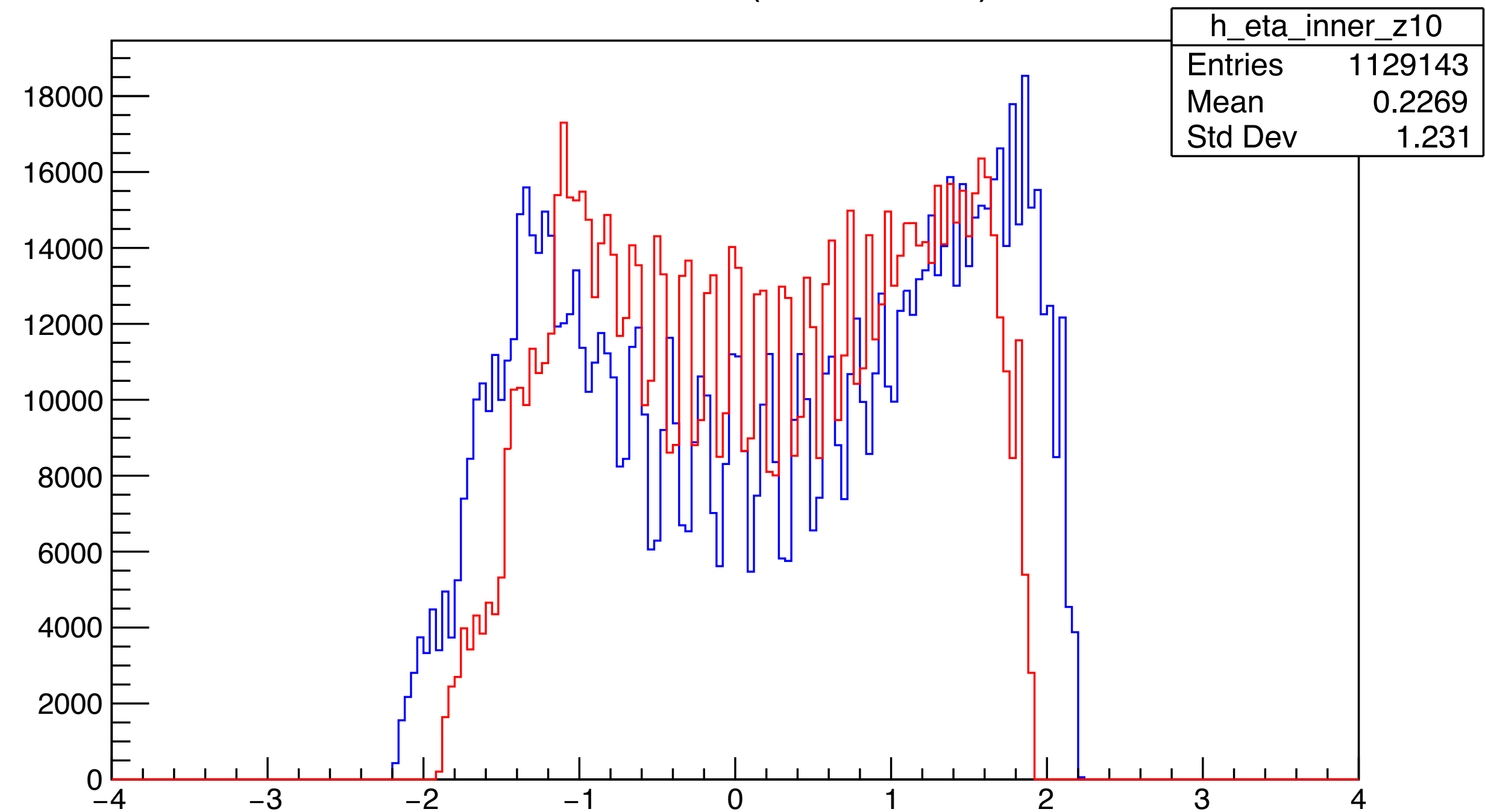
eta ($Z_{vtx}=\pm 10\text{cm}$)

left: All, right: blue->inner barrel, red->outer barrel

eta z=-10~10



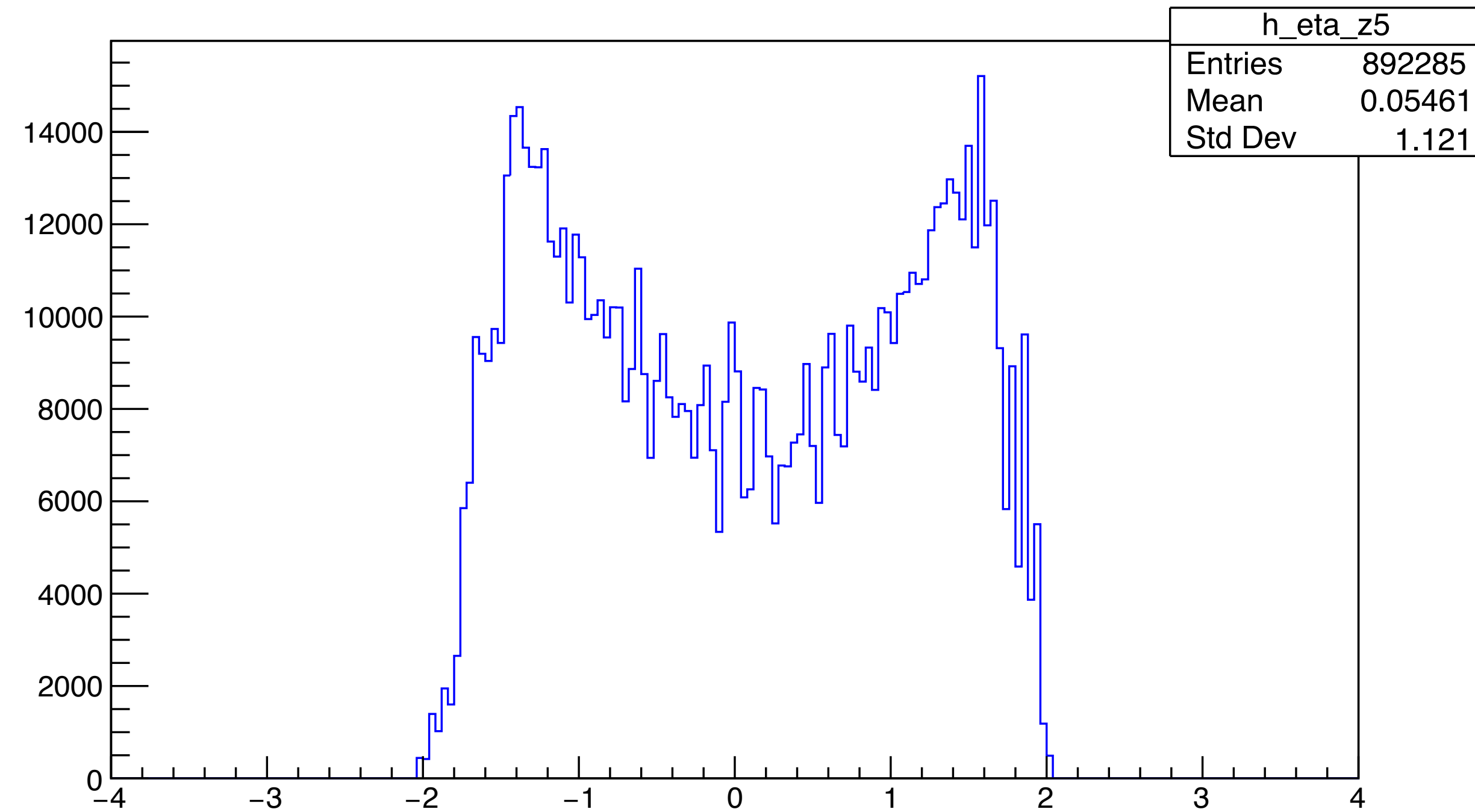
eta z=-10~10 (inner barrel)



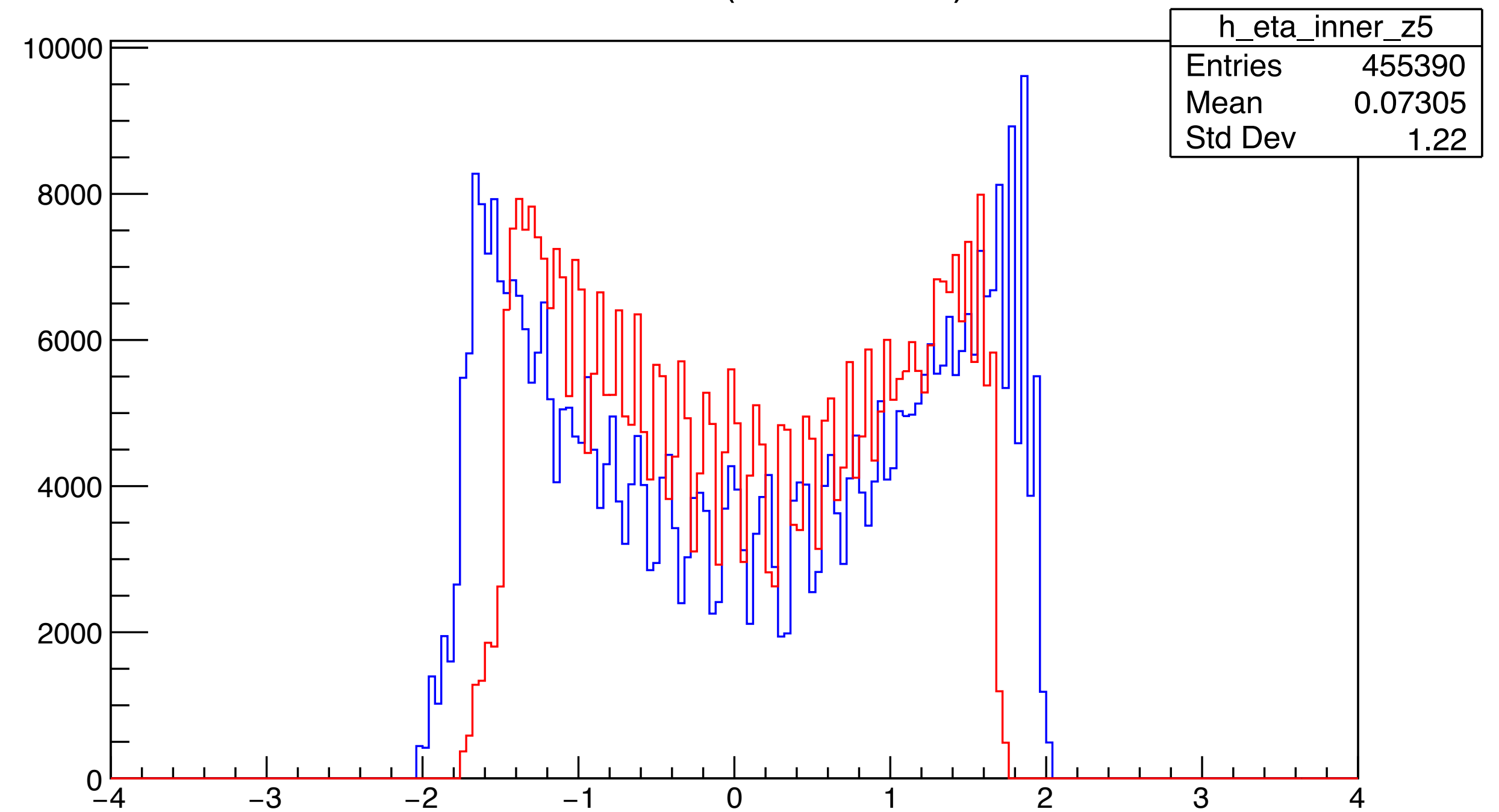
eta ($Z_{vtx}=\pm 5\text{cm}$)

left: All, right: blue->inner barrel, red->outer barrel

eta z=-5~5

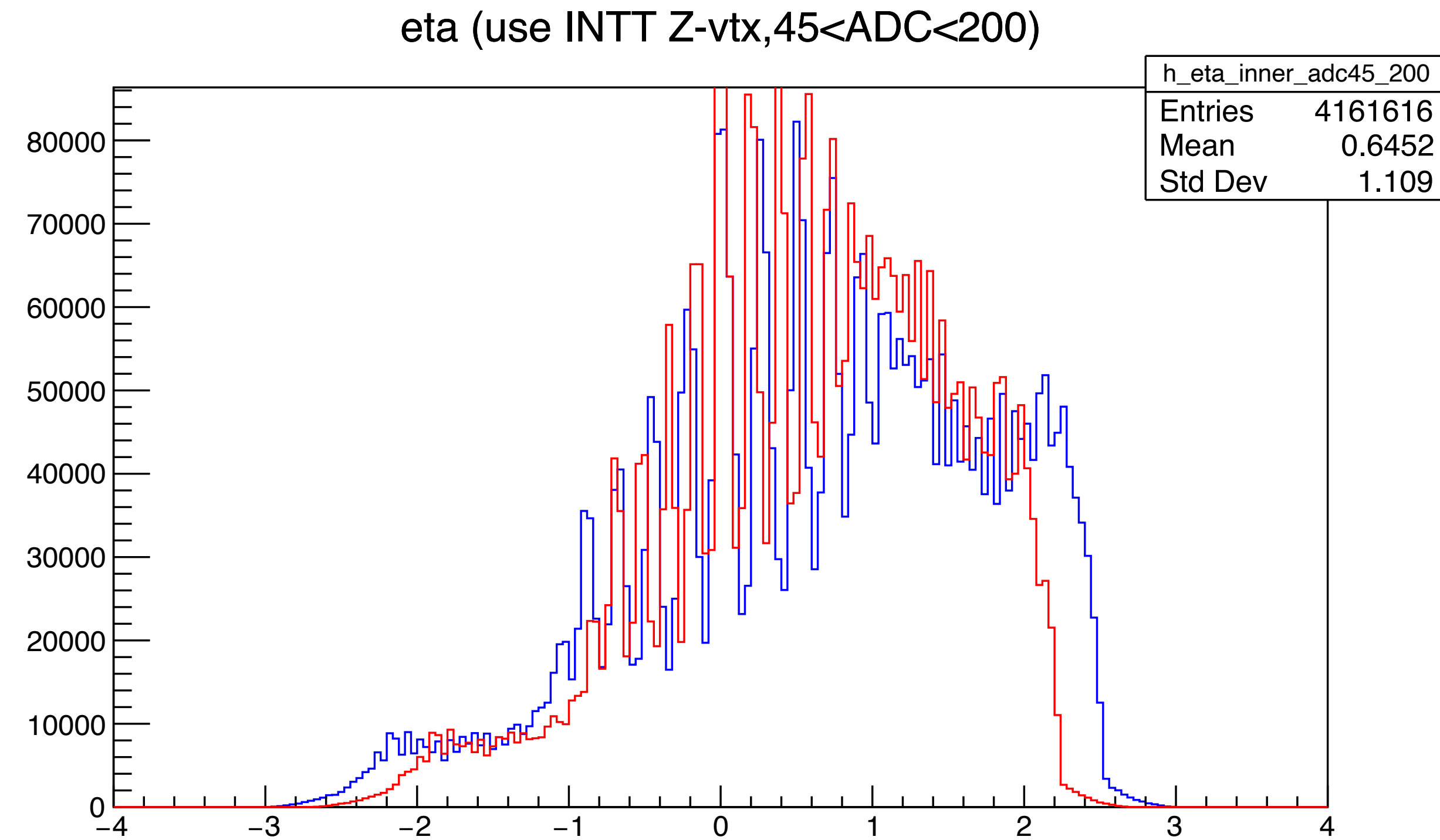
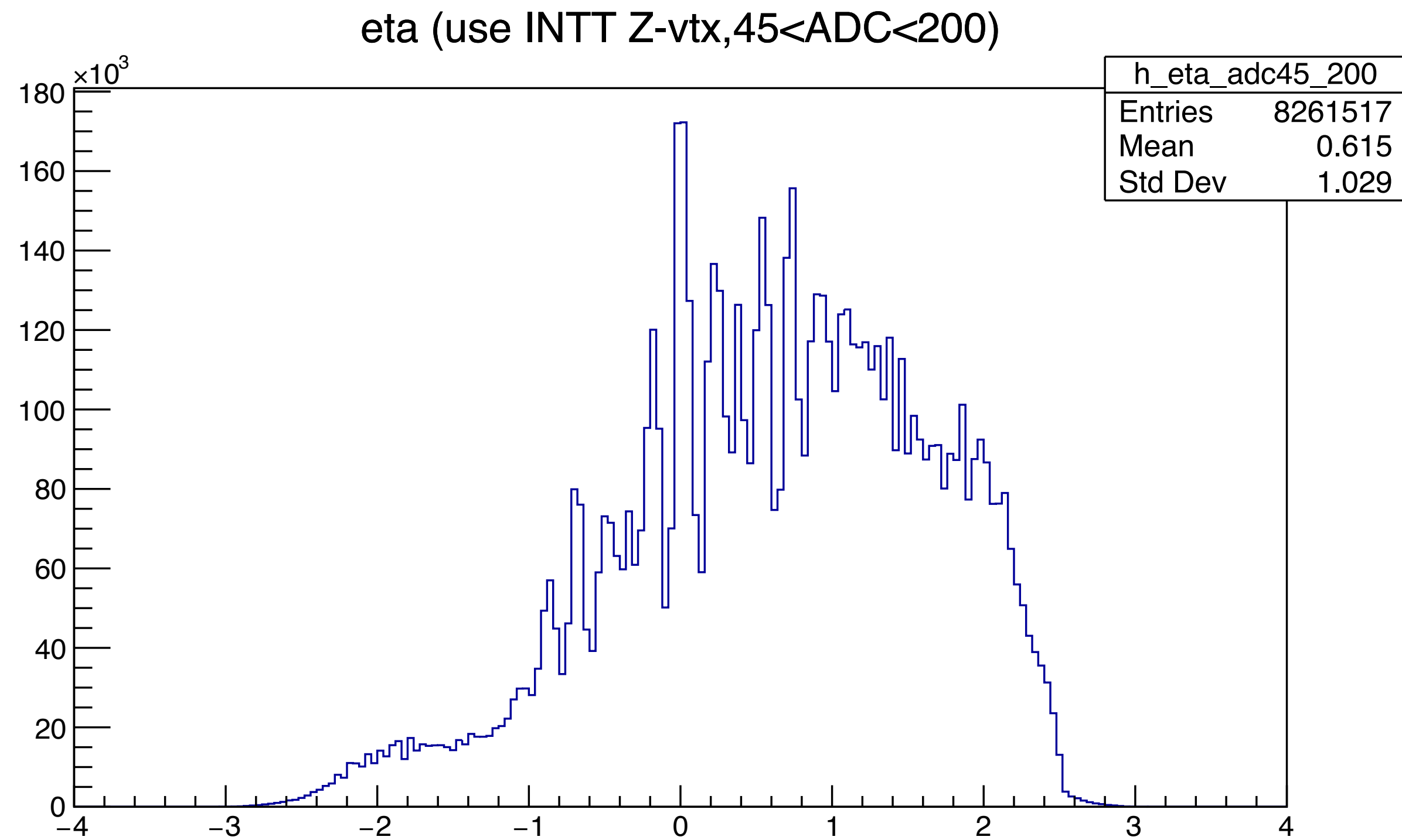


eta z=-5~5 (inner barrel)



eta ($45 < \text{ADC} < 200$)

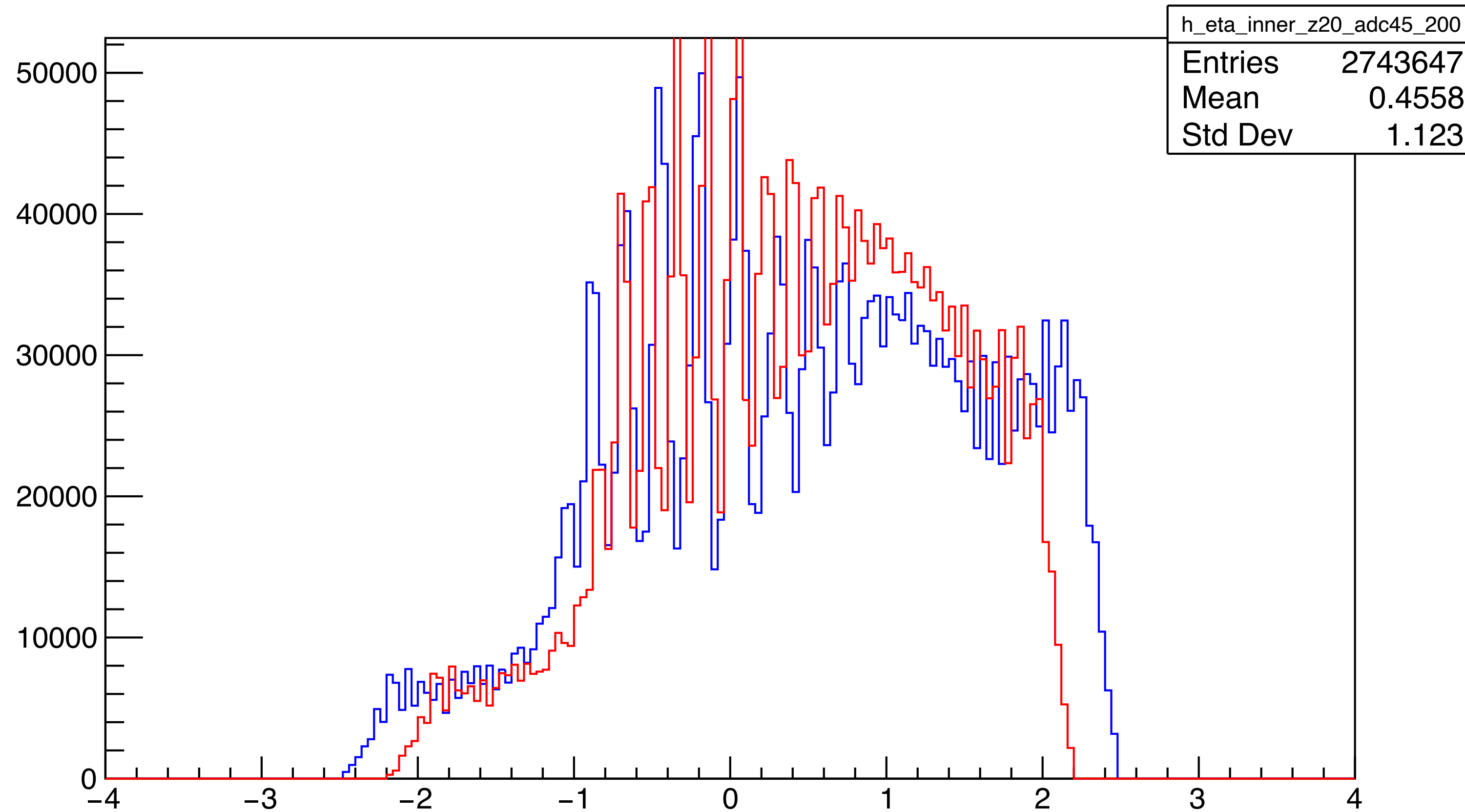
left: All, right: blue->inner barrel, red->outer barrel



eta ($Z_{vtx}=\pm 20\text{cm}$ & $45 < \text{ADC} < 200$)

blue->inner barrel, red->outer barrel

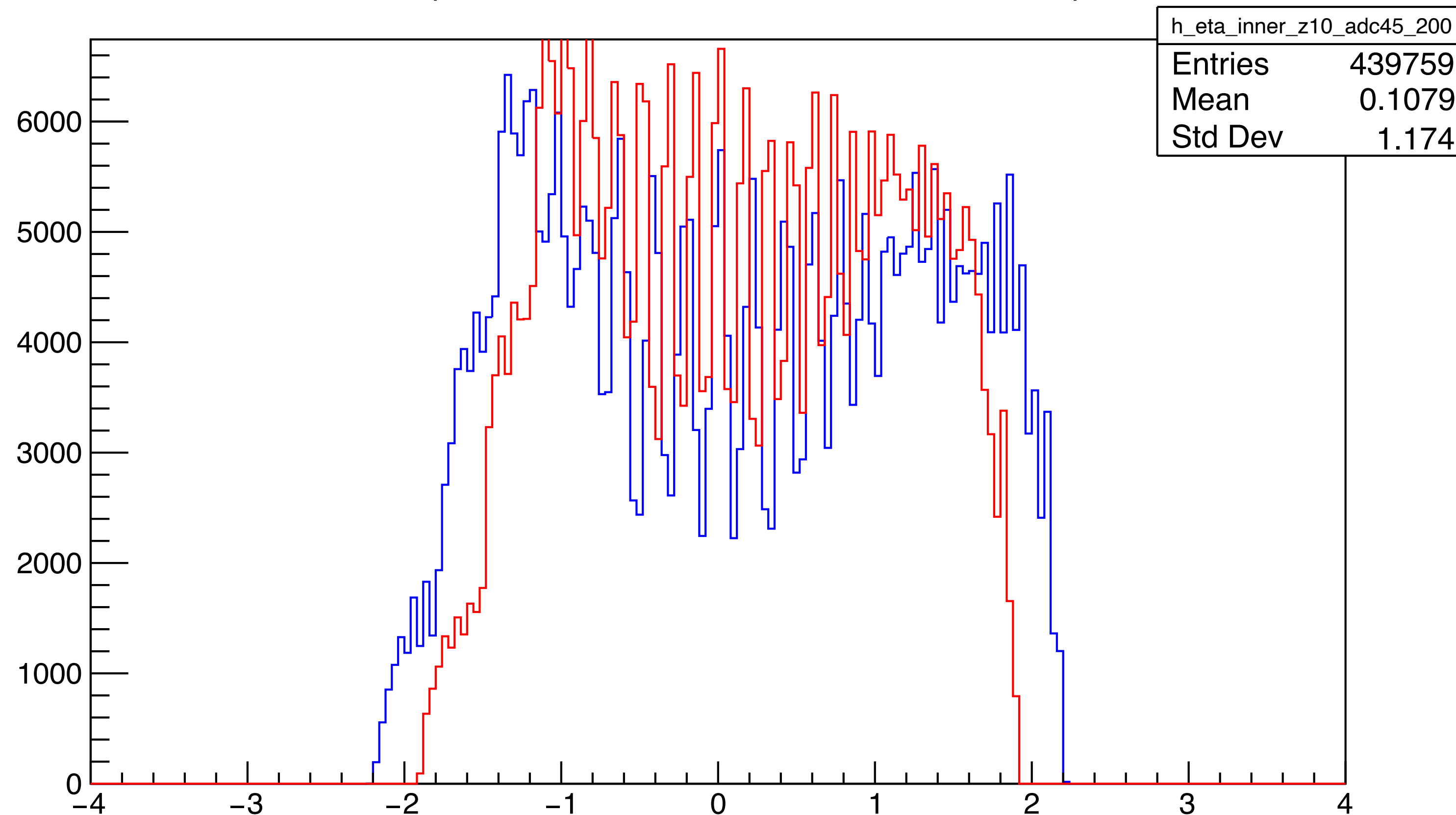
eta (INTT, $z_{vtx}=-20\sim 20, 45 < \text{ADC} < 200$)



eta ($Z_{vtx}=\pm 10\text{cm}$ & $45 < \text{ADC} < 200$)

