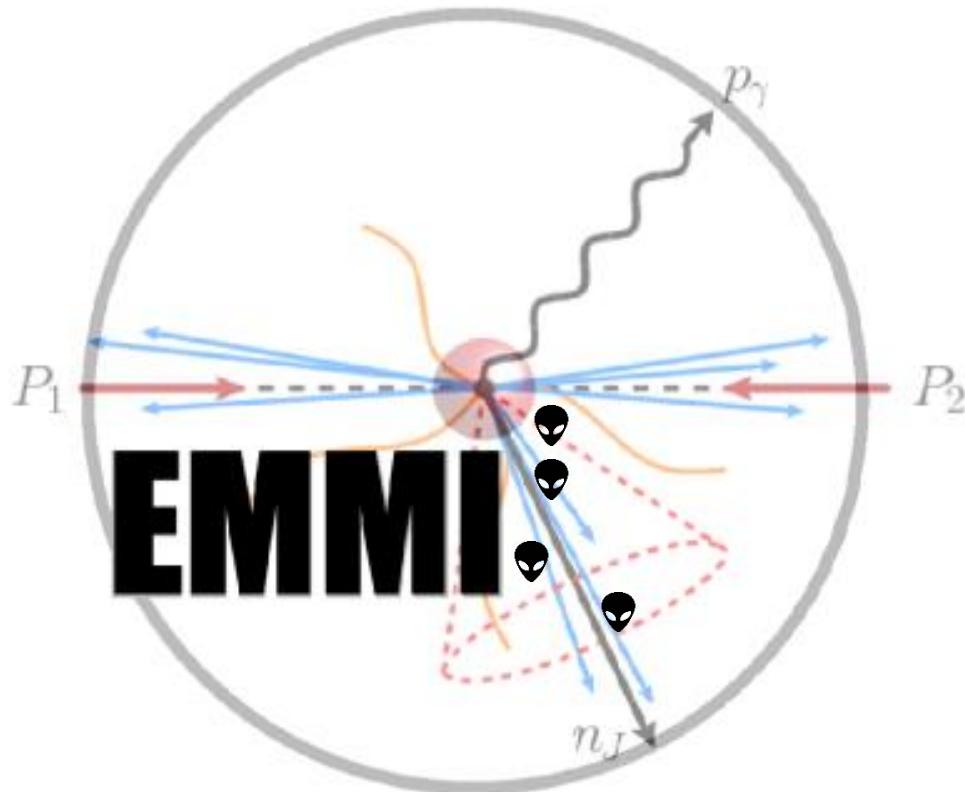
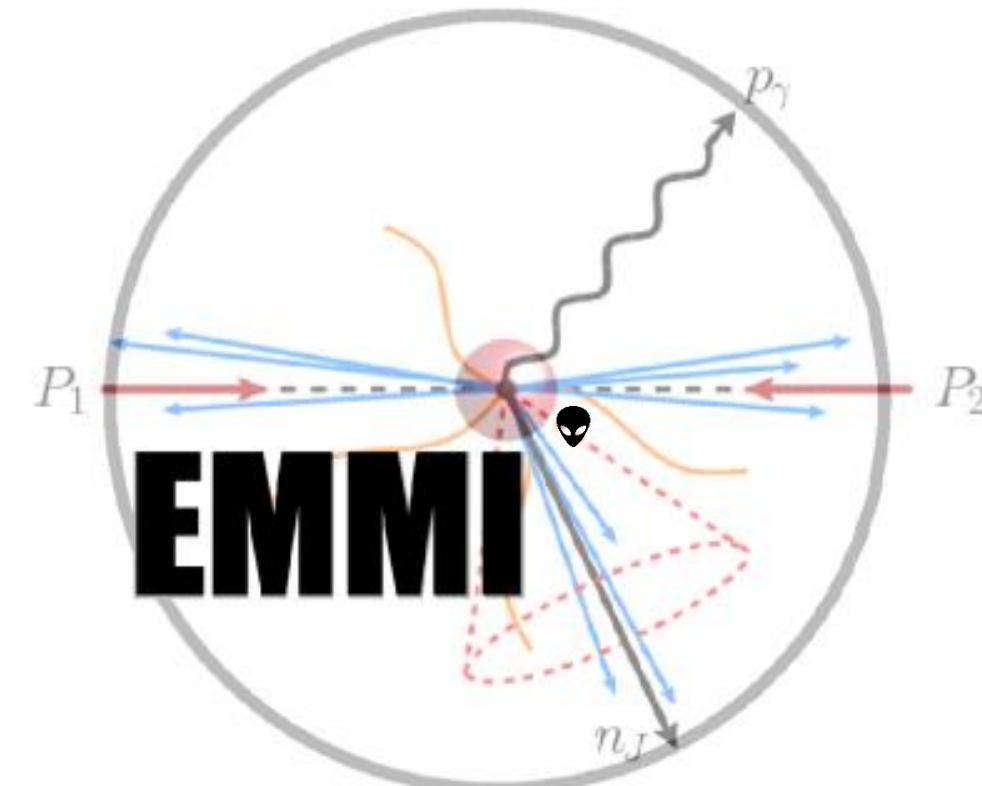