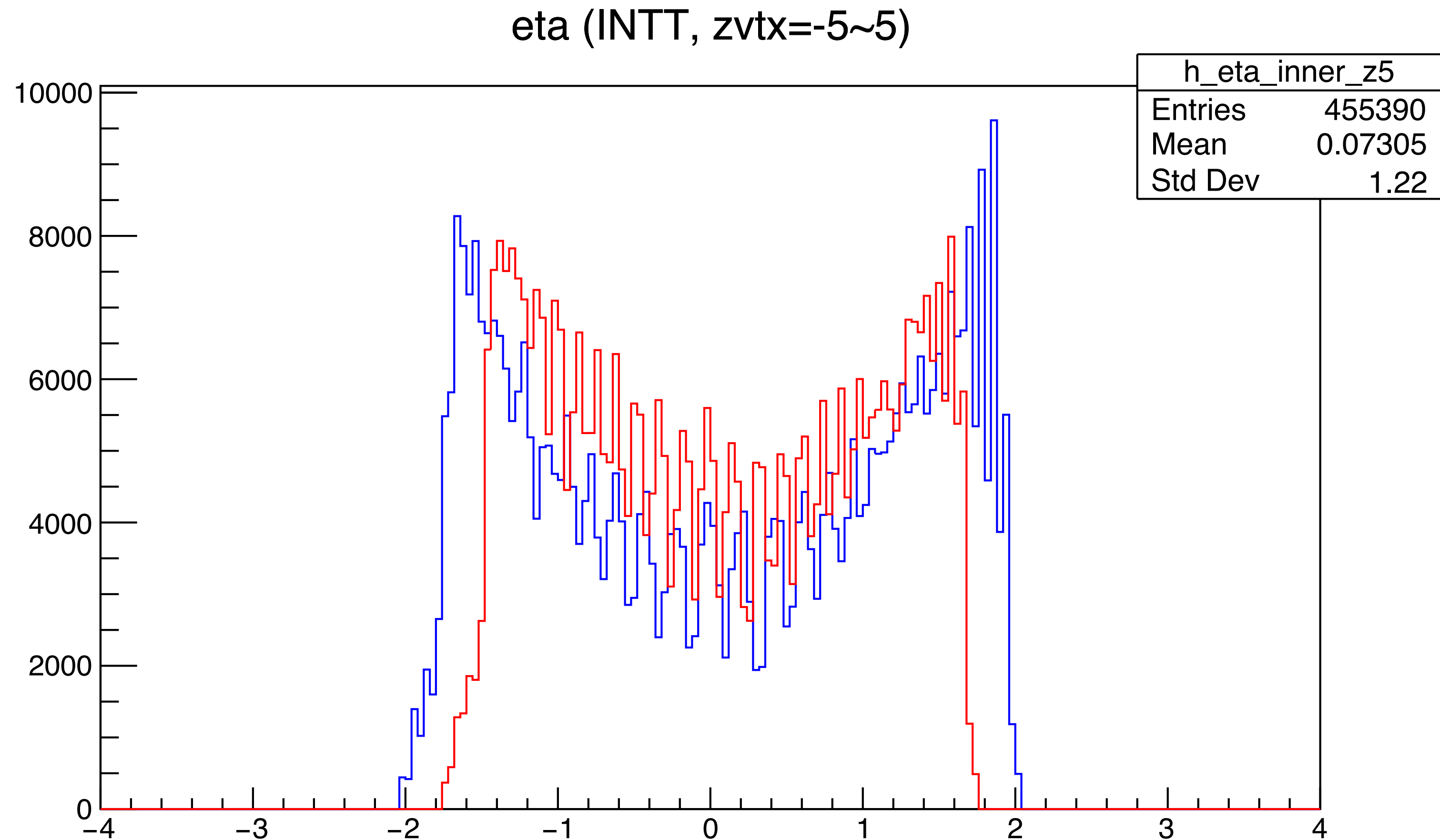
blue->inner barrel, red->outer barrel

eta (INTT, $z_{vtx}=-10\sim 10, 45 < \text{ADC} < 200$)



eta ($Z_{vtx}=\pm 5\text{cm}$ & $45 < \text{ADC} < 200$)

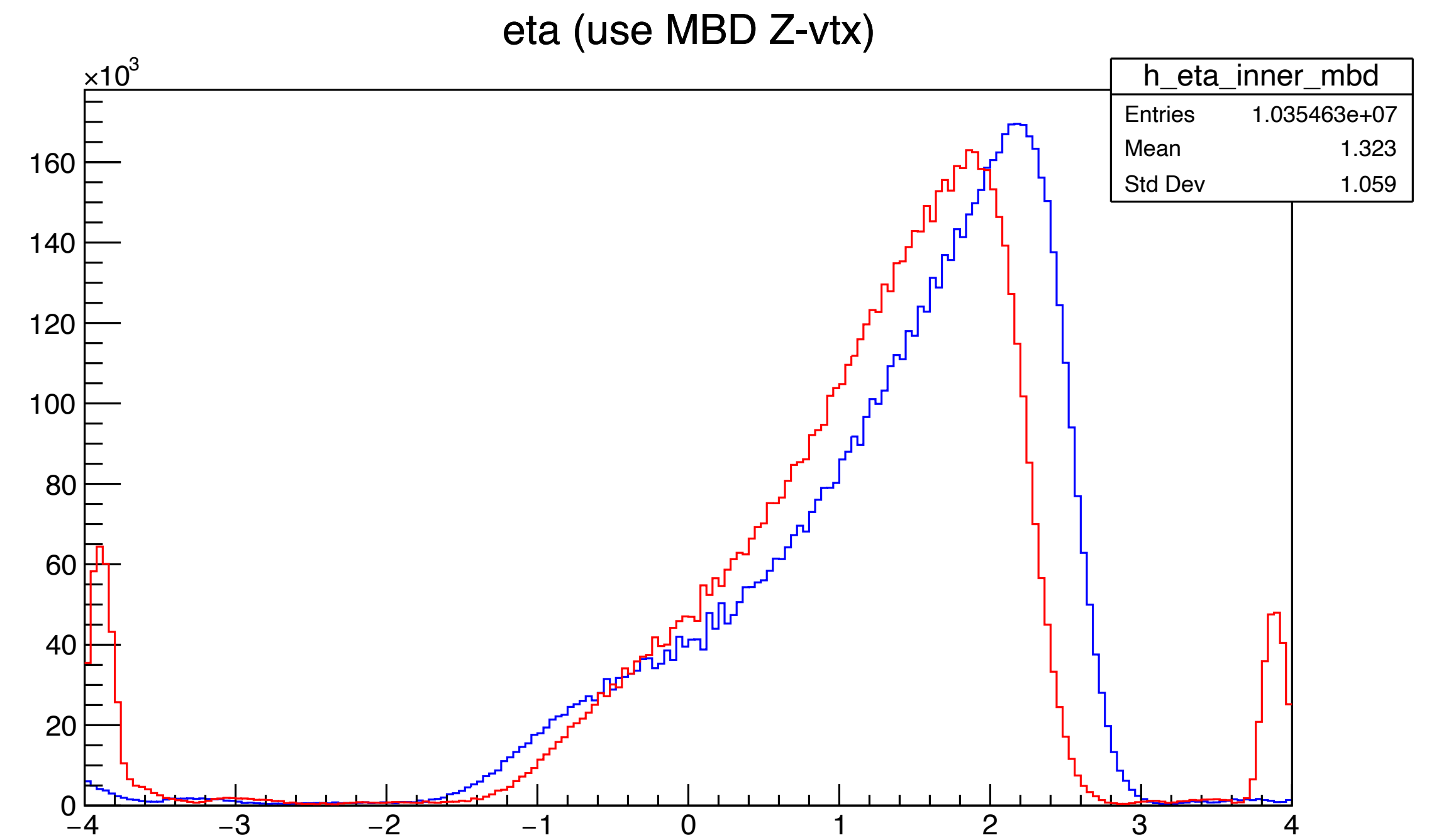
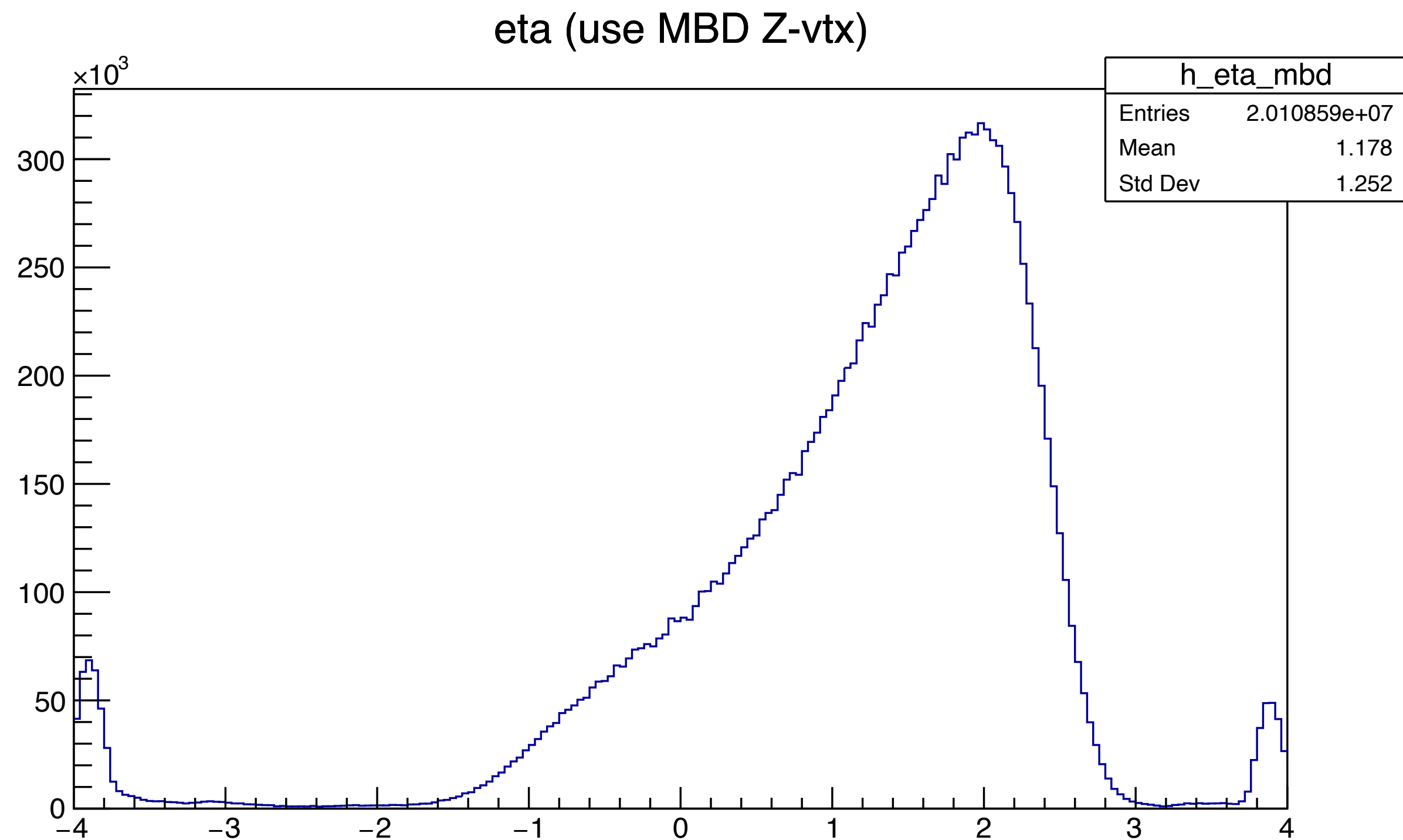
left: All, right: blue->inner barrel, red->outer barrel



eta distribution (use MBD Z_{vxt})

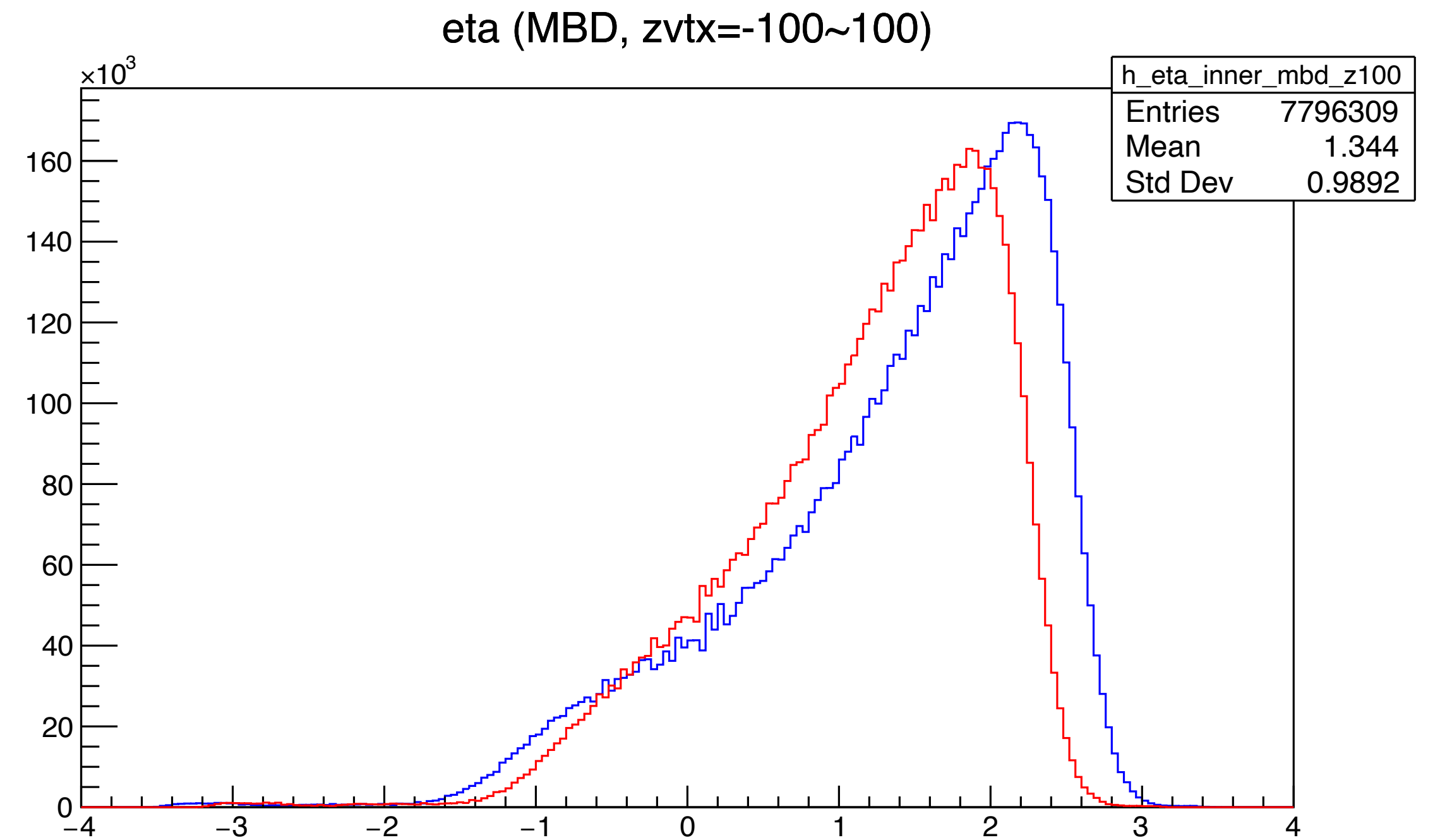
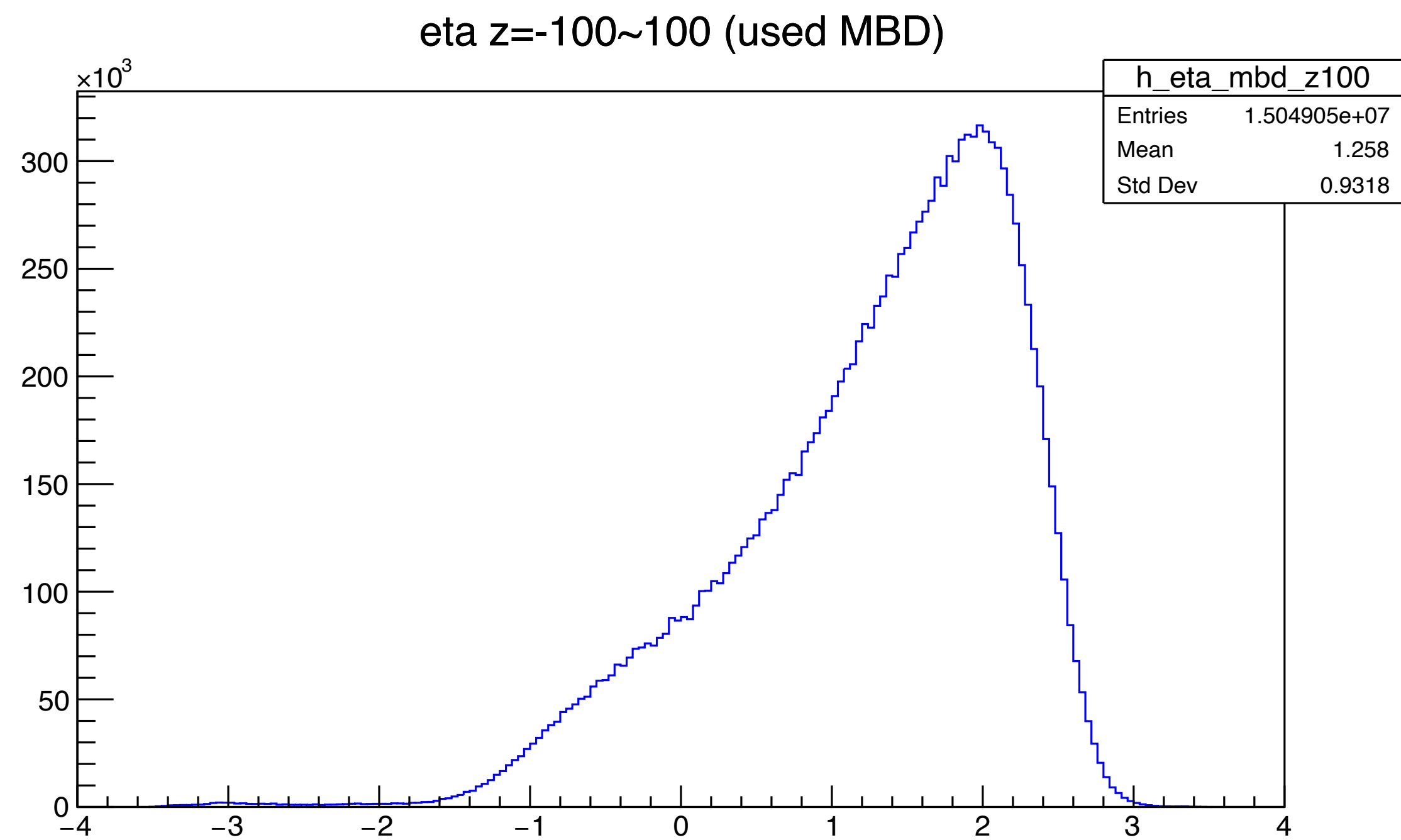
eta (no cut)

left: All, right: blue->inner barrel, red->outer barrel



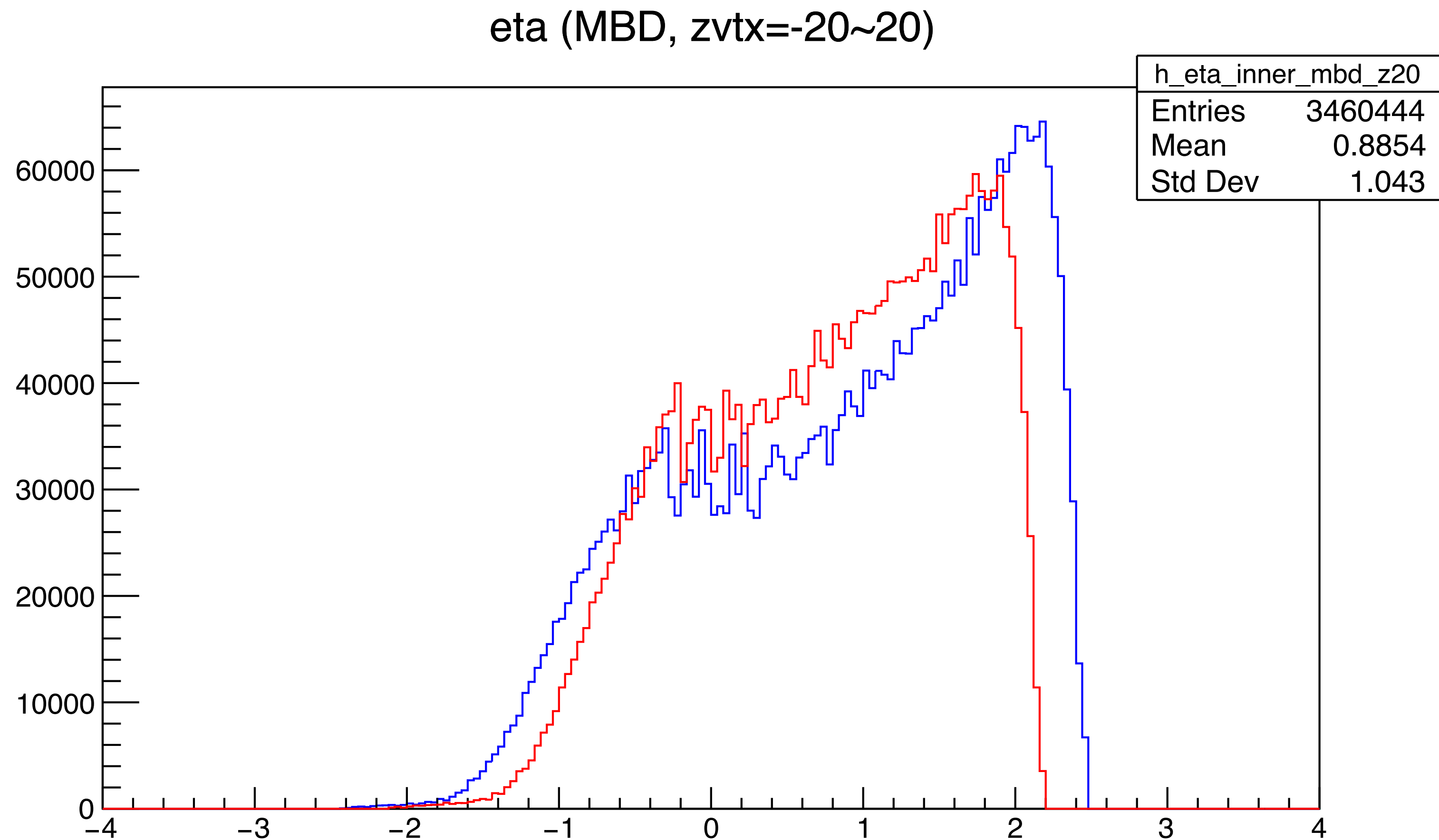
eta ($Z_{vtx}=\pm 100\text{cm}$)

left: All, right: blue->inner barrel, red->outer barrel



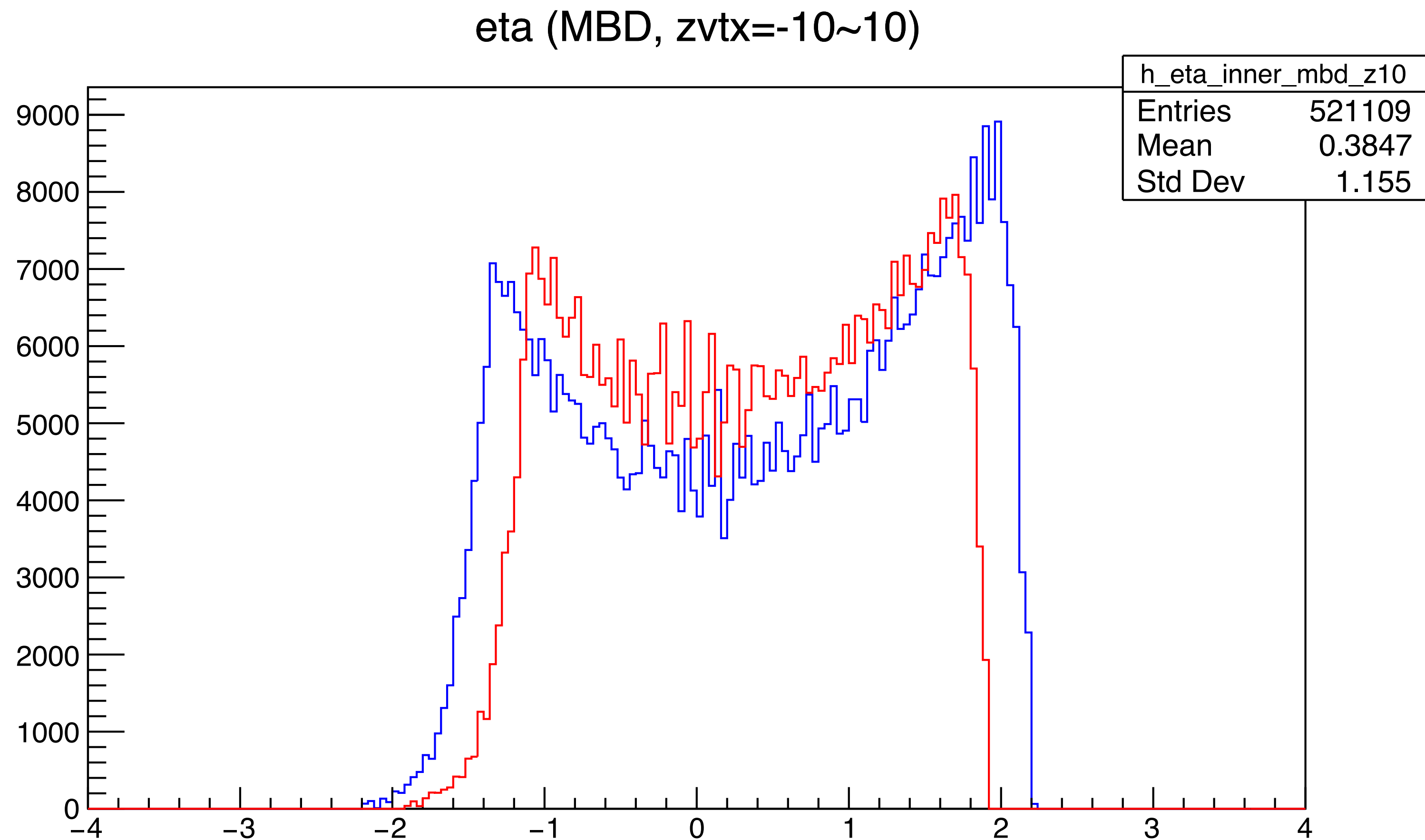
eta ($Z_{vtx}=\pm 20\text{cm}$)