# Status Report

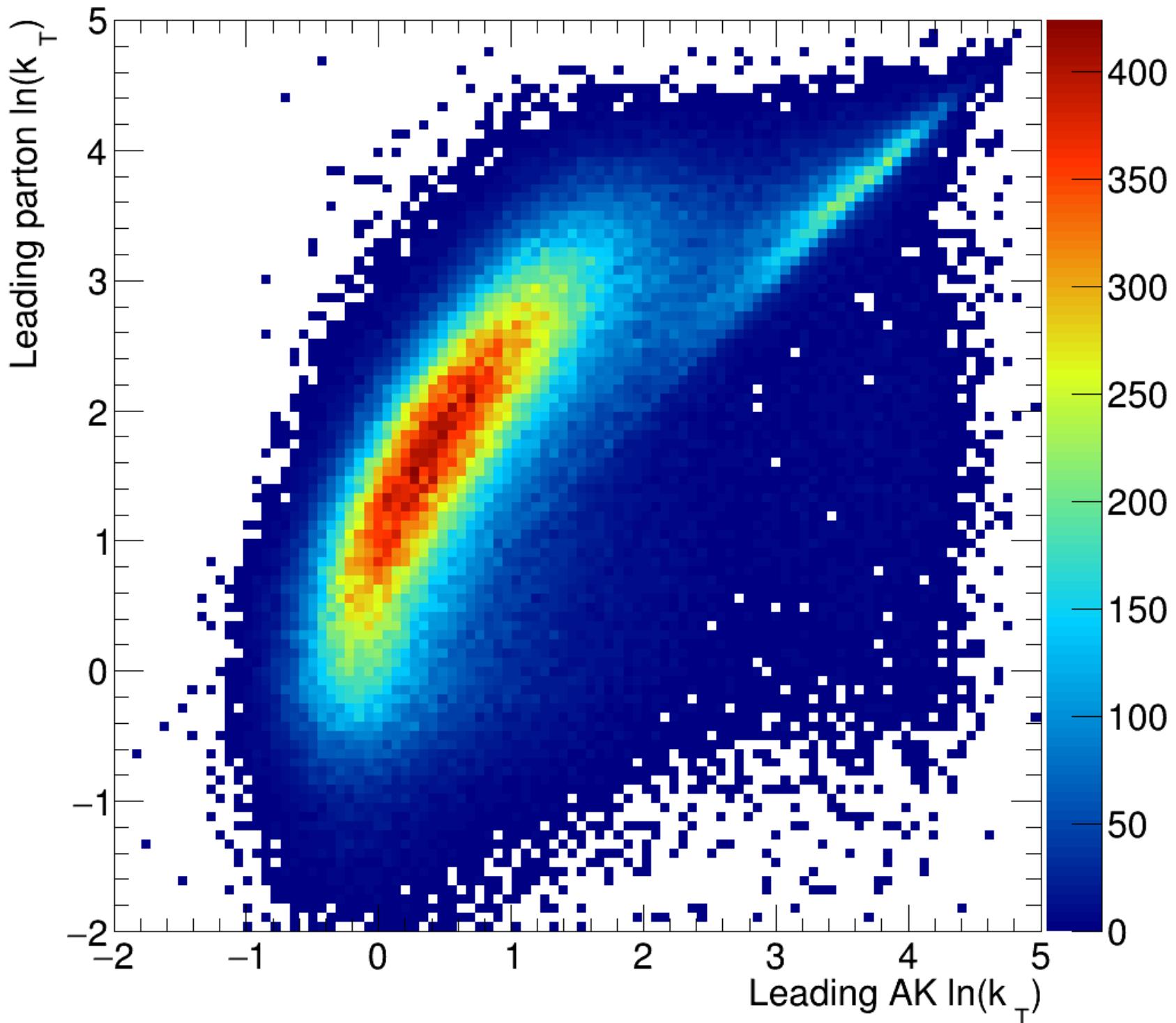


Let's go Lunni!