left: All, right: blue->inner barrel, red->outer barrel



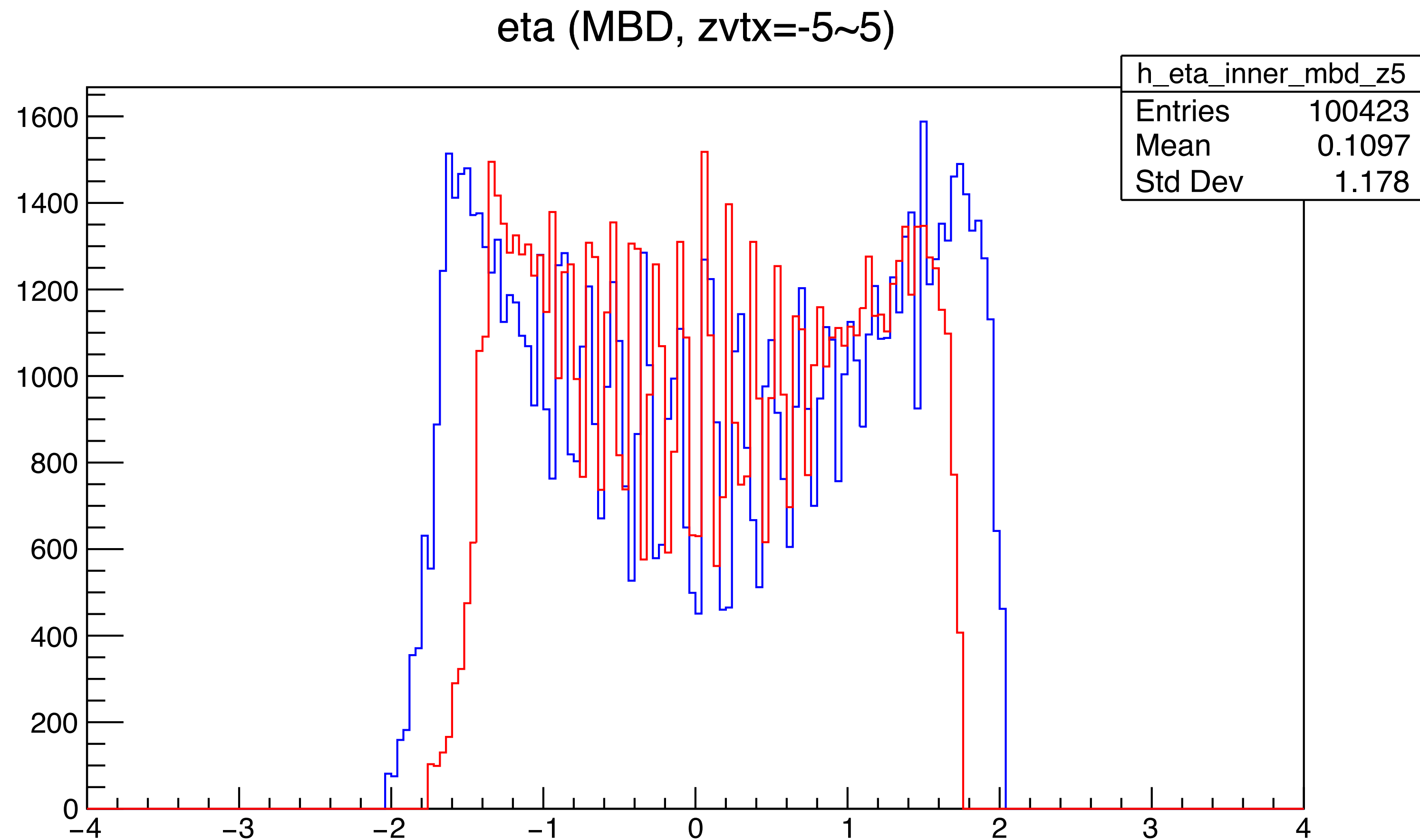
eta ($Z_{vtx}=\pm 10\text{cm}$)

left: All, right: blue->inner barrel, red->outer barrel



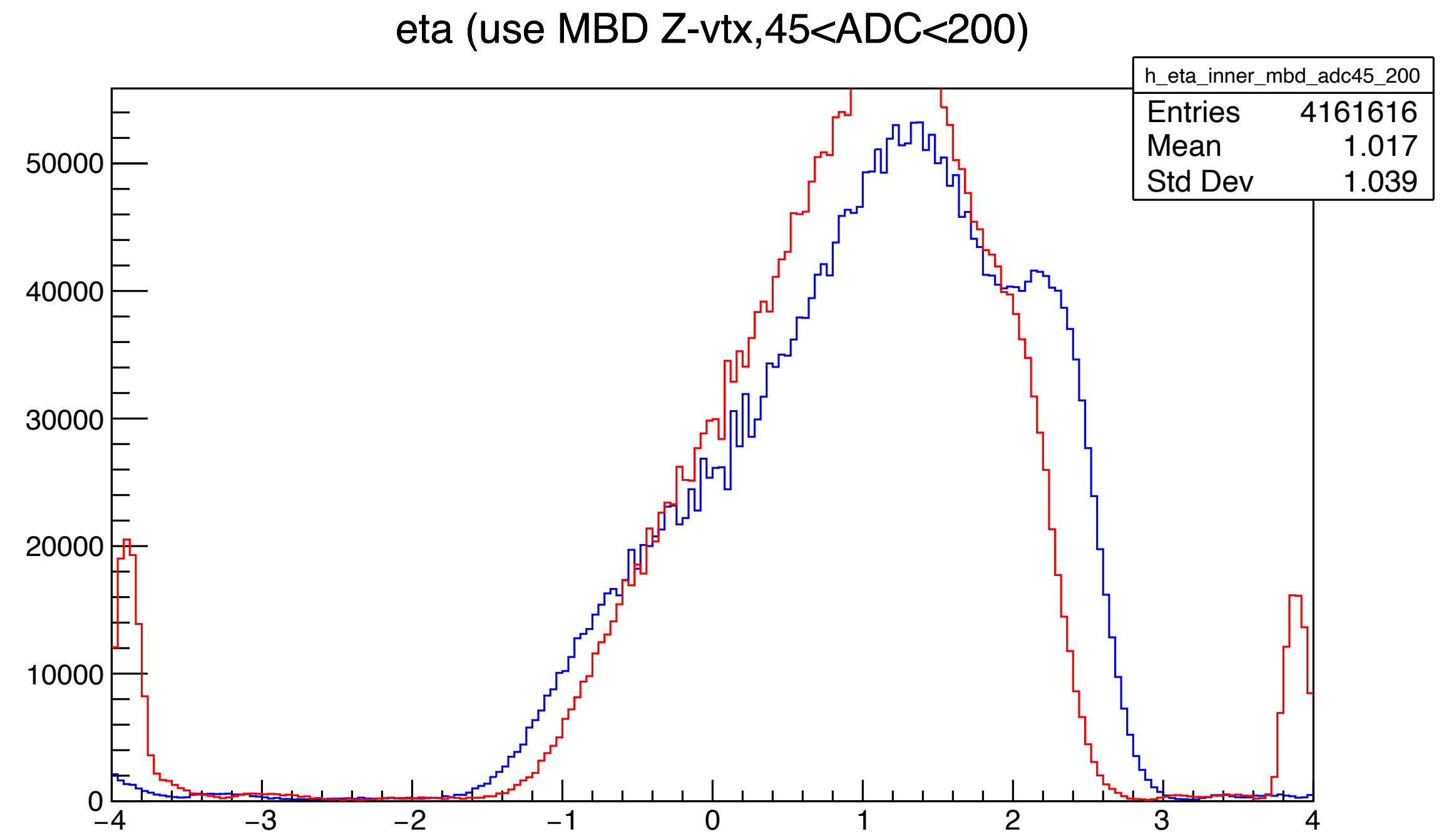
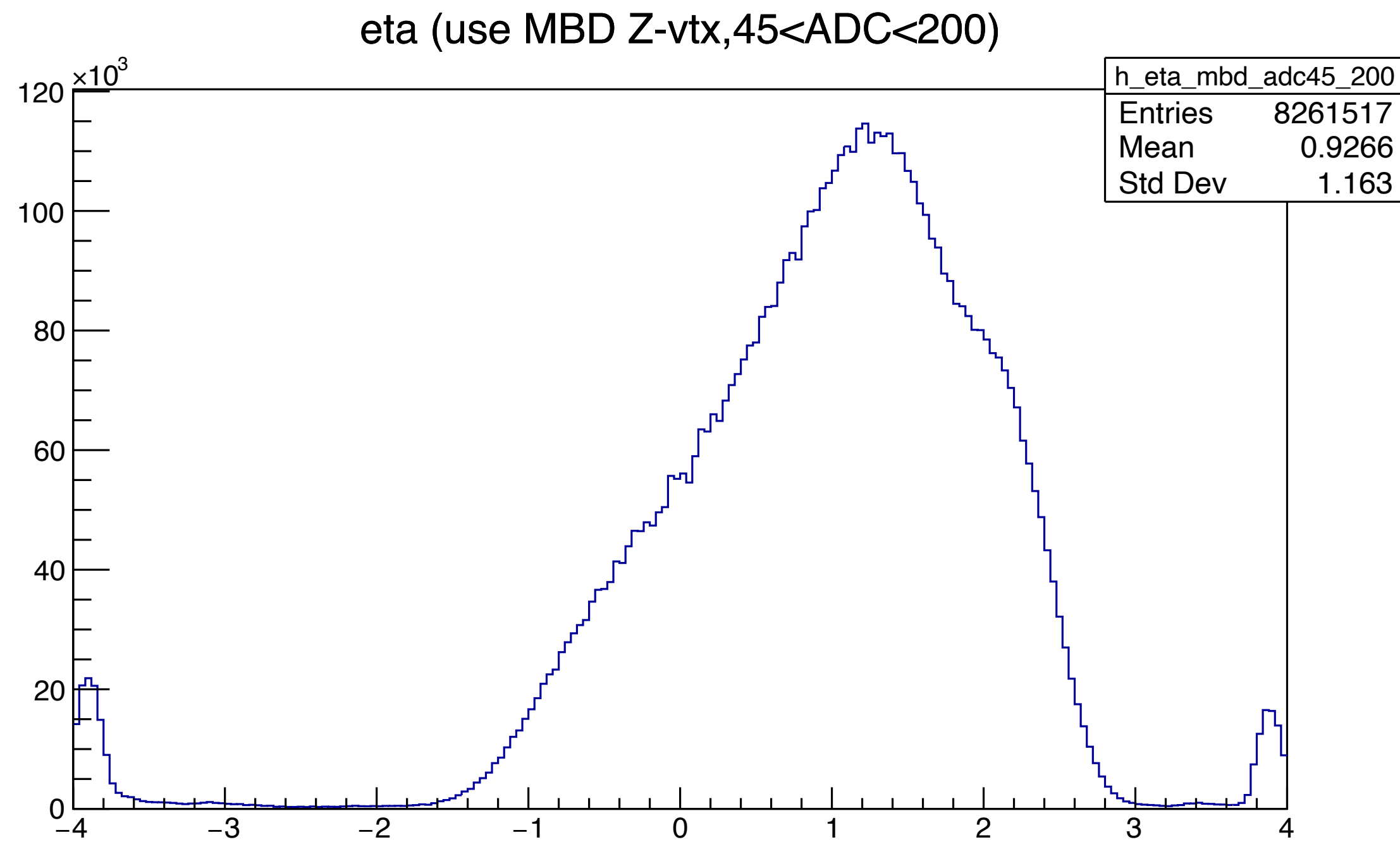
eta ($Z_{vtx}=\pm 5\text{cm}$)

left: All, right: blue->inner barrel, red->outer barrel



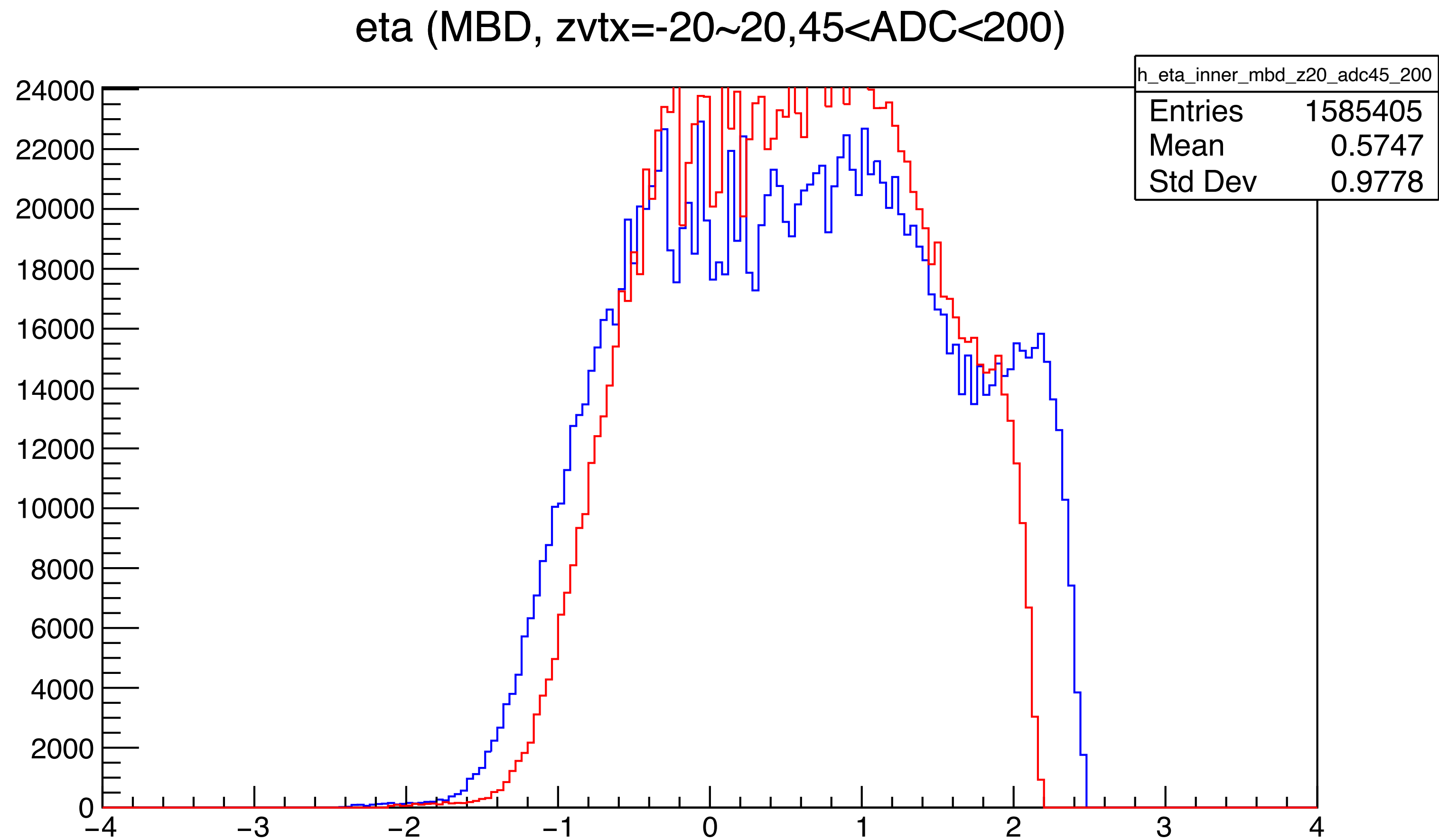
eta (45<ADC<200)

left: All, right: blue->inner barrel, red->outer barrel



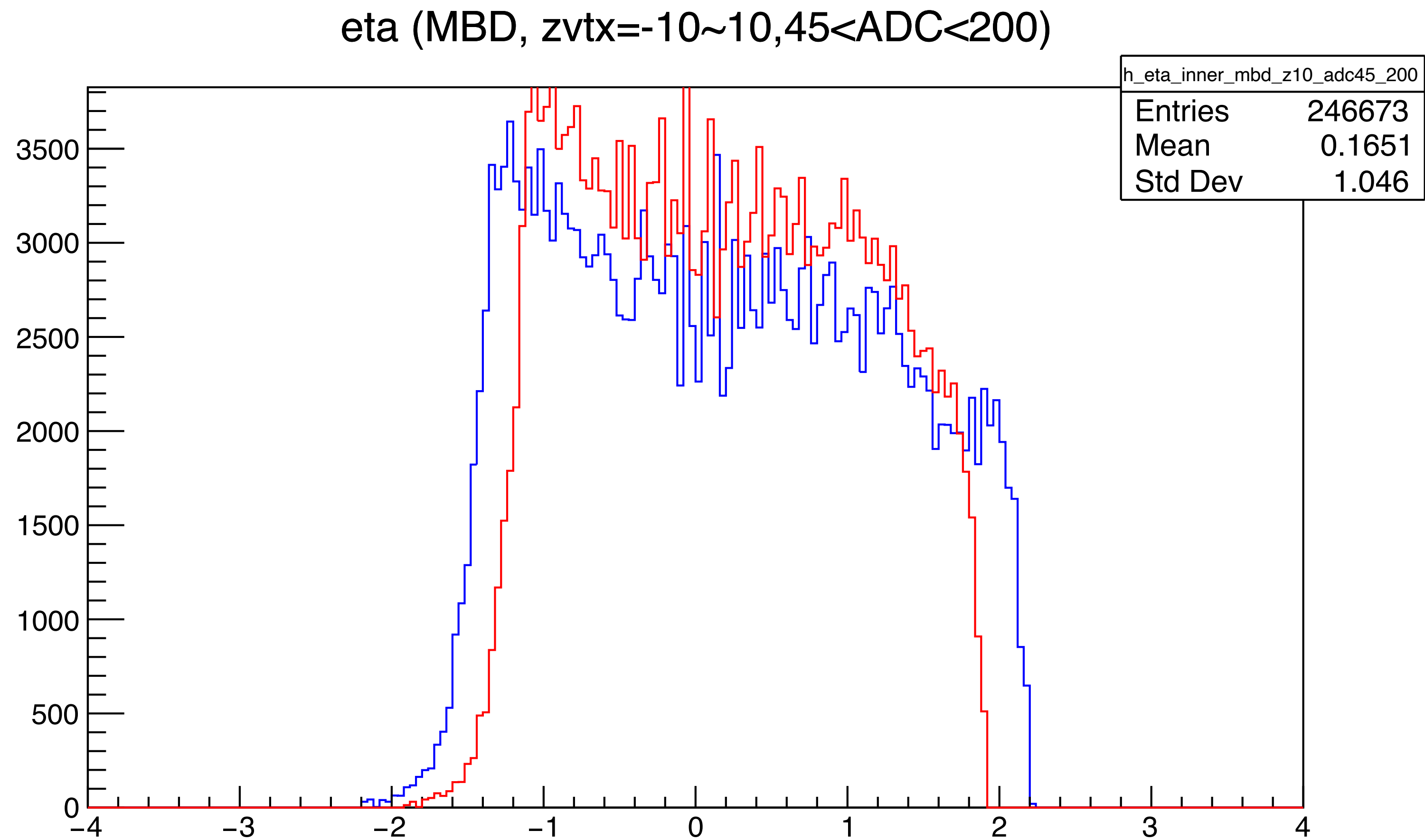
eta ($Z_{vtx}=\pm 20\text{cm}$ & $45 < \text{ADC} < 200$)

left: All, right: blue->inner barrel, red->outer barrel



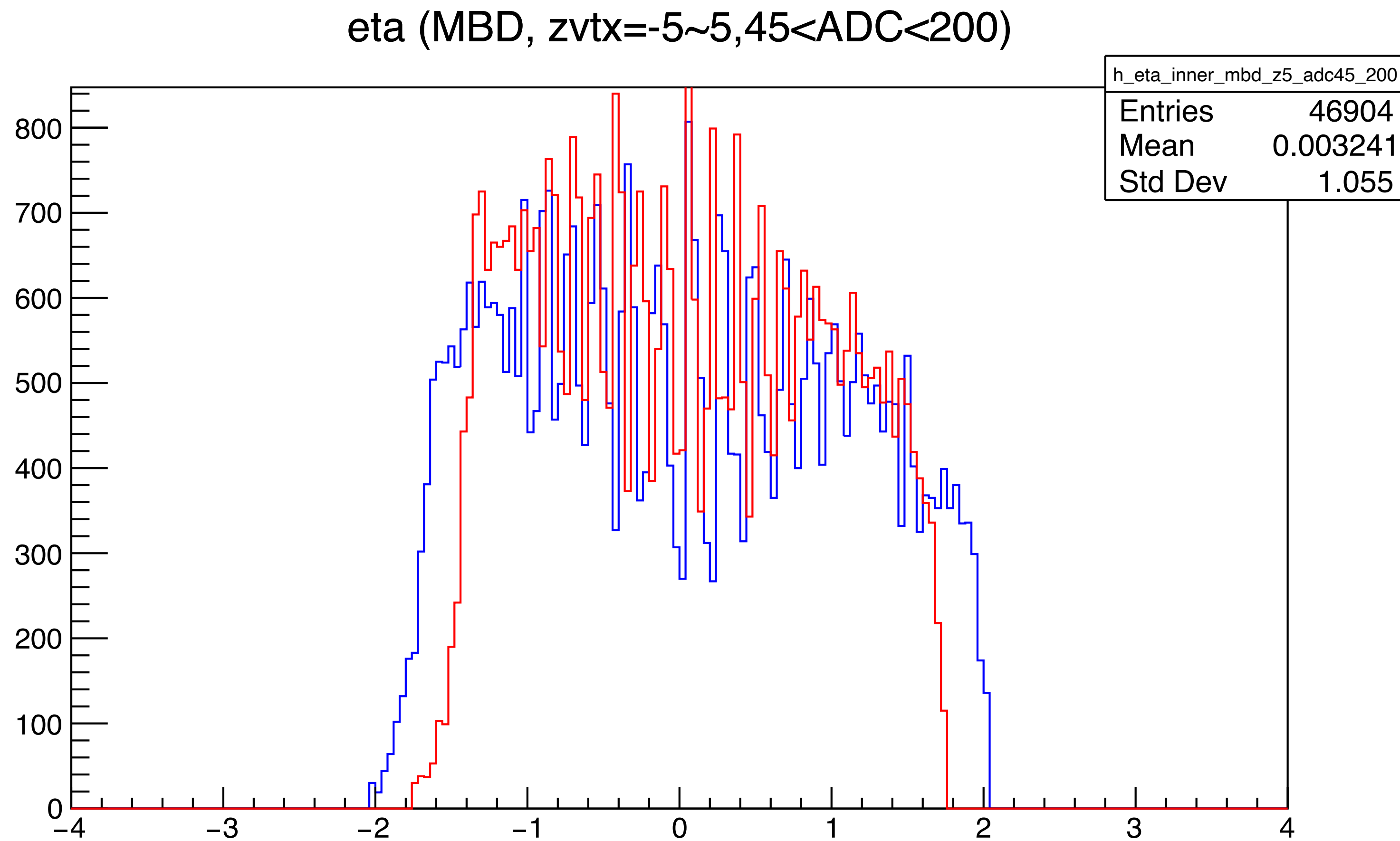
eta ($Z_{vtx}=\pm 10\text{cm}$ & $45 < \text{ADC} < 200$)

left: All, right: blue->inner barrel, red->outer barrel



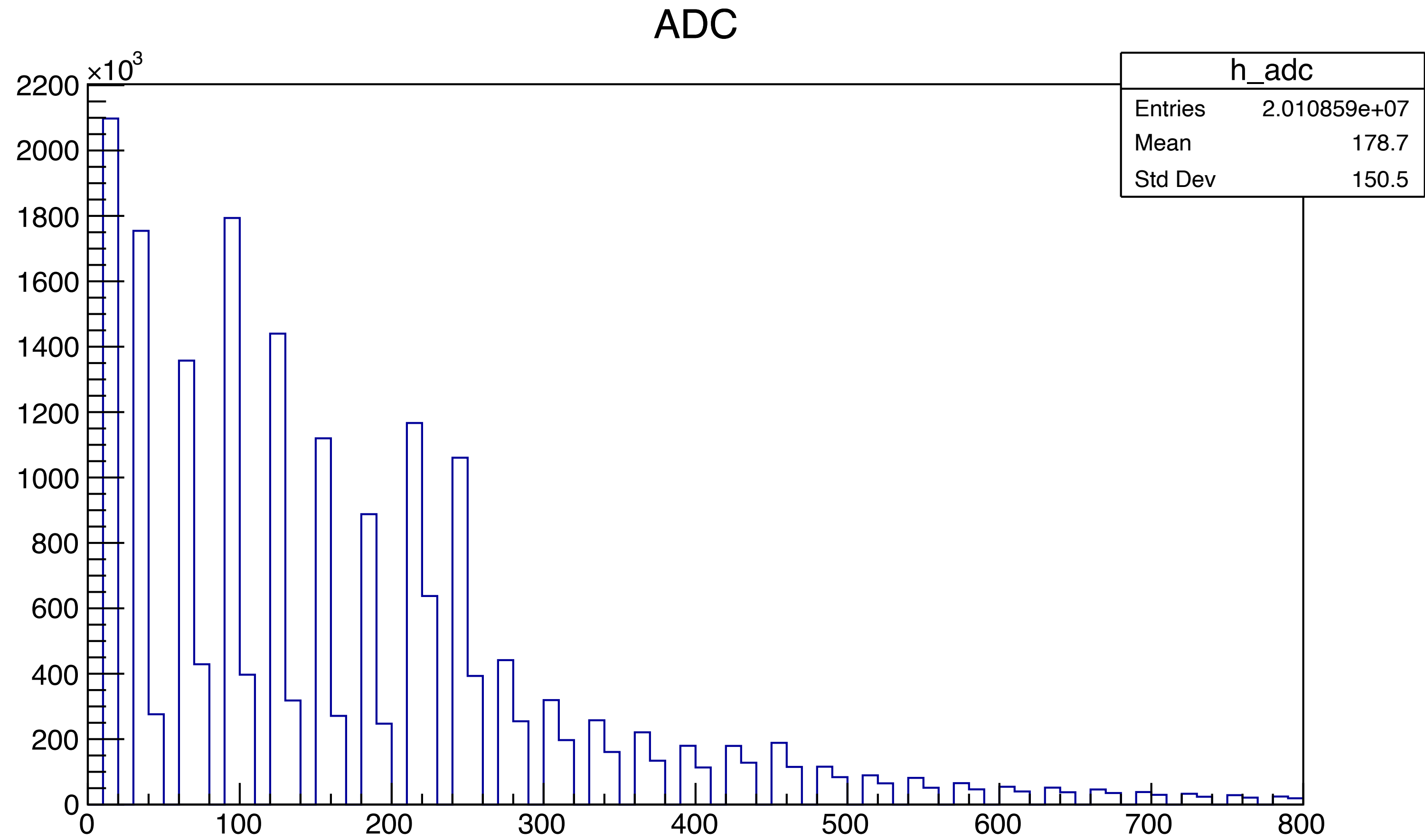
eta ($Z_{vtx}=\pm 5\text{cm}$ & $45 < \text{ADC} < 200$)

left: All, right: blue->inner barrel, red->outer barrel



ADC distribution (no Cut)

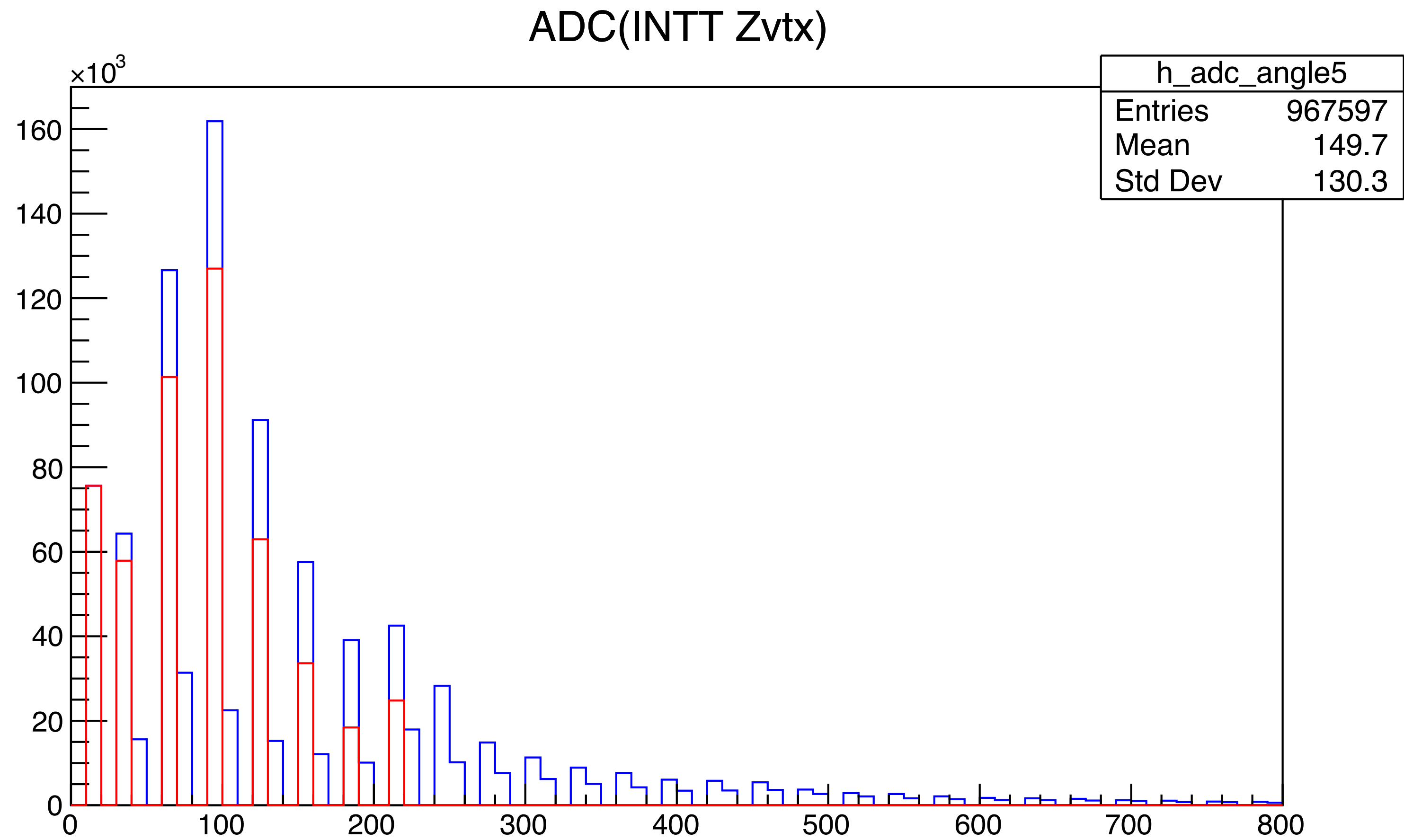
ADC (no cut)



ADC distribution (use INTT Zvxt)

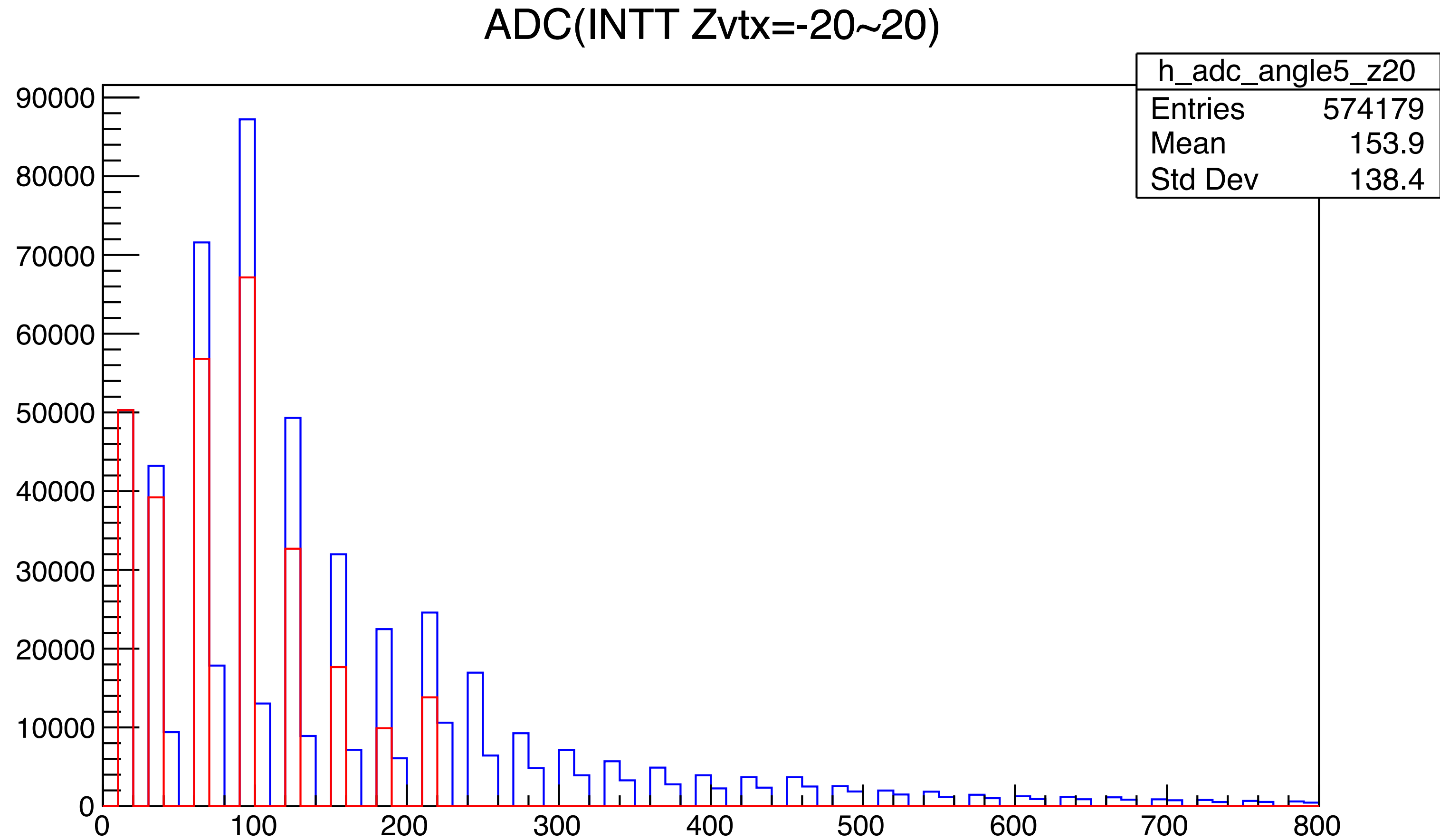
ADC ($85 < \theta < 95$)

blue: all size, red: size=1



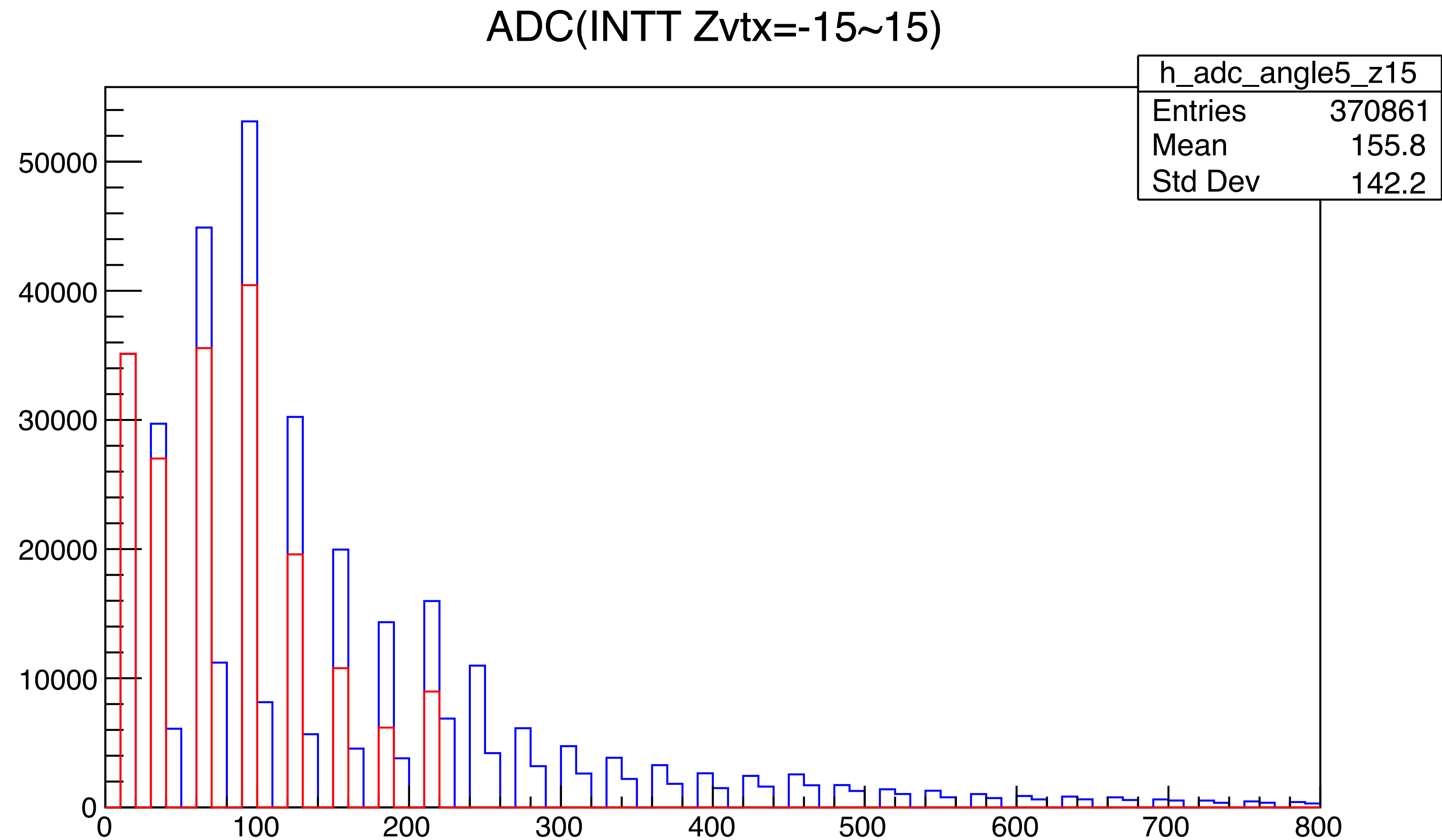
ADC ($85 < \theta < 95$ & $Z_{vtx} = \pm 20\text{cm}$)

blue: all size, red: size=1



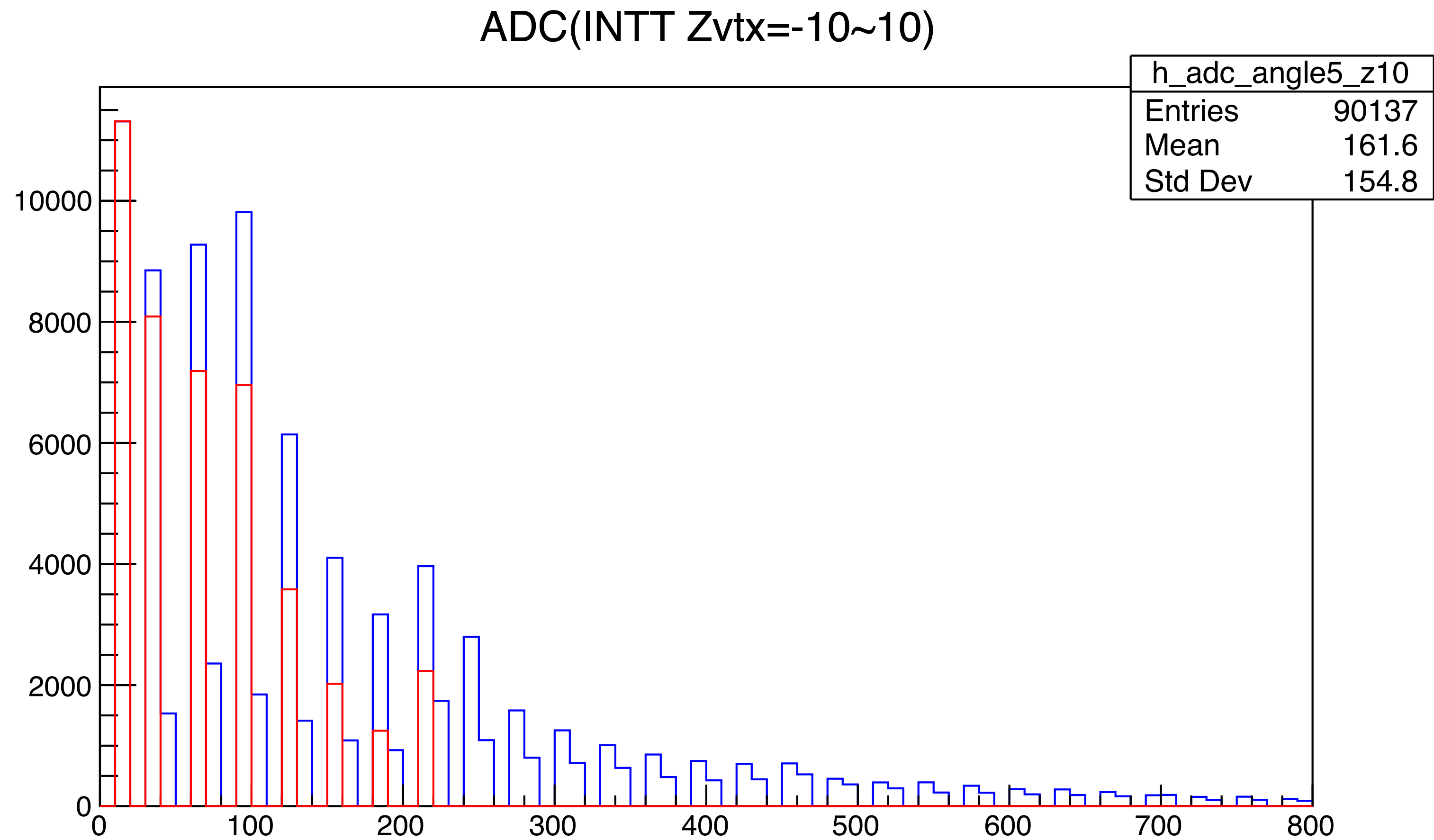
ADC ($85 < \theta < 95$ & $Z_{vtx} = \pm 15\text{cm}$)

blue: all size, red: size=1



ADC ($85 < \theta < 95$ & $Z_{vtx} = \pm 10\text{cm}$)

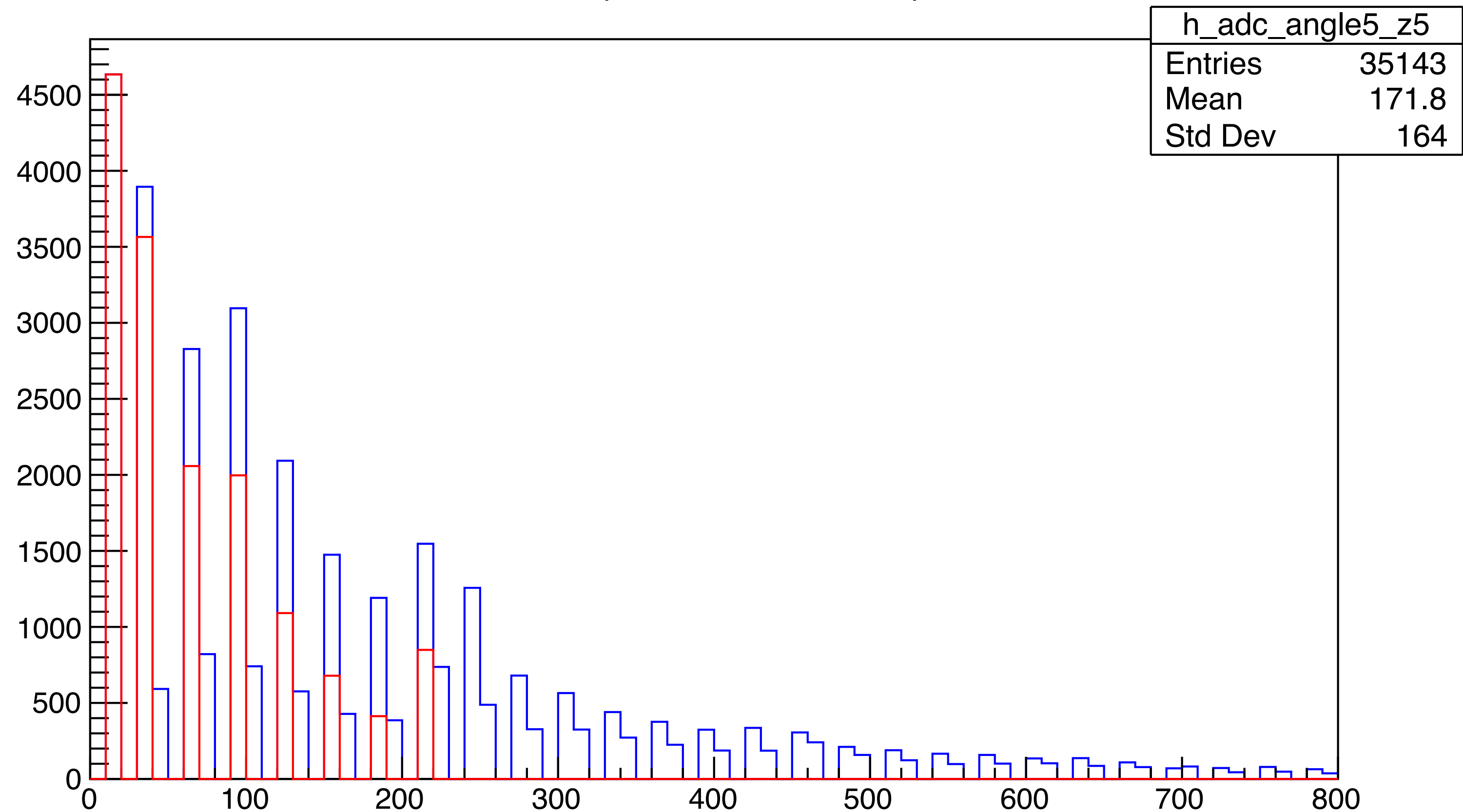
blue: all size, red: size=1



ADC ($85 < \theta < 95$ & $Z_{vtx} = \pm 5\text{cm}$)

blue: all size, red: size=1

ADC(INTT $Z_{vtx} = -5 \sim 5$)



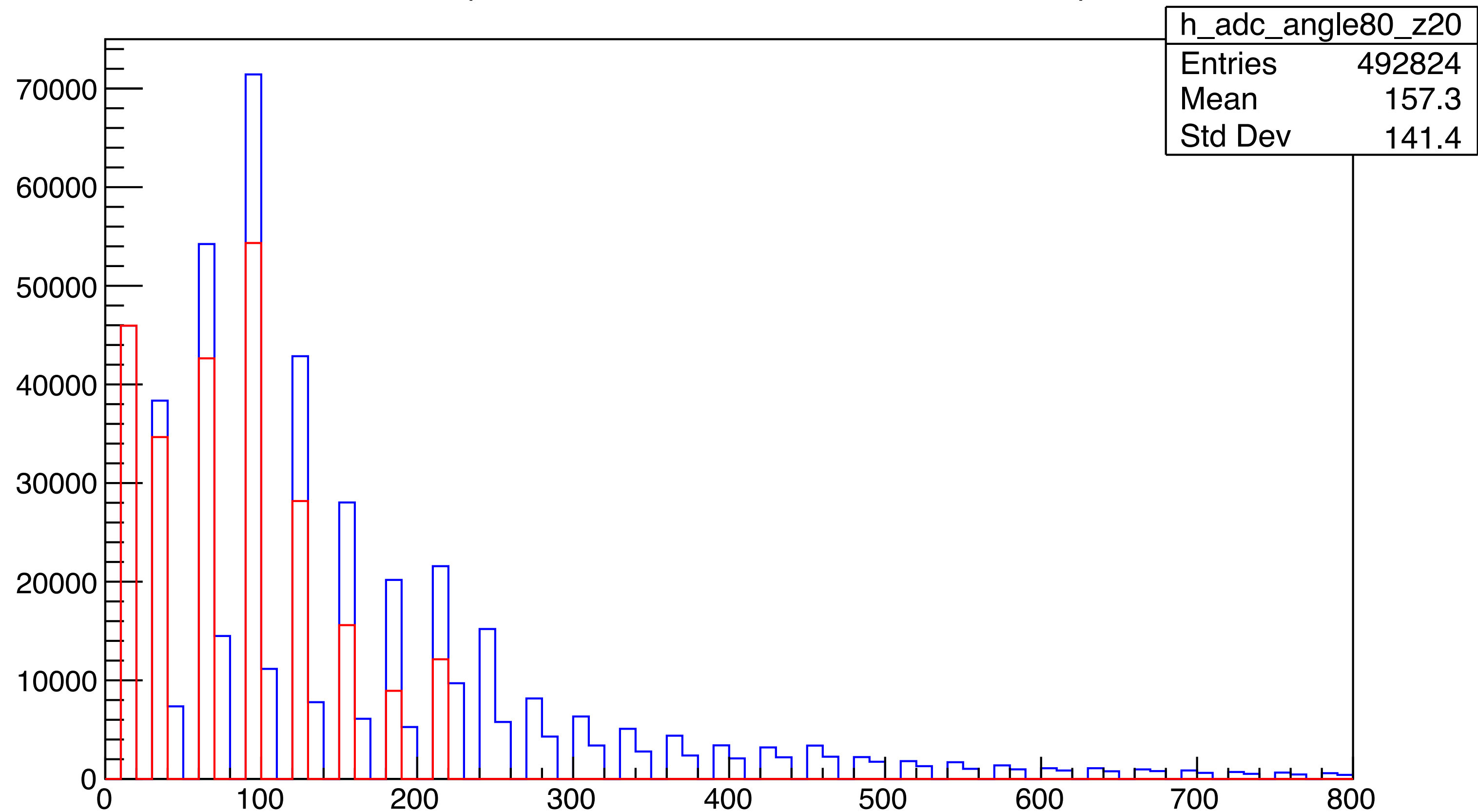
ADC ($75 < \theta < 85$)

blue: all size, red: size=1

ADC ($75 < \theta < 85$ & $Z_{vtx} = \pm 20\text{cm}$)