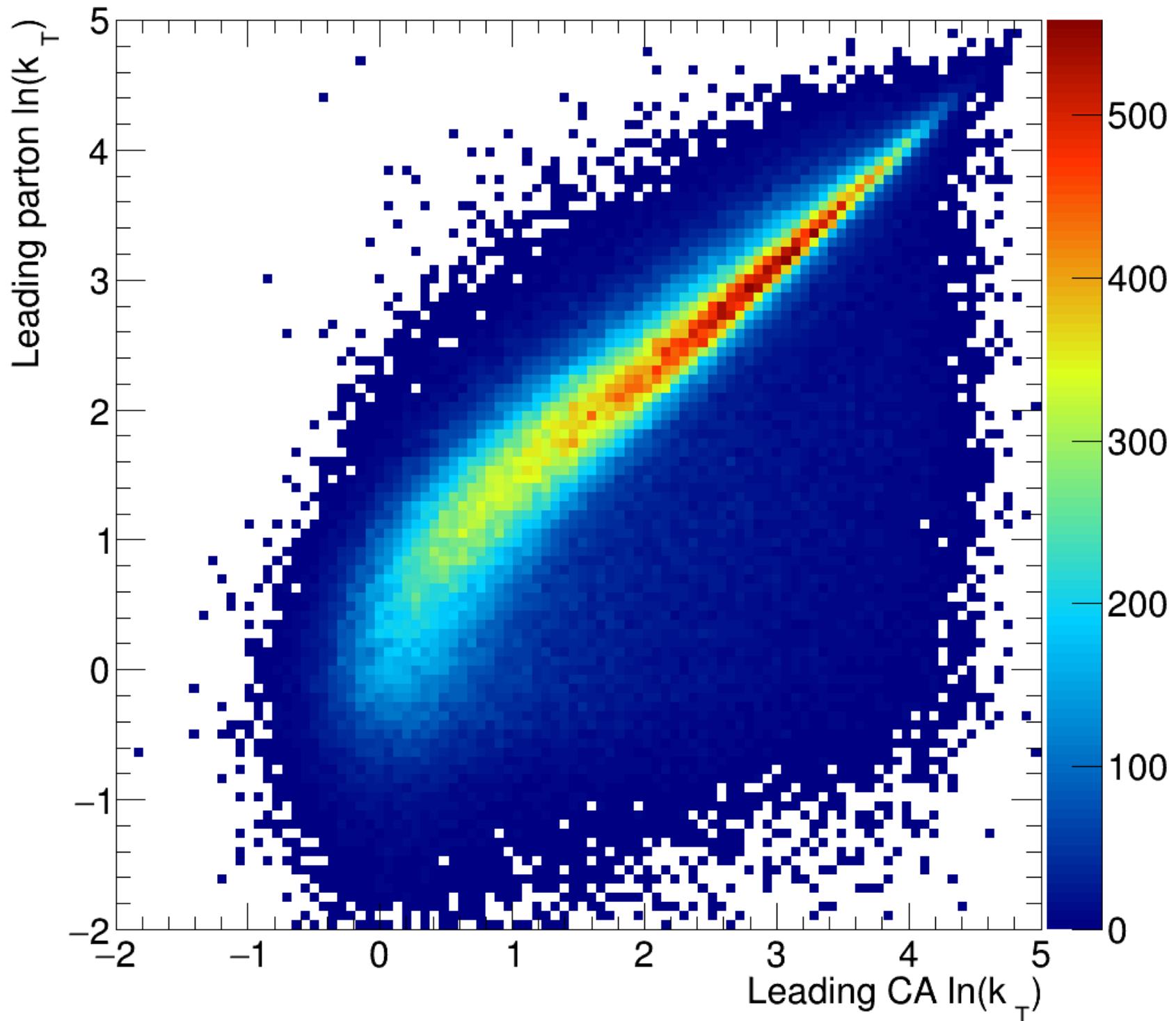
# Performance of Leading KT Vertex