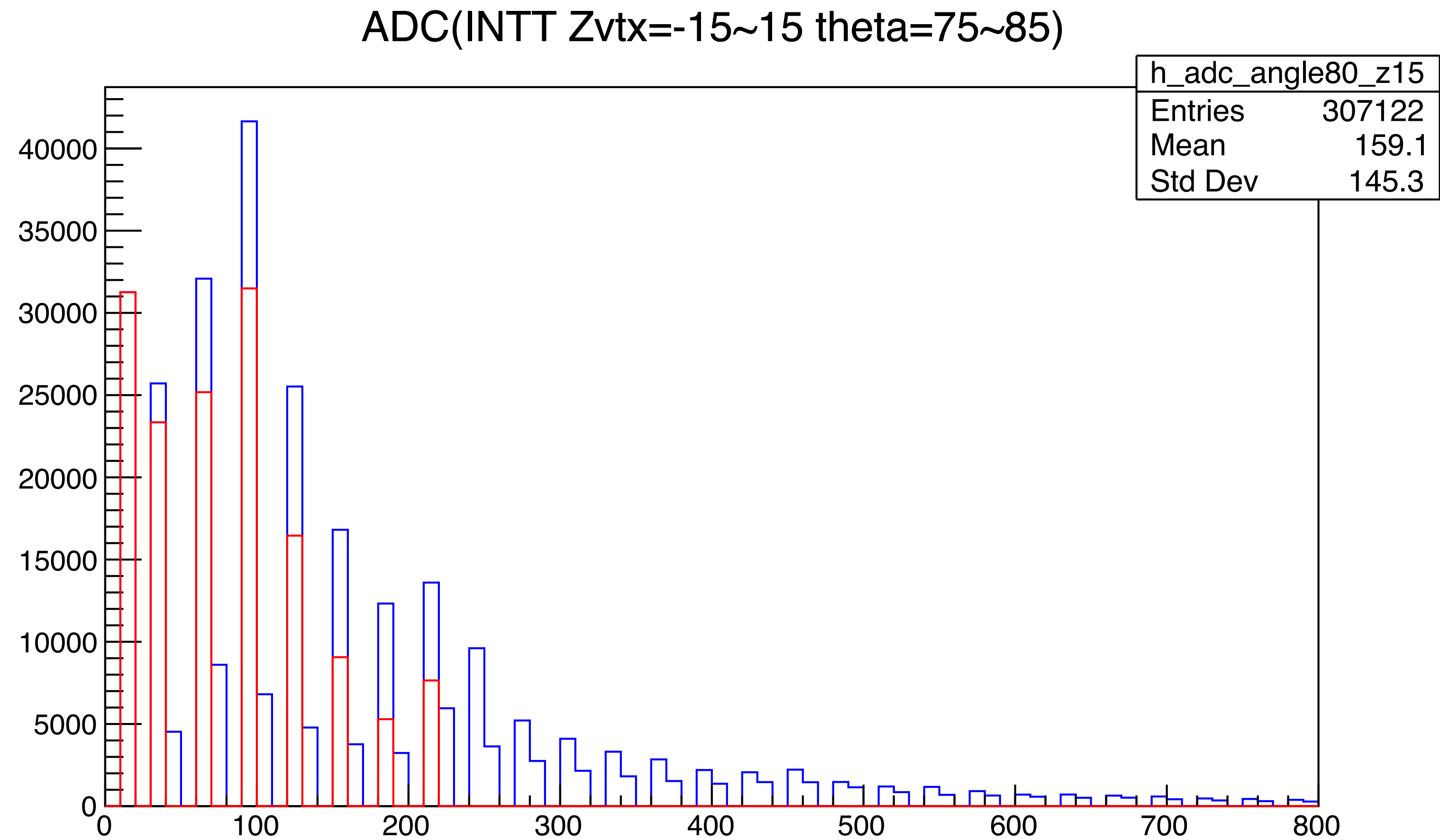
blue: all size, red: size=1

ADC(INTT $Z_{vtx} = -20 \sim 20$ $\theta = 75 \sim 85$)



ADC ($75 < \theta < 85$ & $Z_{vtx} = \pm 15\text{cm}$)

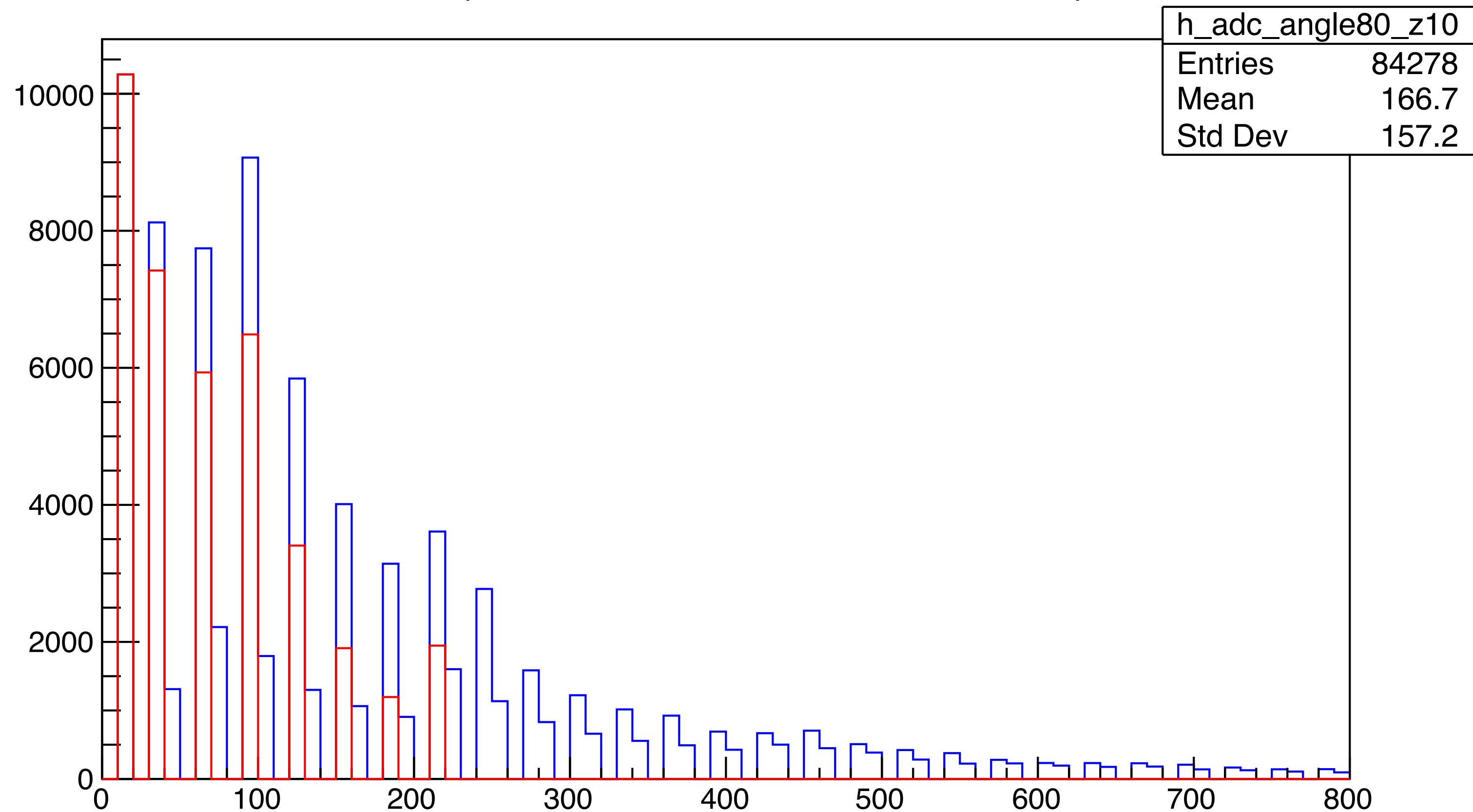
blue: all size, red: size=1



ADC ($75 < \theta < 85$ & $Z_{vtx} = \pm 10\text{cm}$)

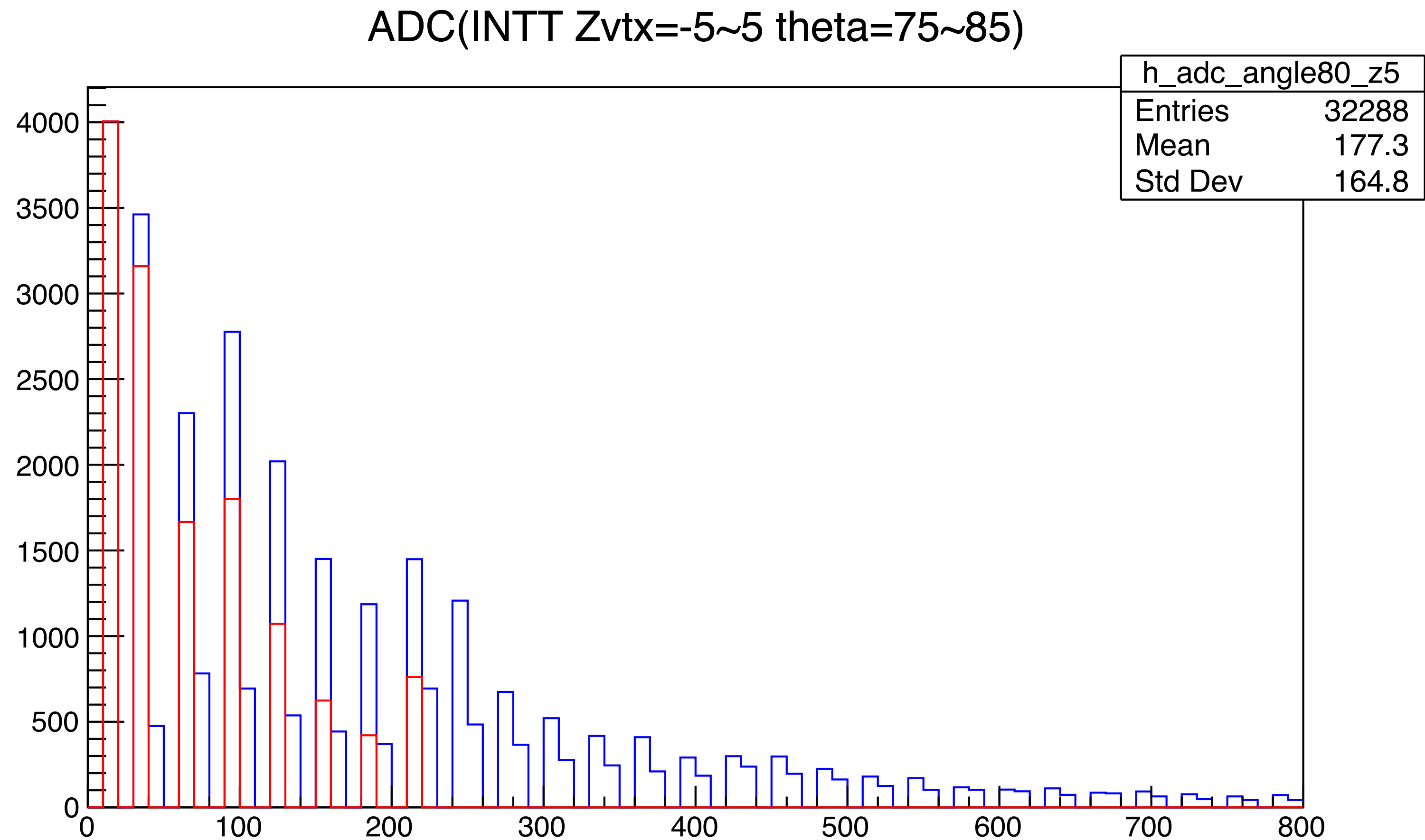
blue: all size, red: size=1

ADC(INTT $Z_{vtx} = -10 \sim 10$ $\theta = 75 \sim 85$)



ADC ($75 < \theta < 85$ & $Z_{vtx} = \pm 5\text{cm}$)

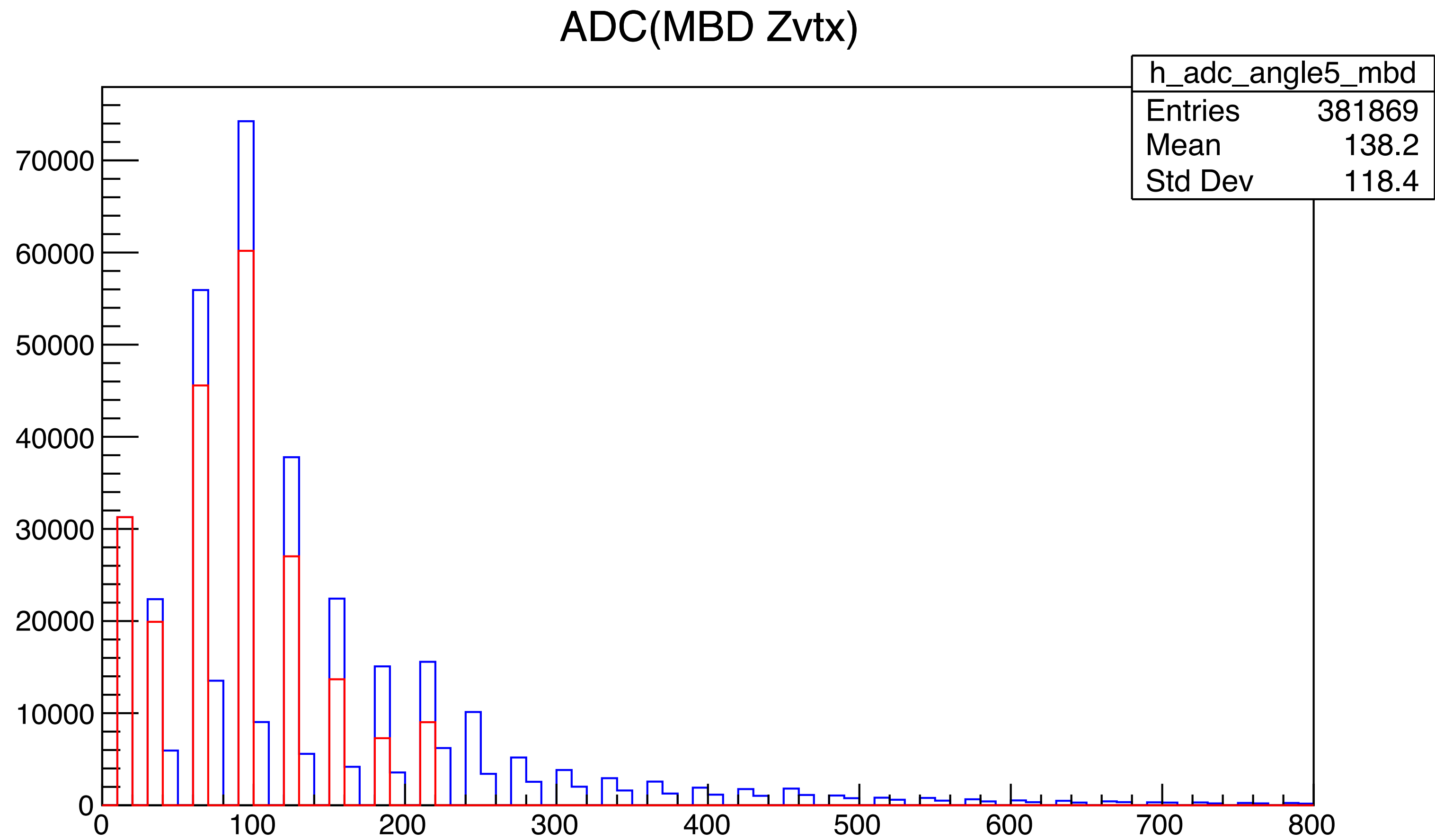
blue: all size, red: size=1



ADC distribution (use MBD Zvxt)

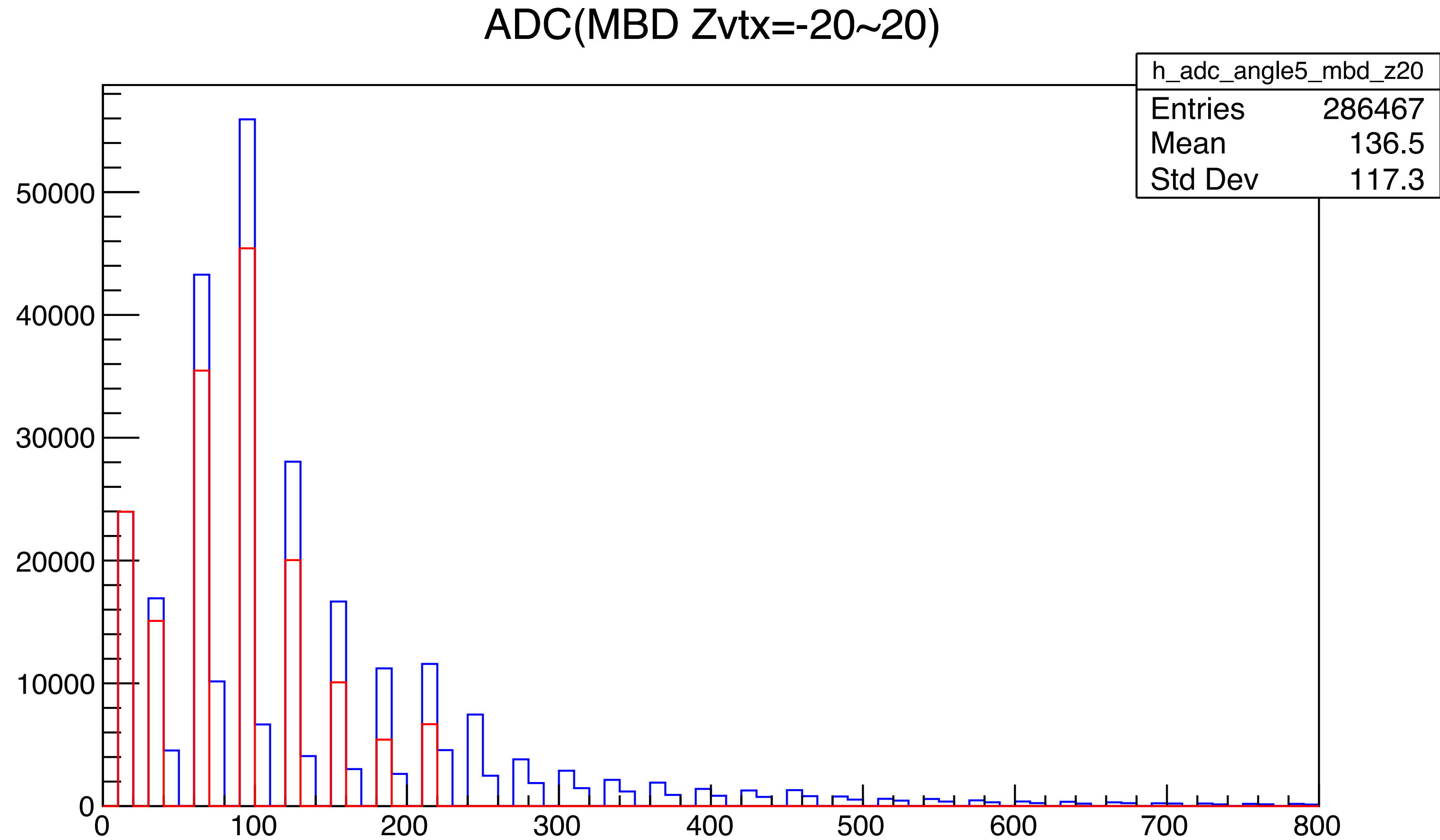
ADC ($85 < \theta < 95$)

blue: all size, red: size=1



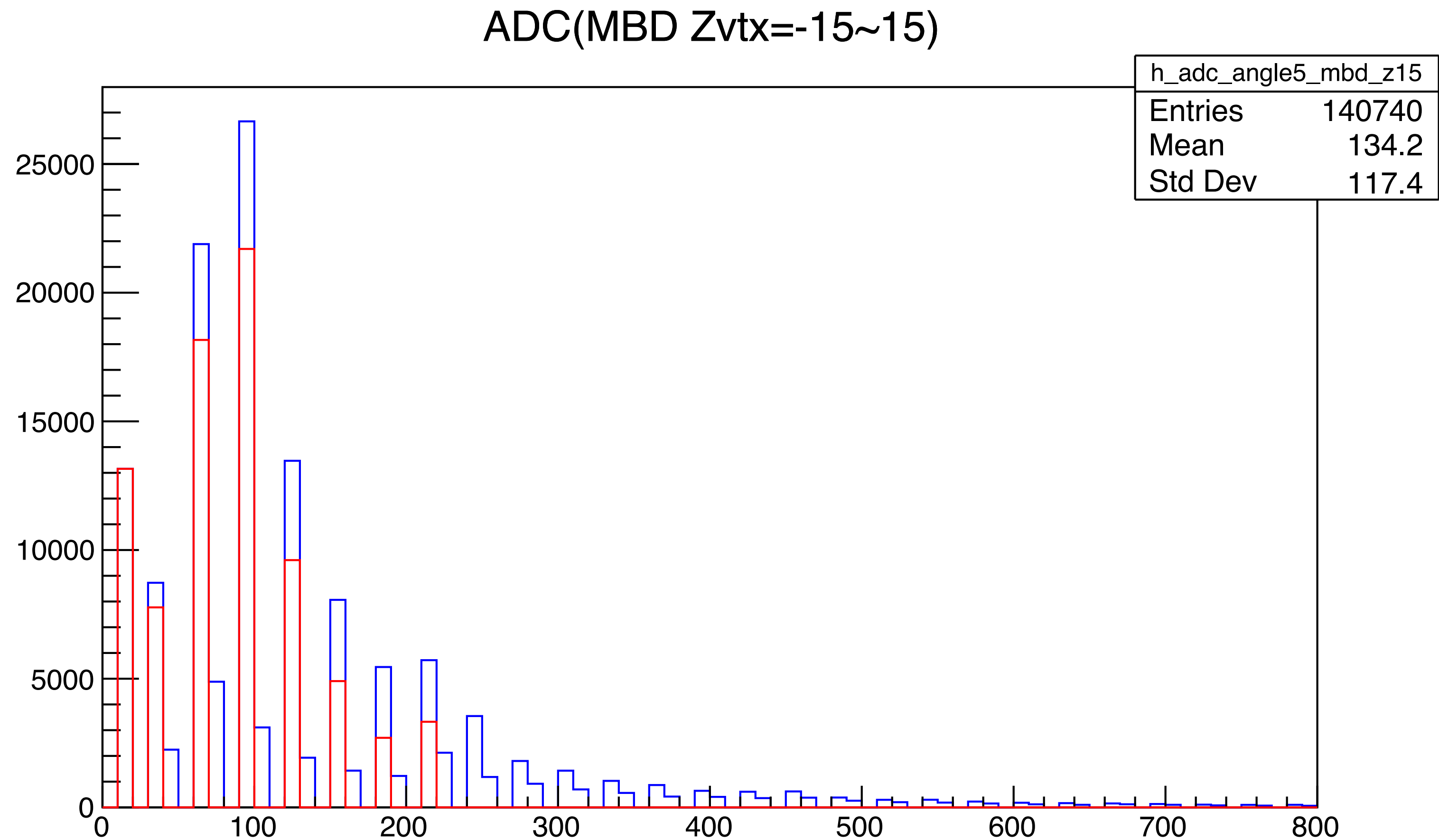
ADC ($85 < \theta < 95$ & $Z_{vtx} = \pm 20\text{cm}$)

blue: all size, red: size=1



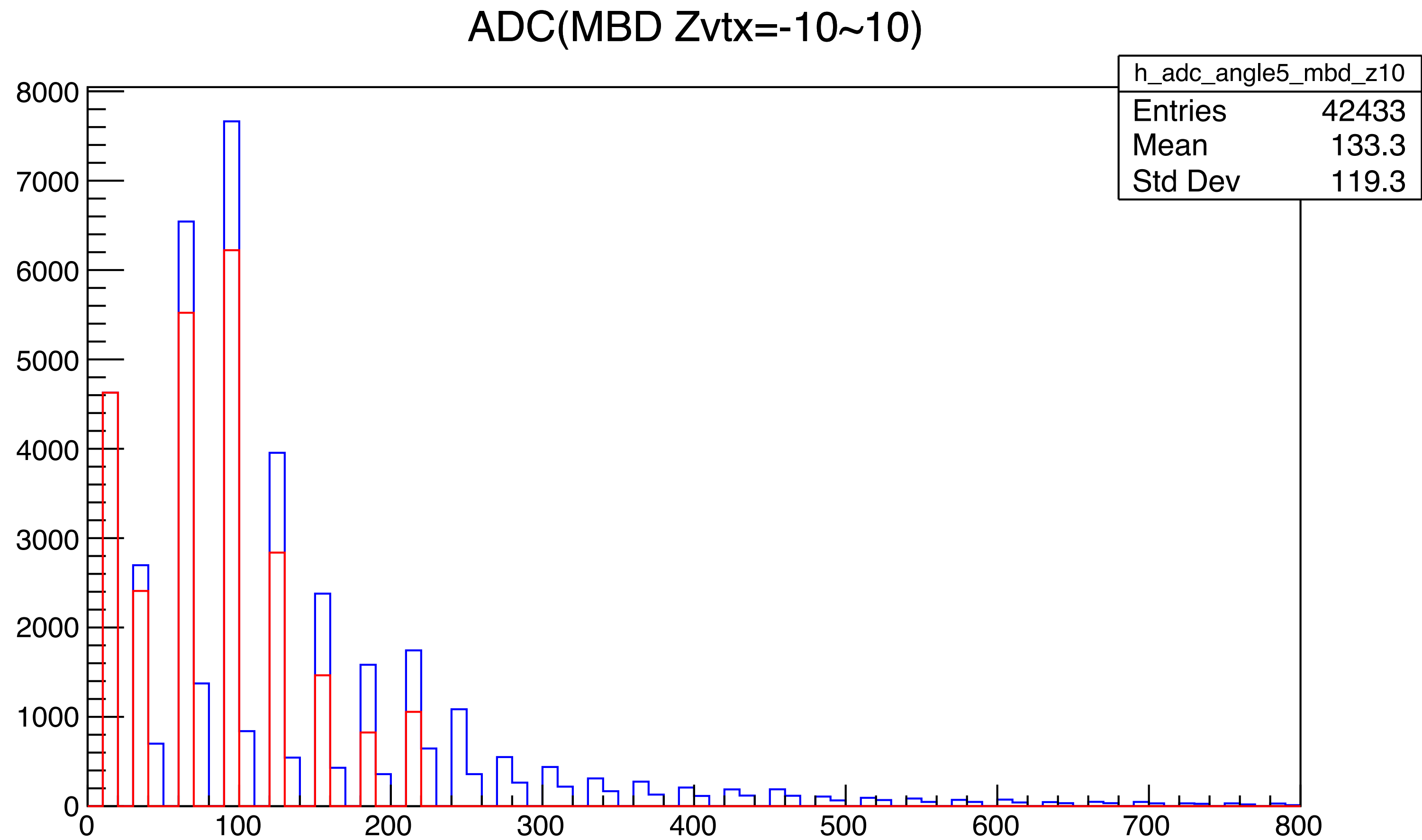
ADC ($85 < \theta < 95$ & $Z_{vtx} = \pm 15\text{cm}$)

blue: all size, red: size=1



ADC ($85 < \theta < 95$ & $Z_{vtx} = \pm 10\text{cm}$)

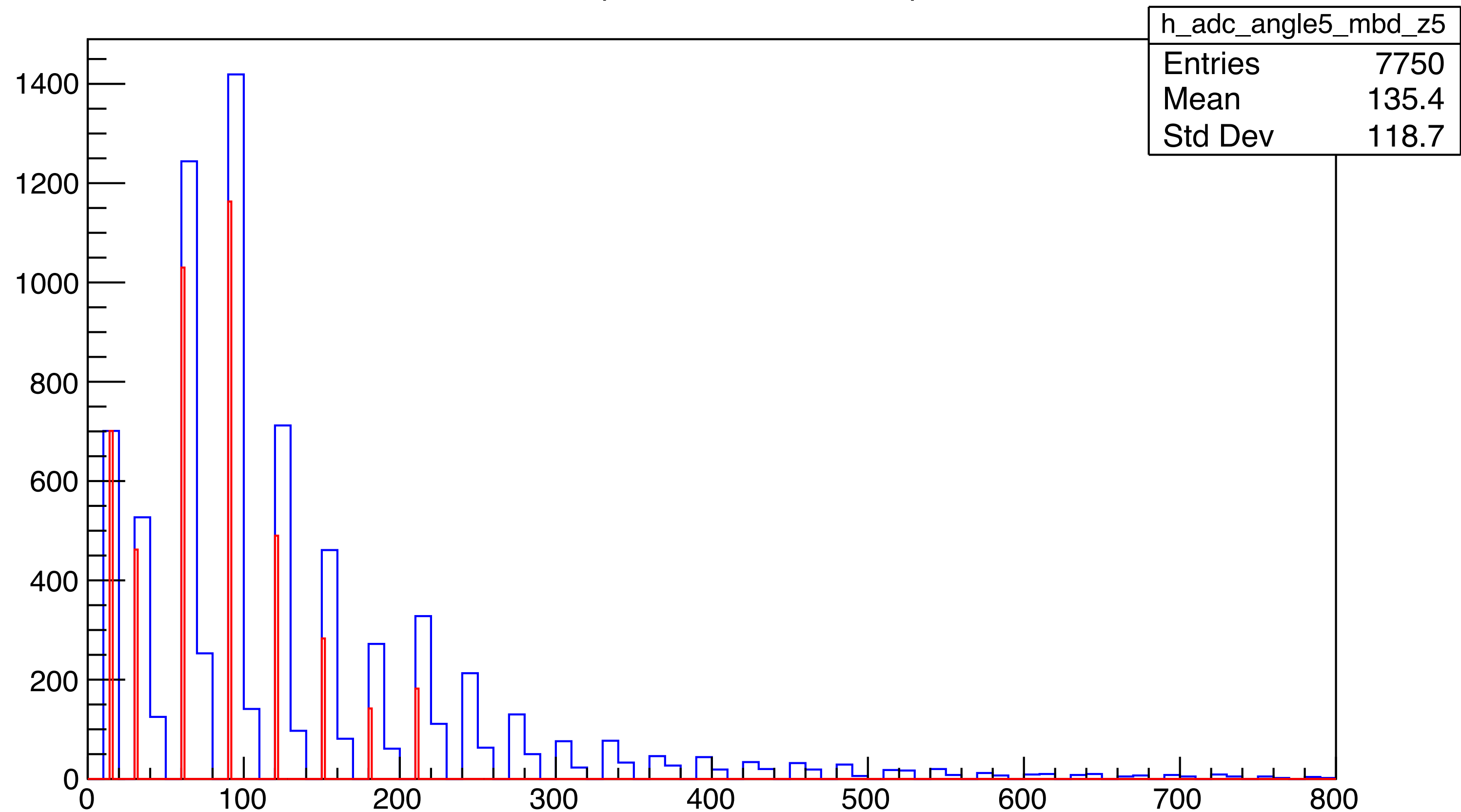
blue: all size, red: size=1



ADC ($85 < \theta < 95$ & $Z_{vtx} = \pm 5\text{cm}$)

blue: all size, red: size=1

ADC(MBD $Z_{vtx} = -5 \sim 5$)

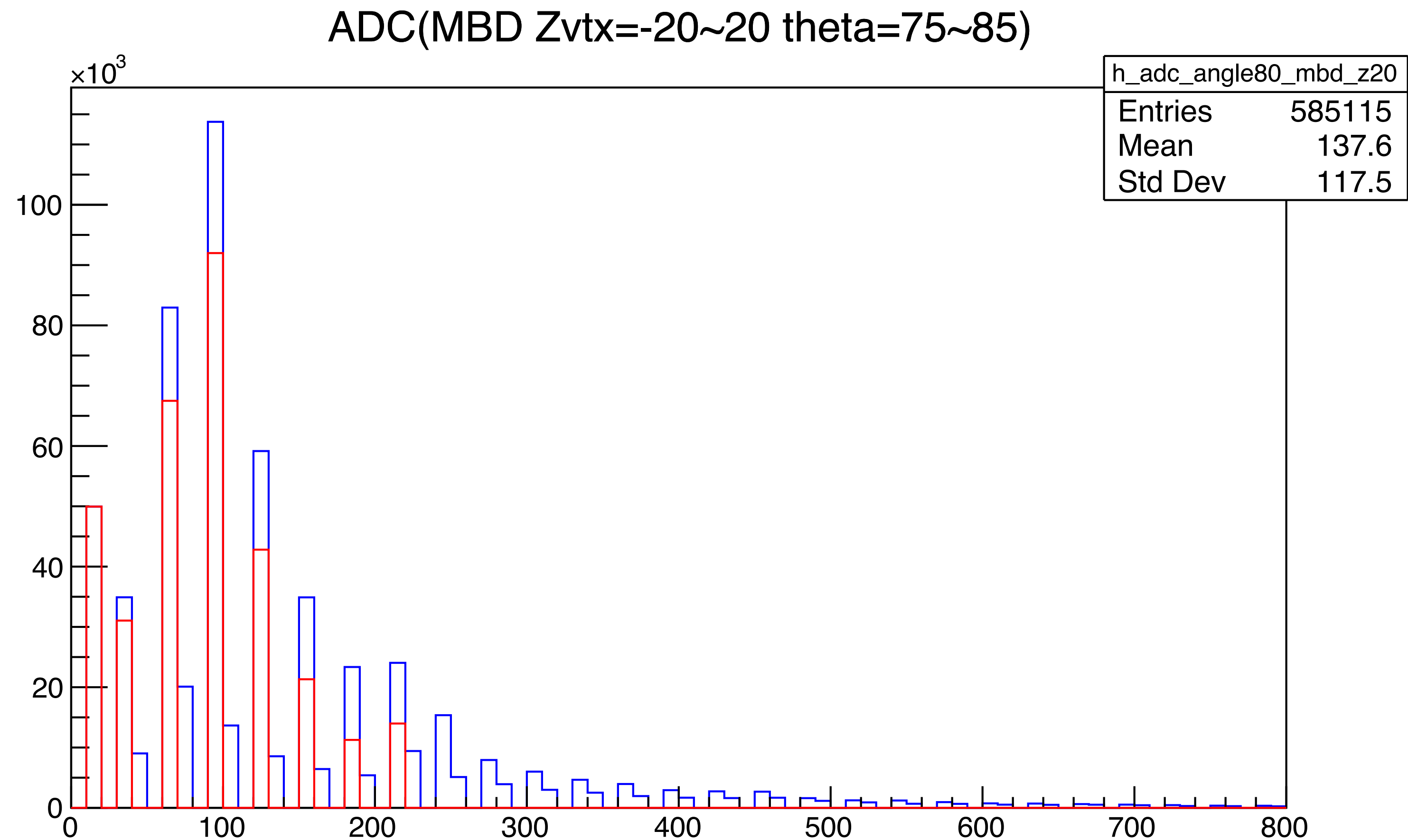


ADC ($75 < \theta < 85$)

blue: all size, red: size=1

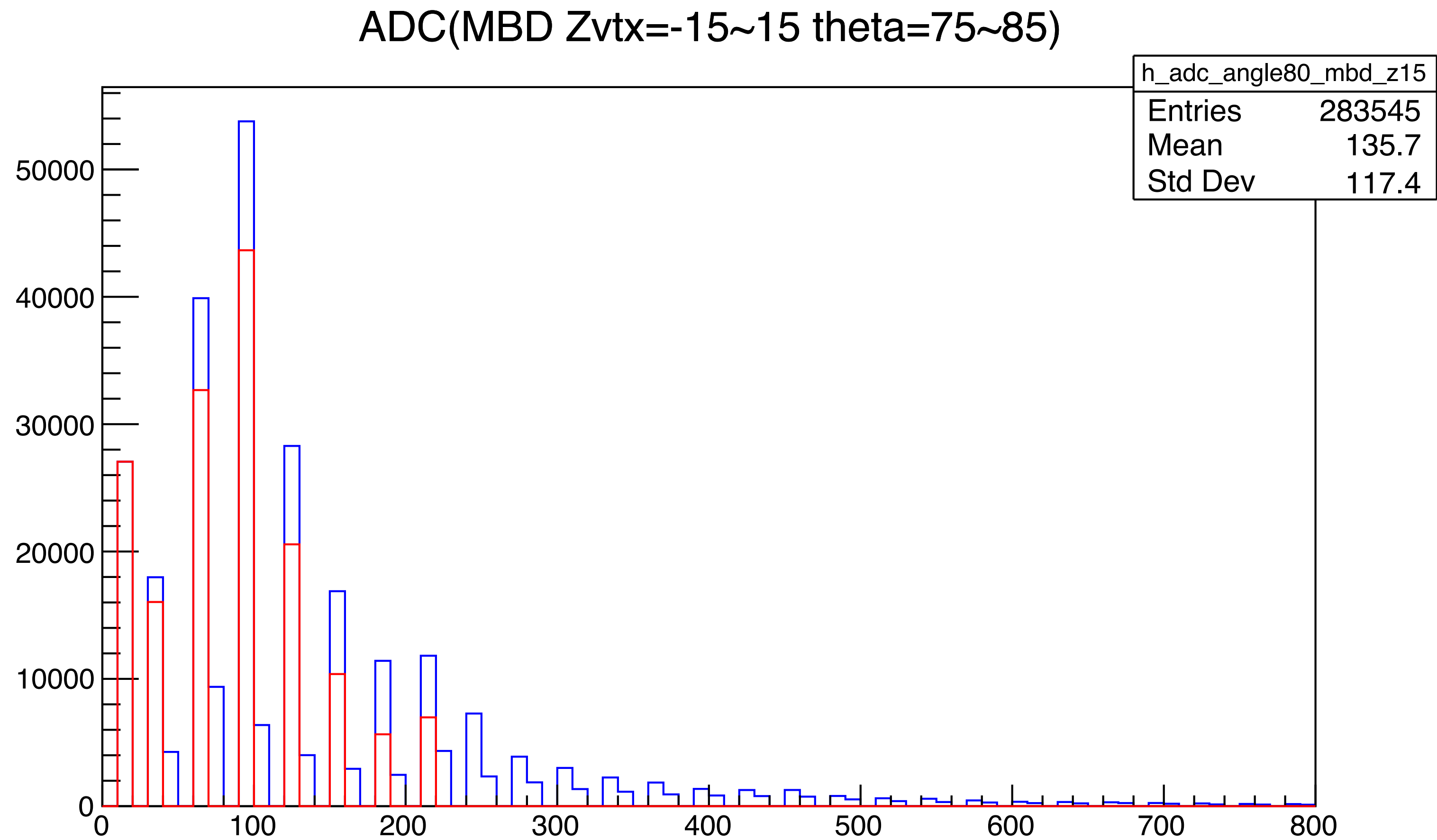
ADC ($75 < \theta < 85$ & $Z_{vtx} = \pm 20\text{cm}$)

blue: all size, red: size=1



ADC ($75 < \theta < 85$ & $Z_{vtx} = \pm 15\text{cm}$)

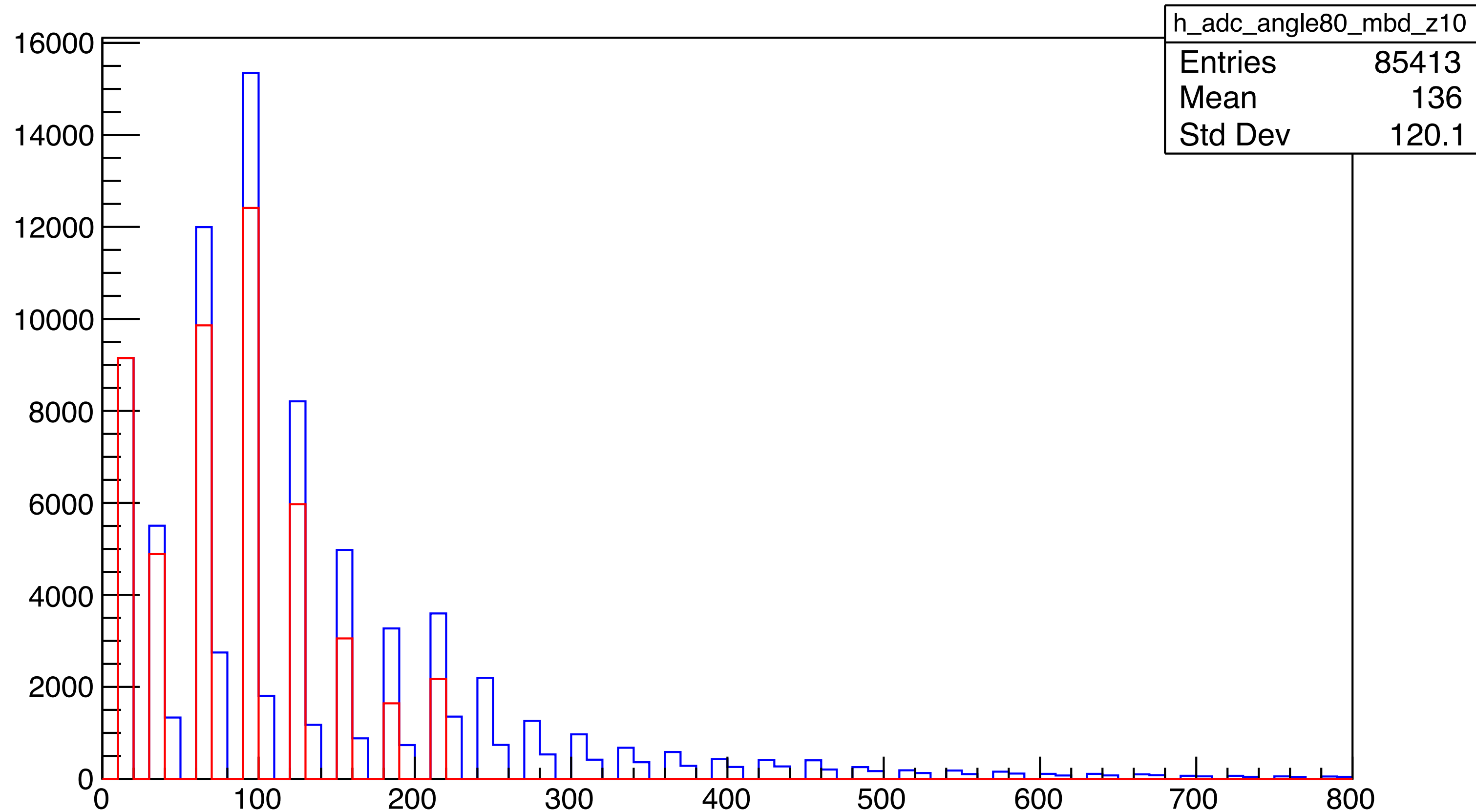
blue: all size, red: size=1



ADC ($75 < \theta < 85$ & $Z_{vtx} = \pm 10\text{cm}$)

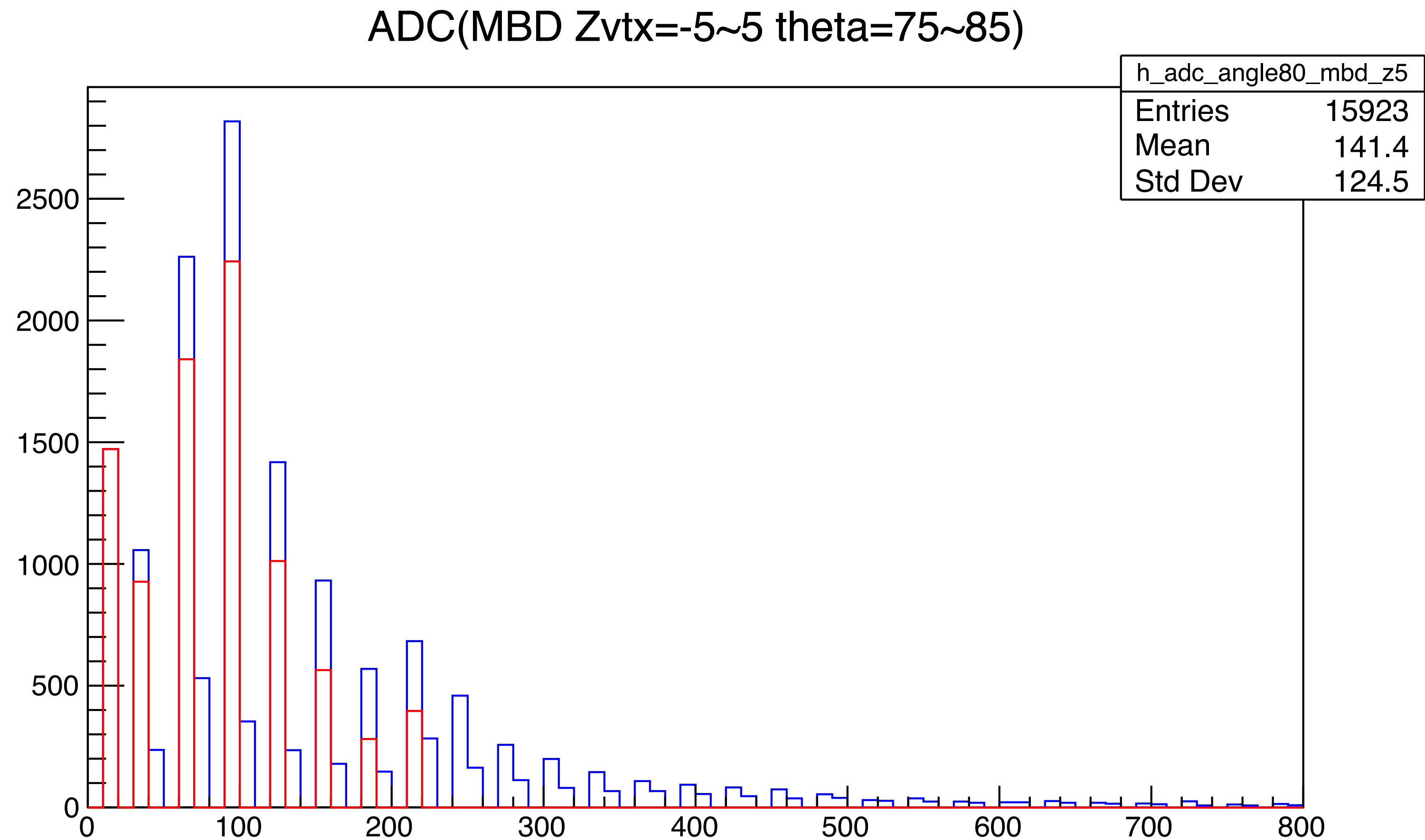
blue: all size, red: size=1

ADC(MBD $Z_{vtx} = -10 \sim 10$ $\theta = 75 \sim 85$)



ADC ($75 < \theta < 85$ & $Z_{vtx} = \pm 5\text{cm}$)

blue: all size, red: size=1

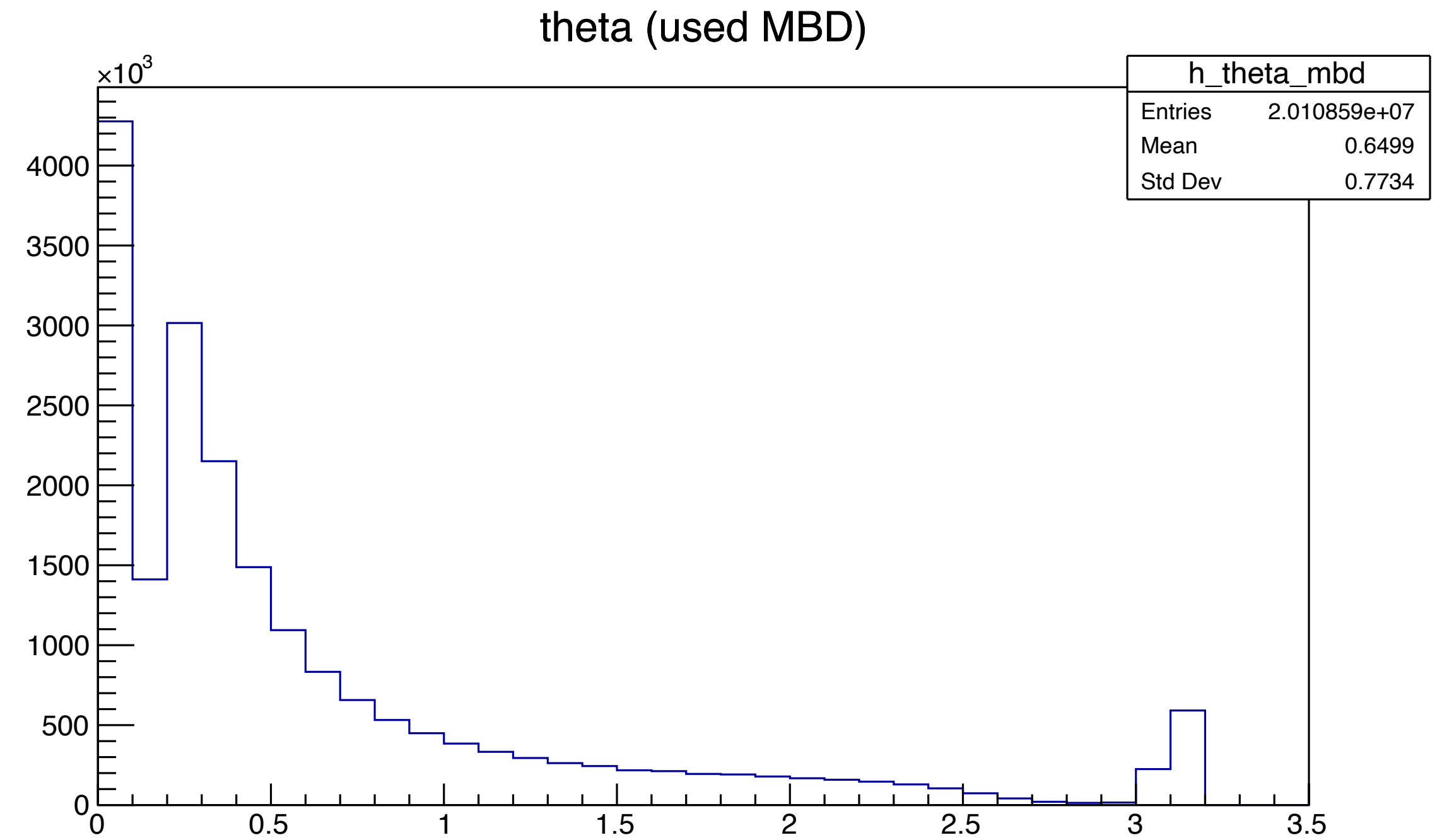
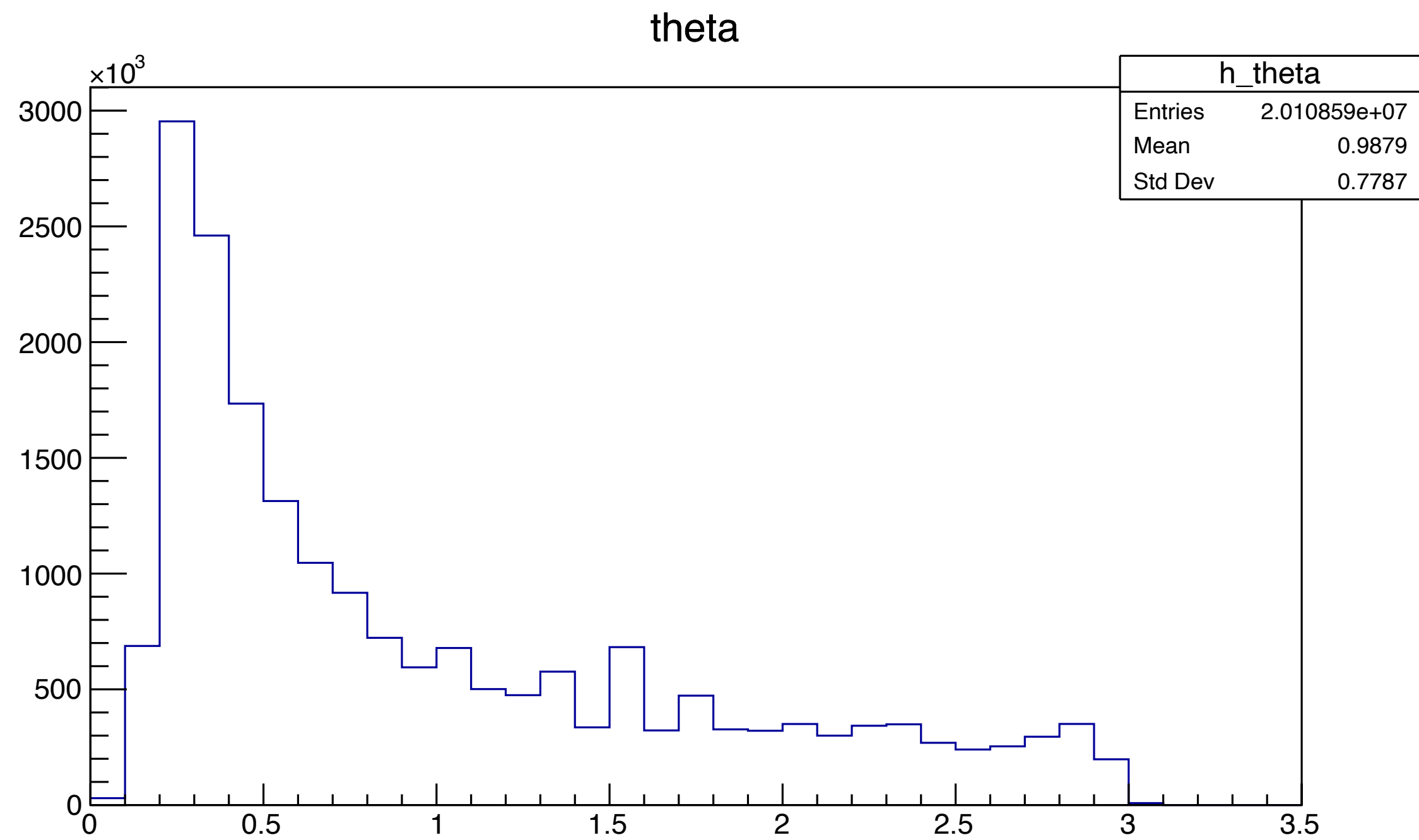


others

theta

left: use INTT Zvtx

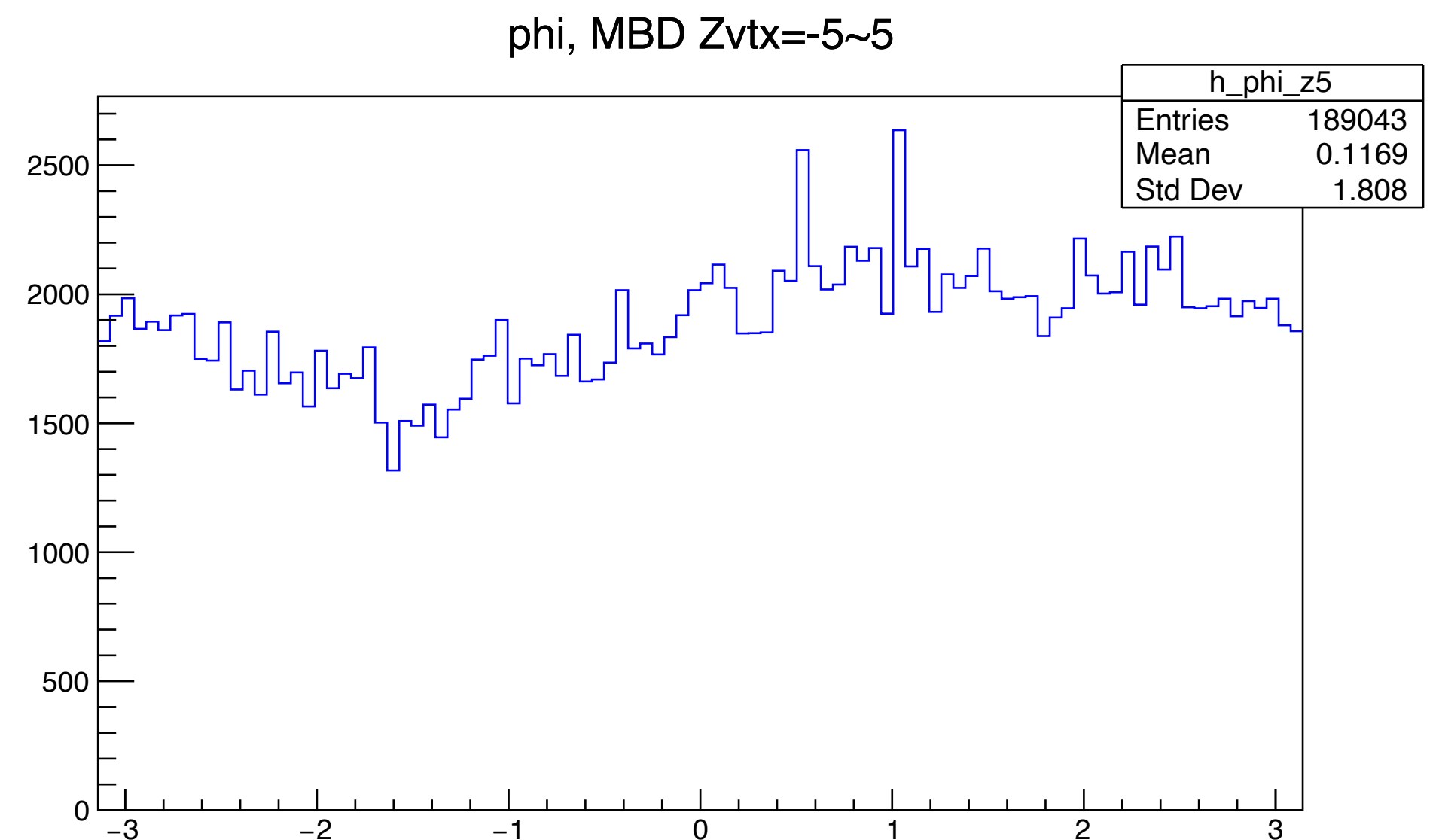
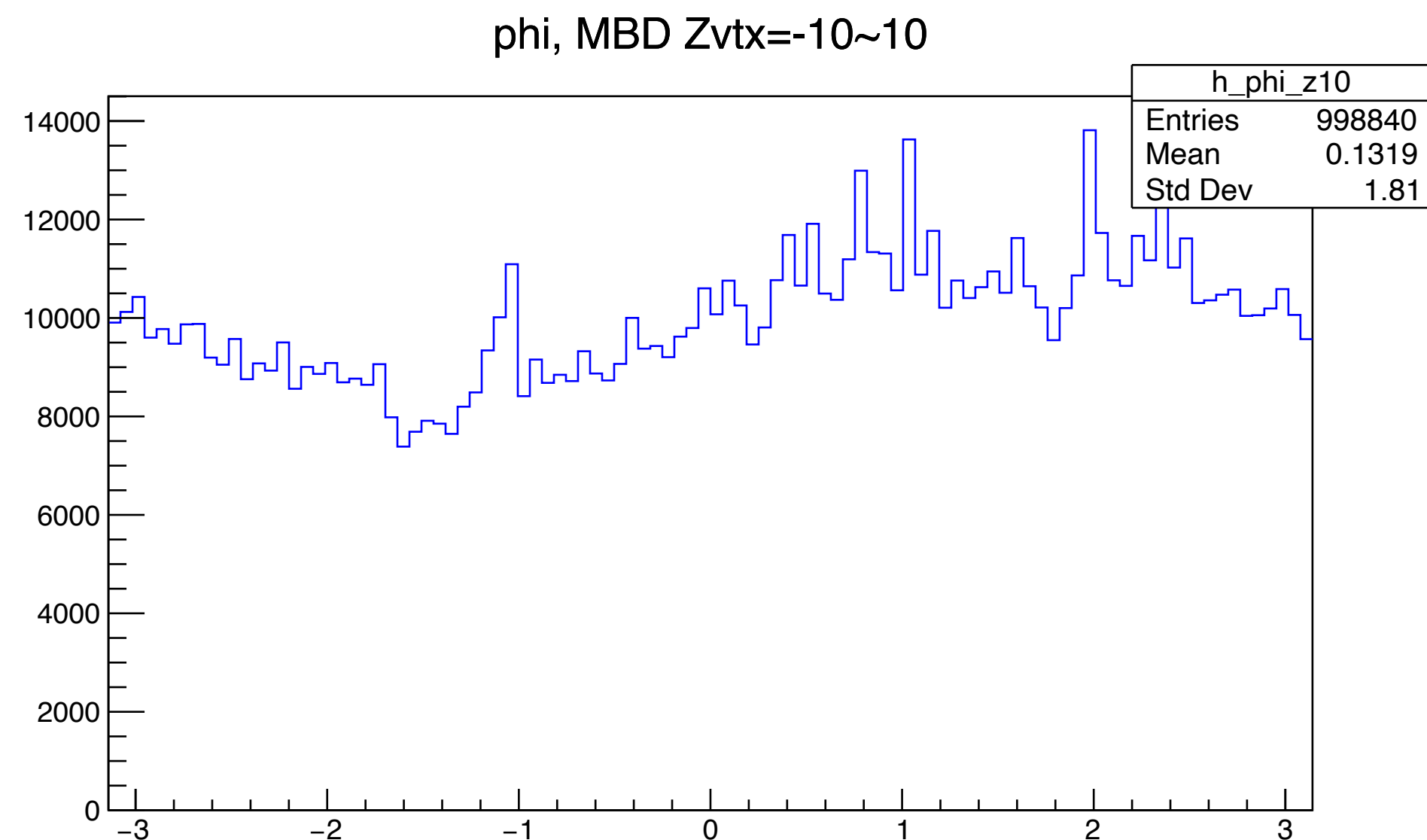
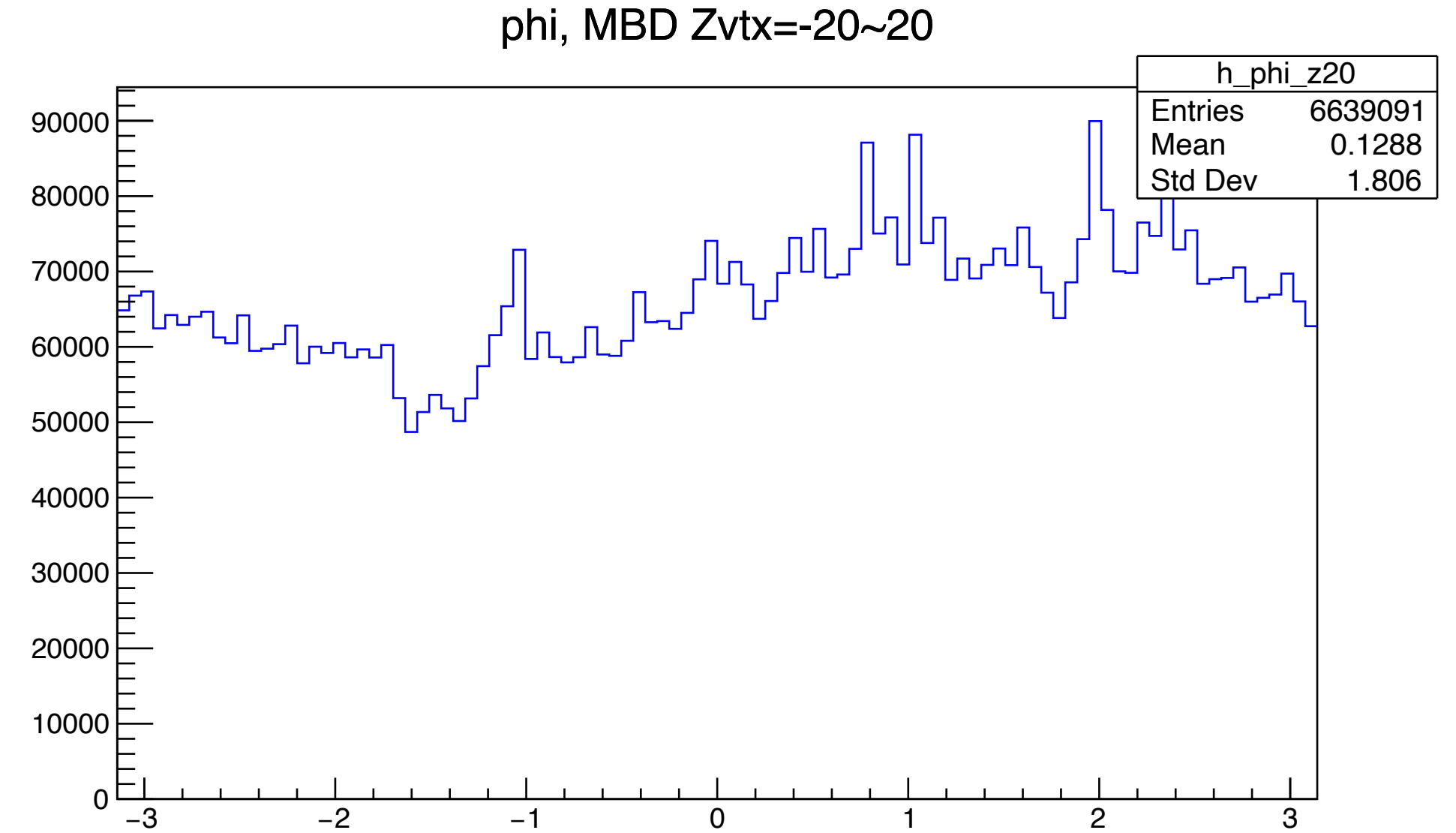
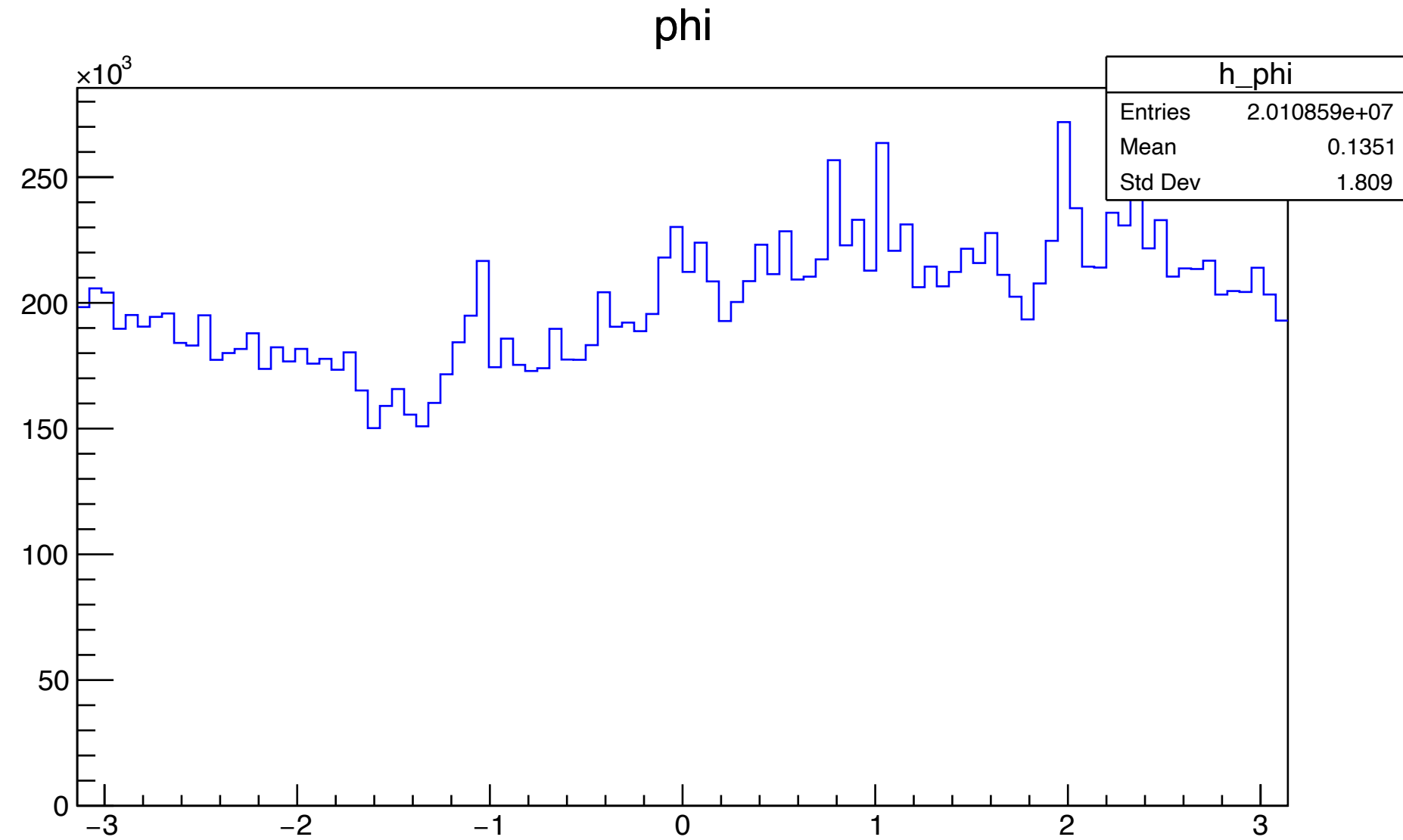
right: use MBD Zvtx



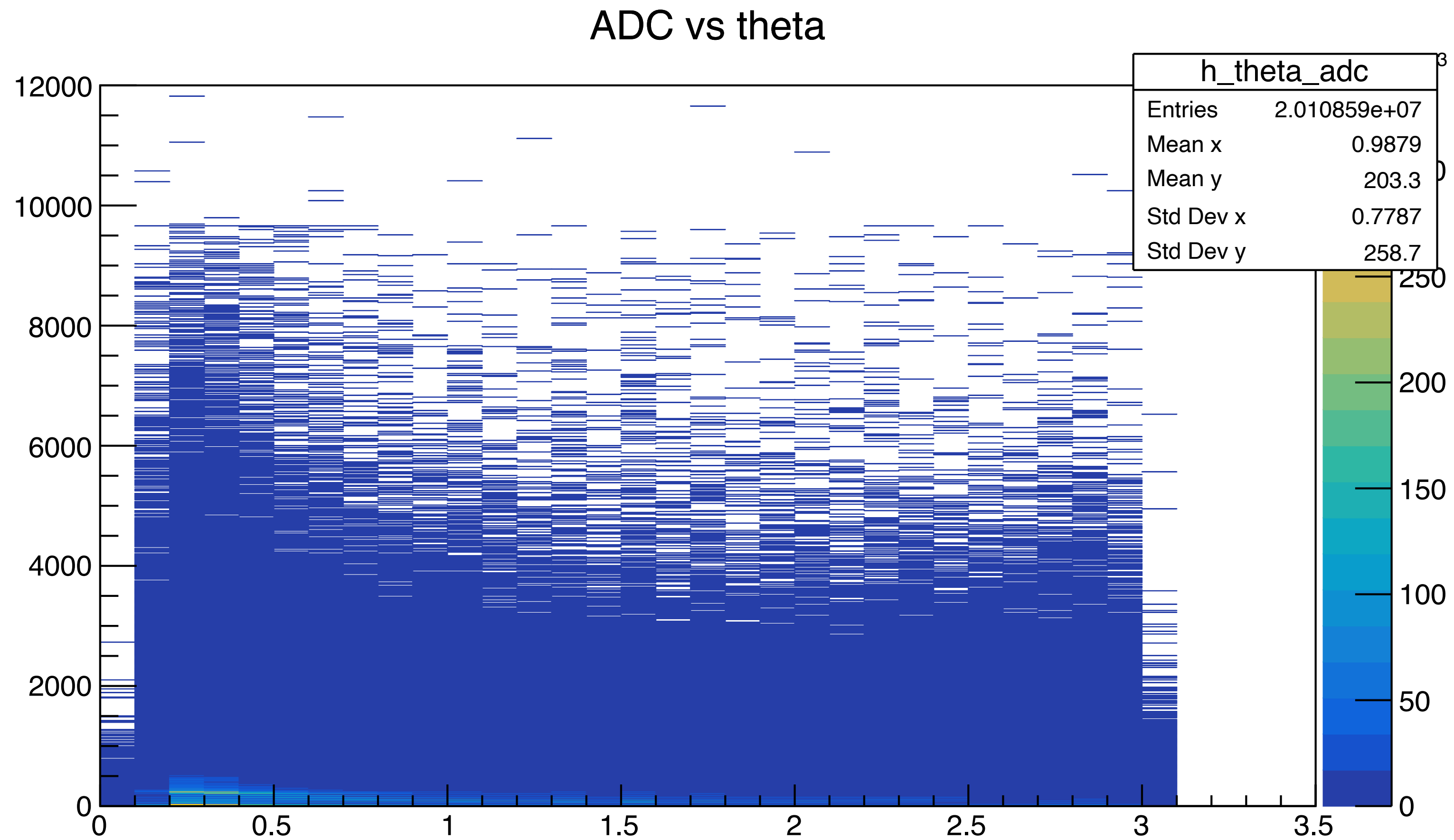
phi

left top: no cut, right top: $Z_{vtx}=\pm 20\text{cm}$,

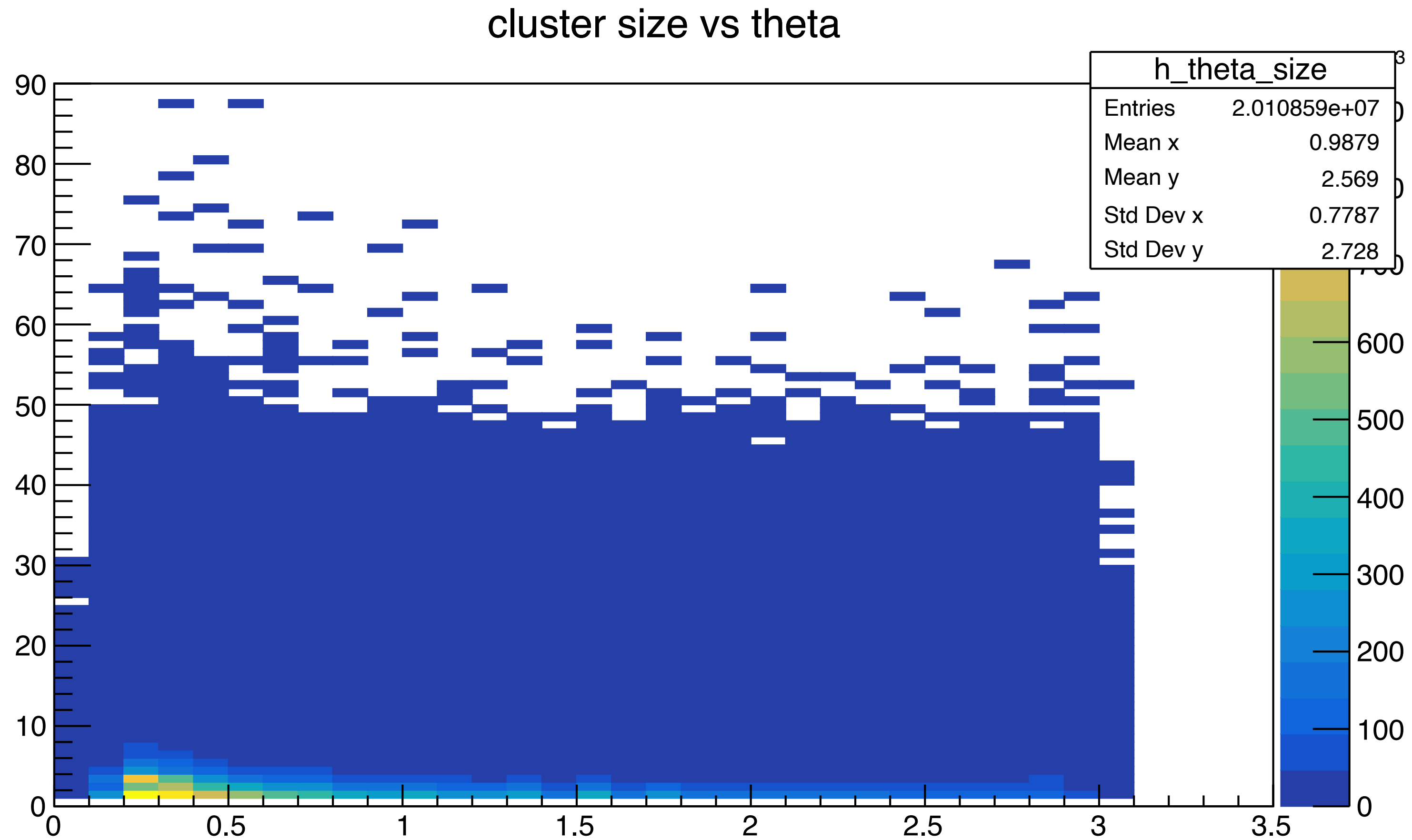
left bottom: $Z_{vtx}=\pm 10\text{cm}$, right bottom: $Z_{vtx}=\pm 5\text{cm}$



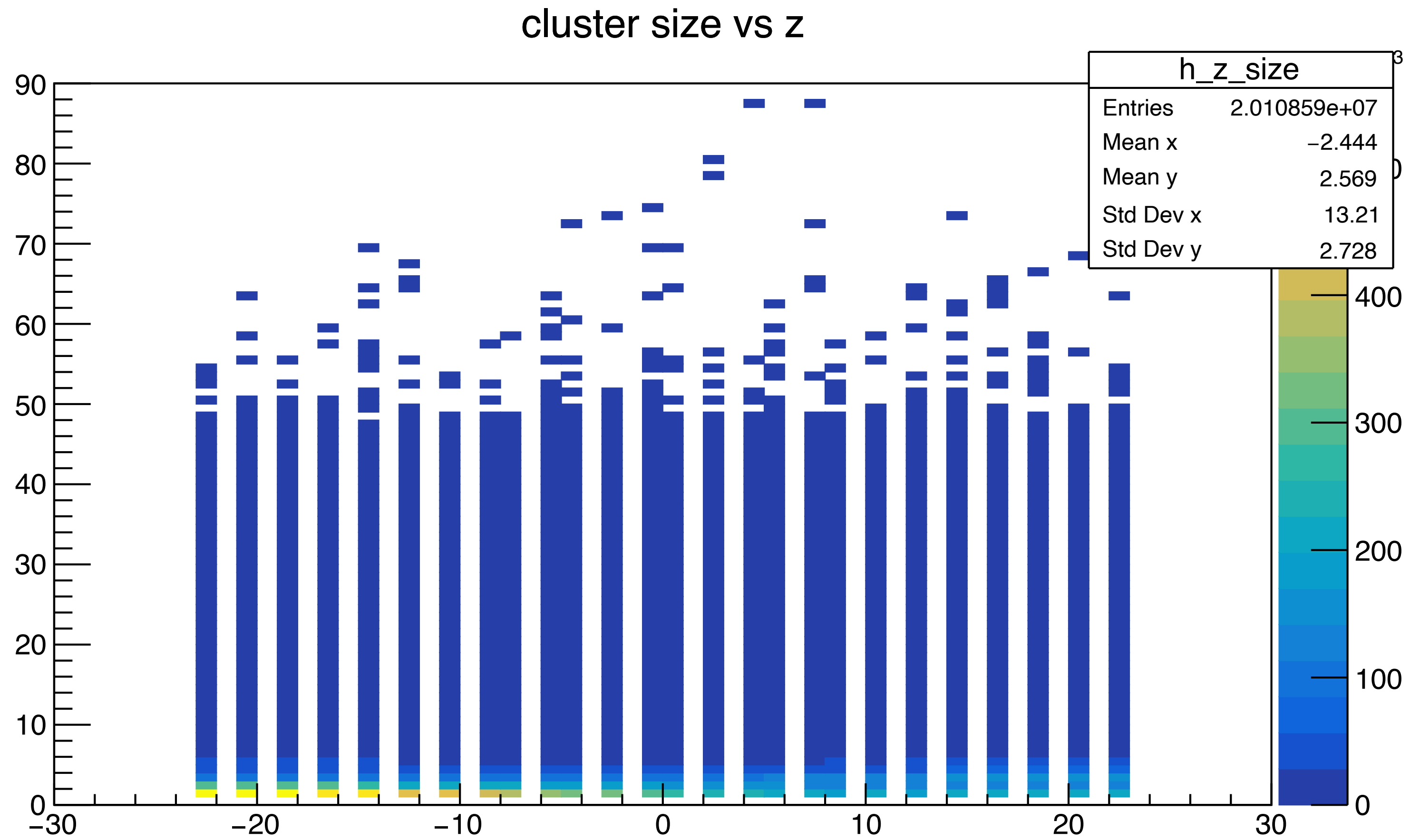
ADC vs theta (Zvtx: INTT)



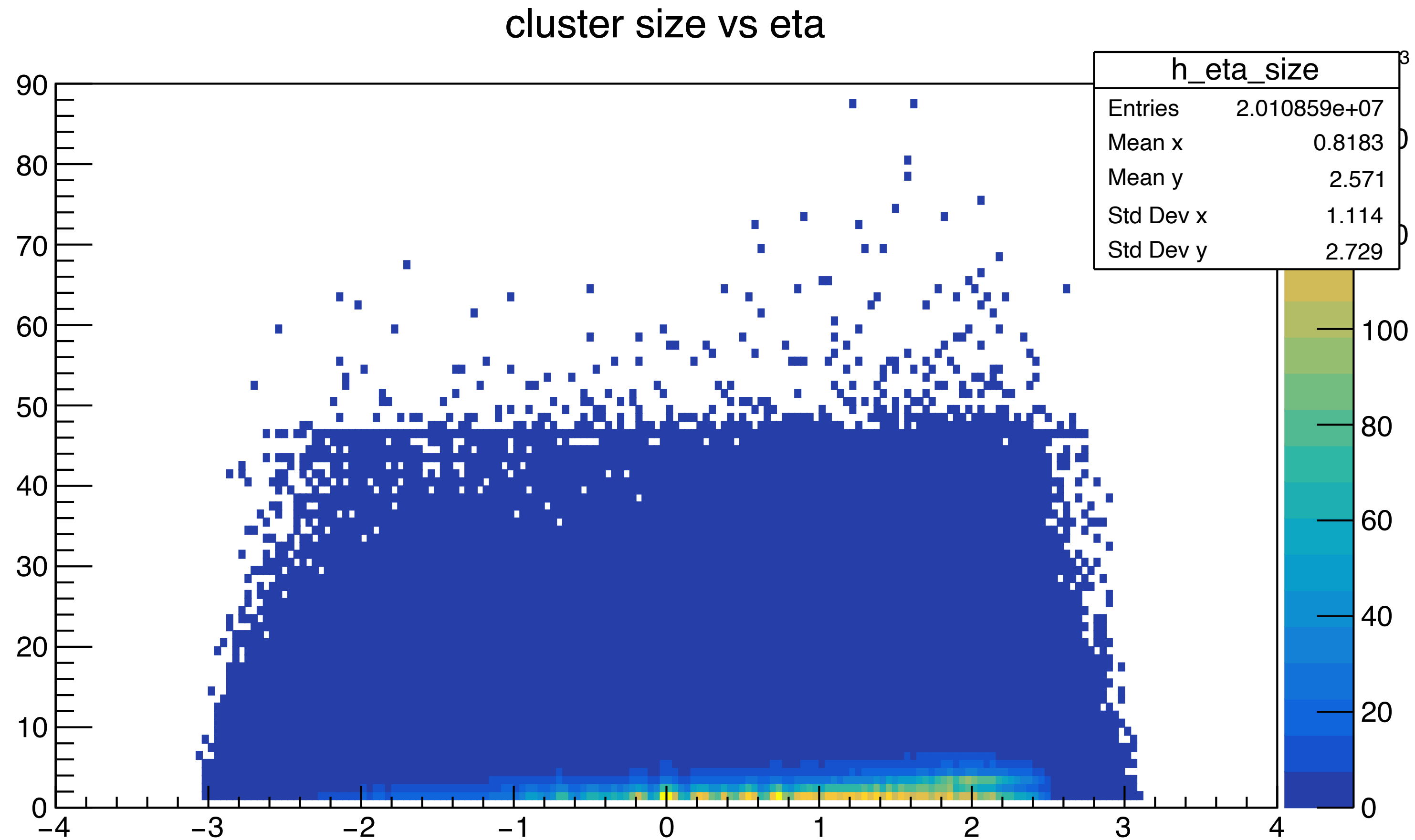
cluster size vs theta (Zvtx: INTT)



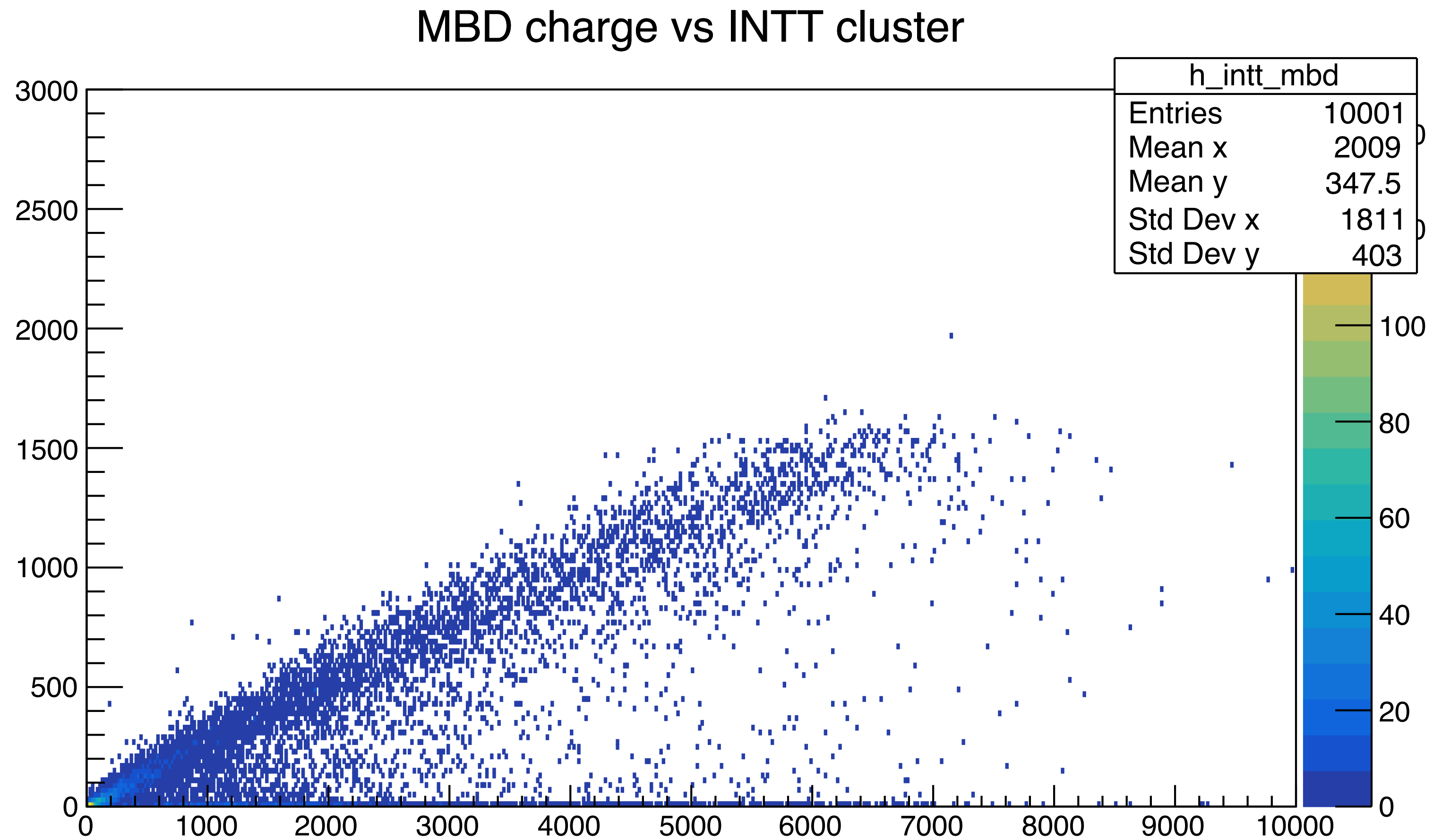
cluster size vs z



cluster size vs eta (Zvtx: INTT)

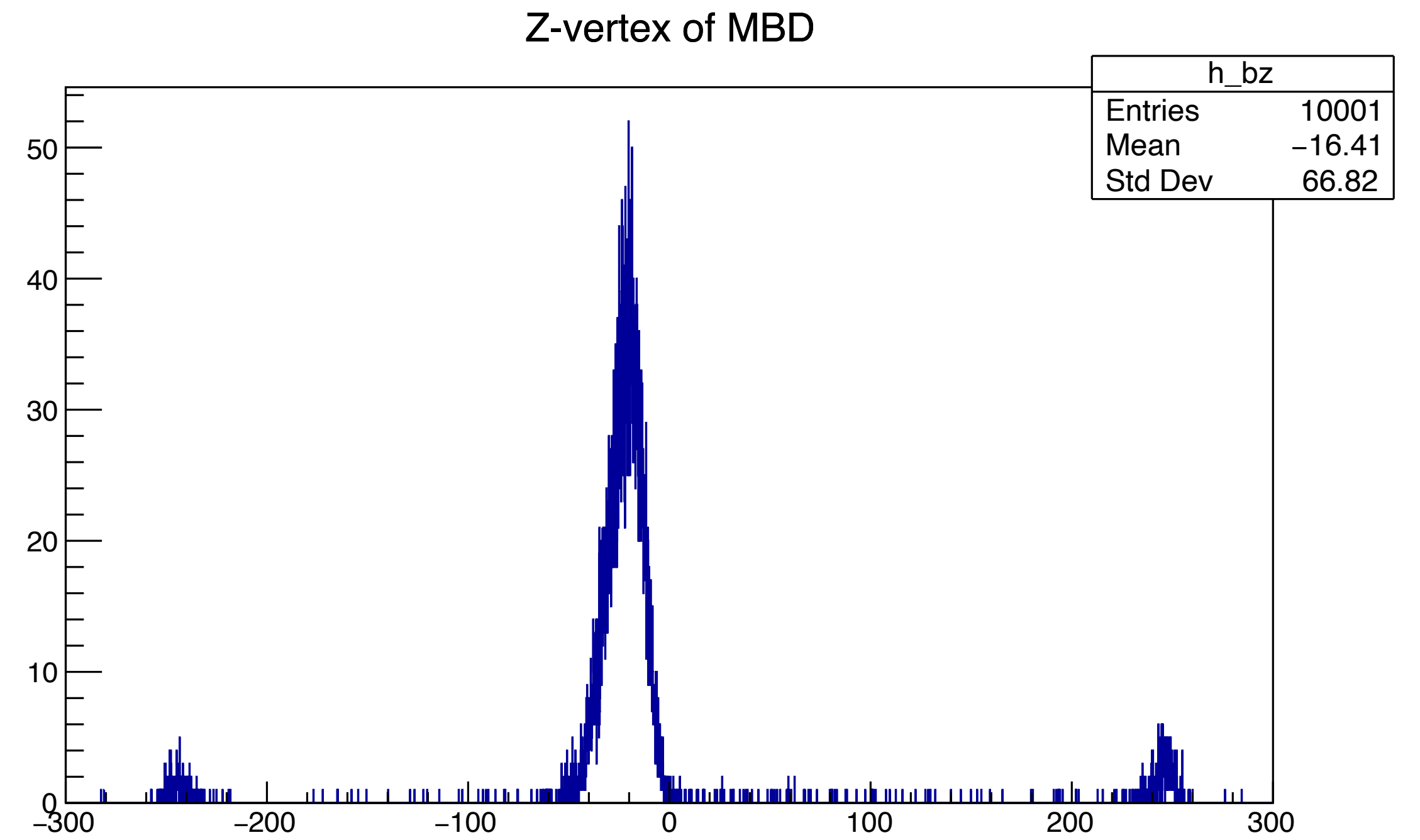
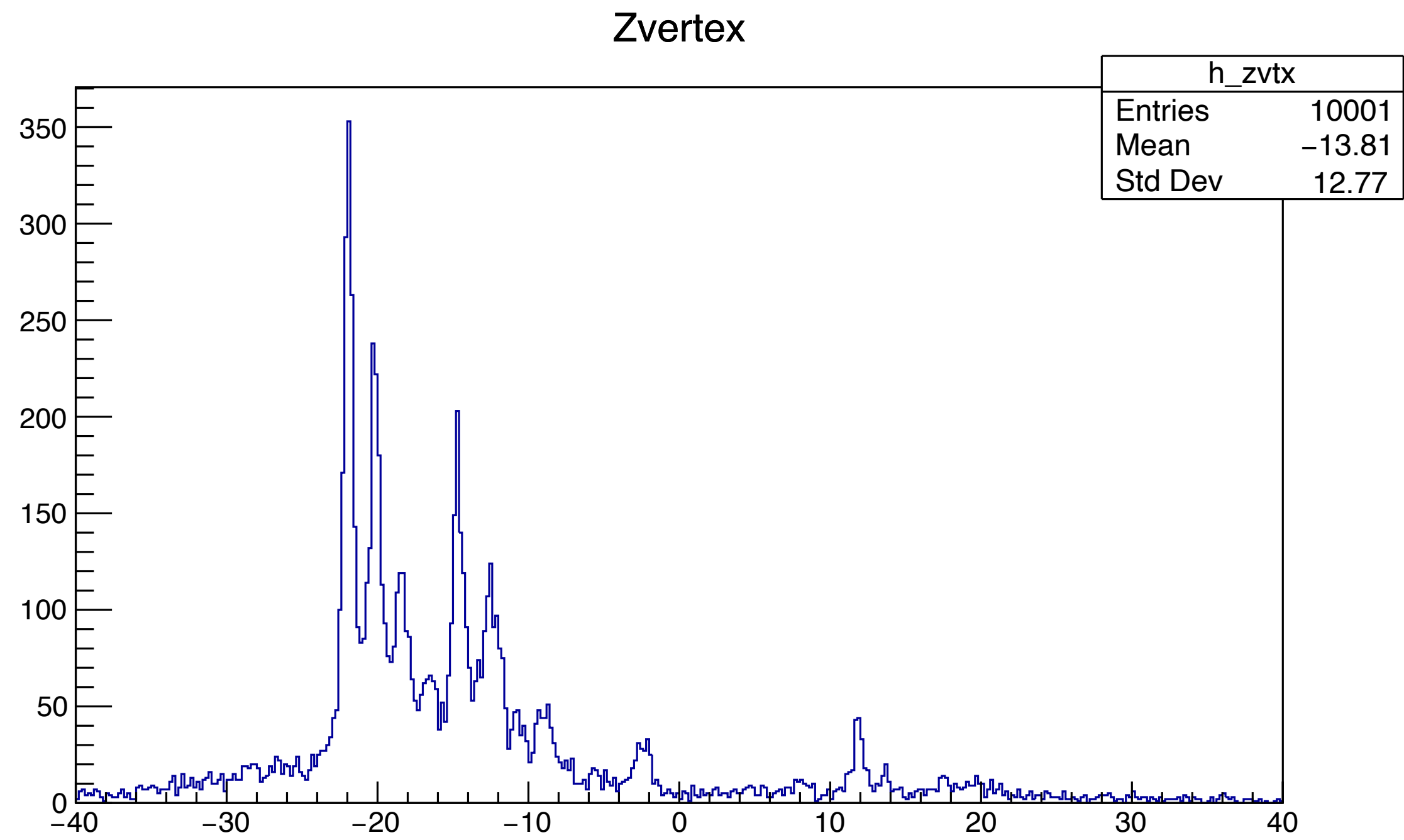


MBD charge vs INTT cluster

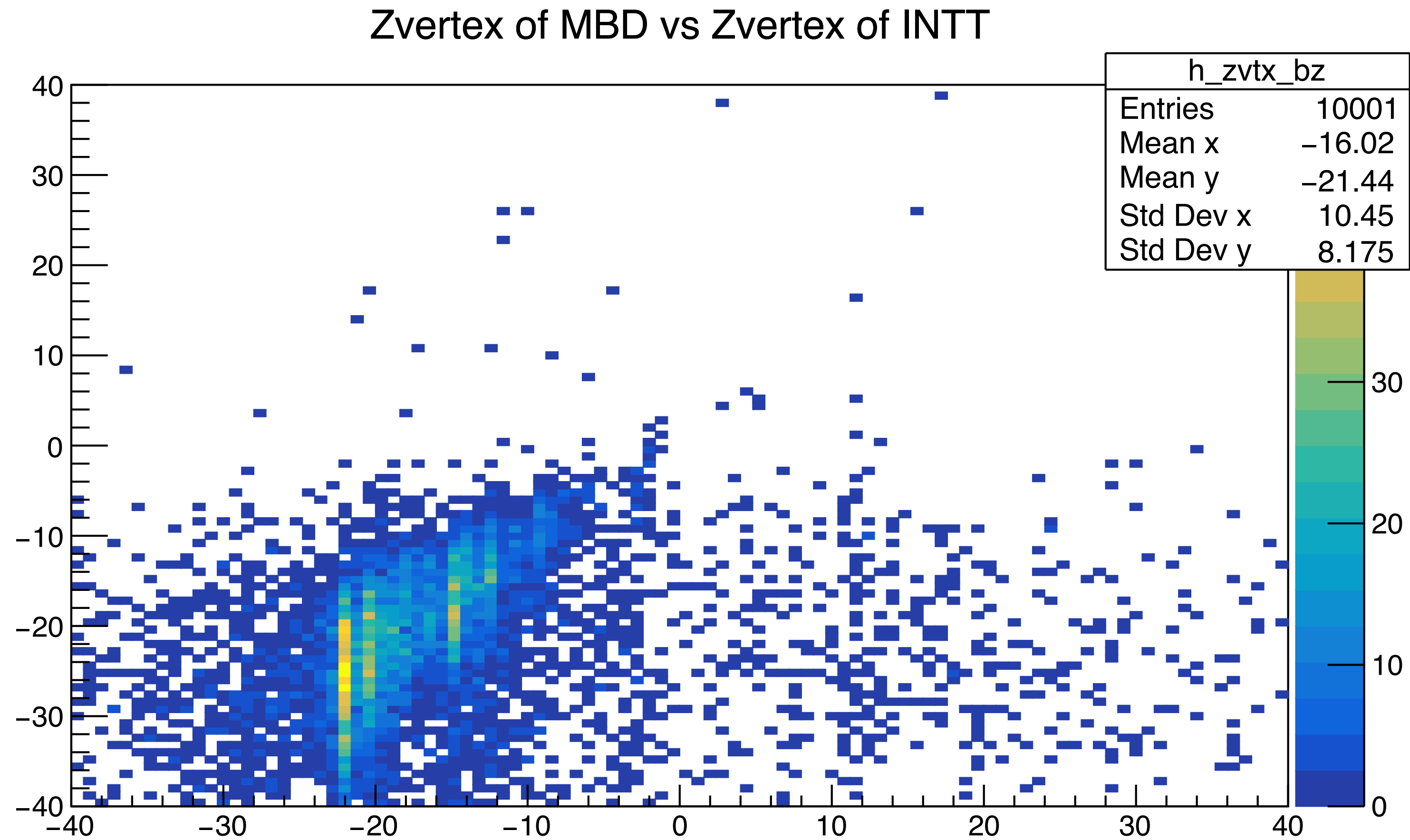


Zvtx

left: INTT, right: MBD

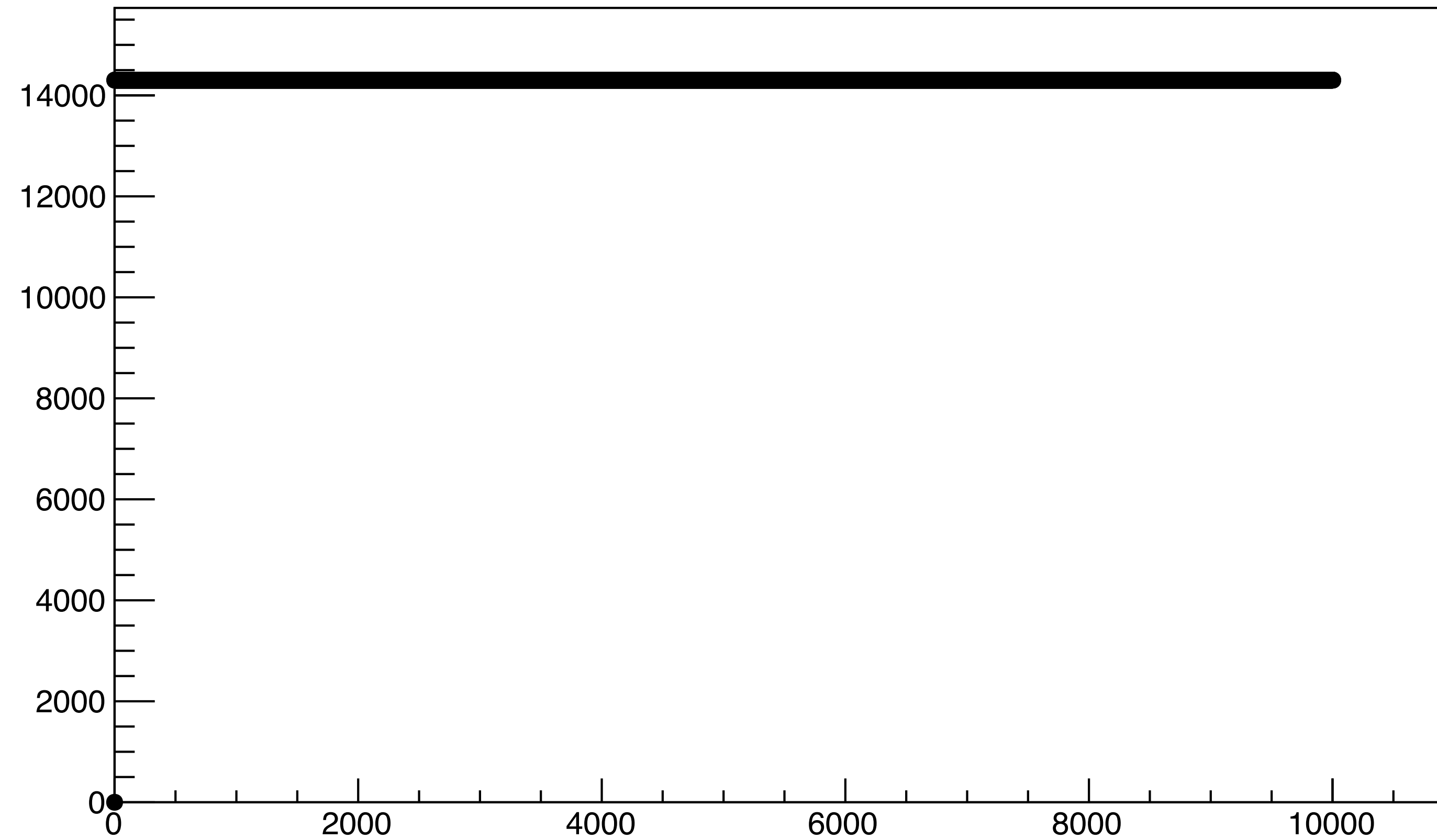


MBD Zvtx vs INTT Zvtx



Graph: deltaT vs number of event

$$\text{deltaT} = \text{MBDCLK} - \text{BCO-Full}$$



memo

直すもの

- ADC($\theta = 75 \sim 85$)のbin切り (INTT & MBD)
- ADC($\theta = 85 \sim 95$)のbin切り (MBD)