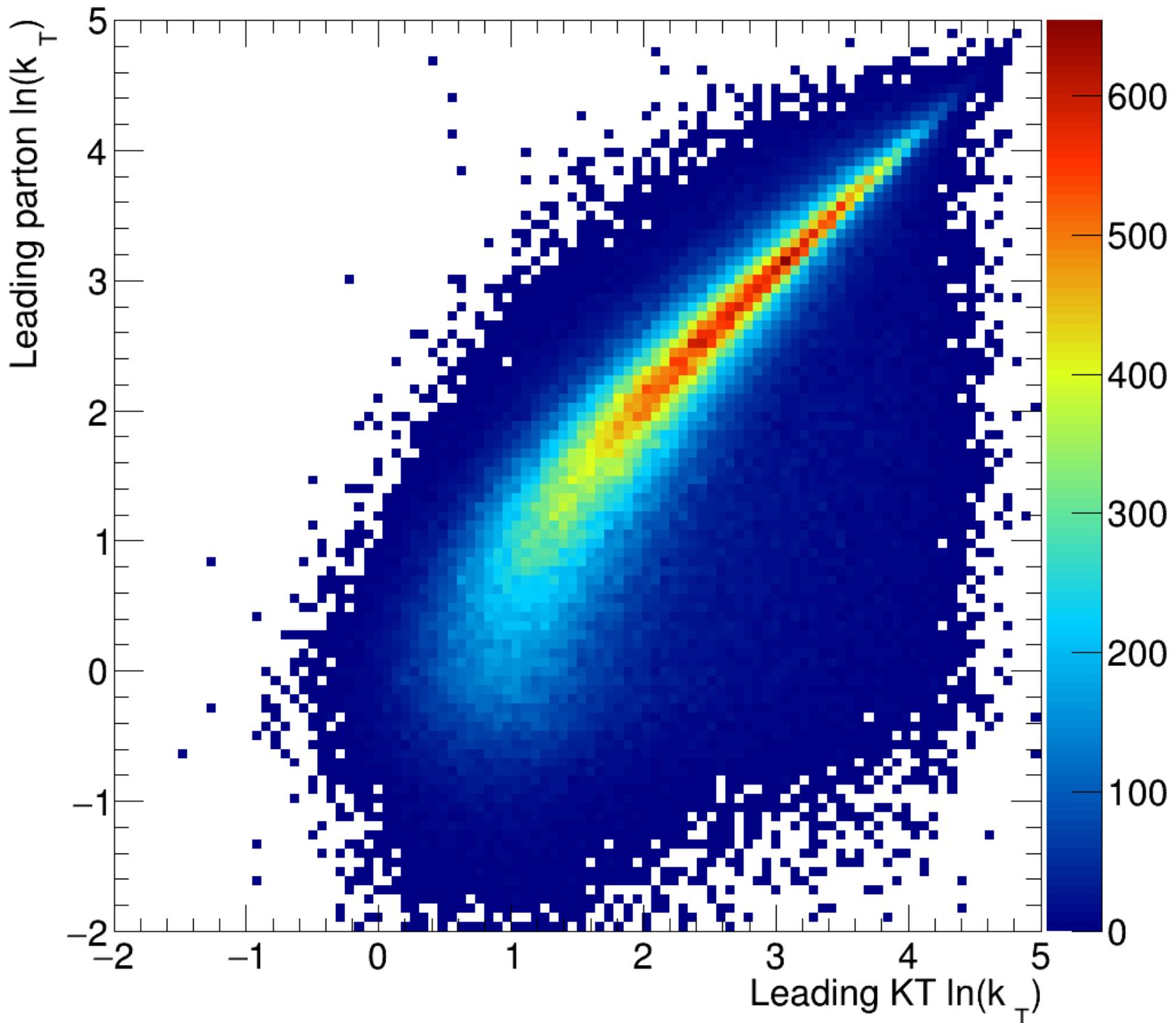
# PYTHIA8 Pthat300 Jet pT>350 GeV



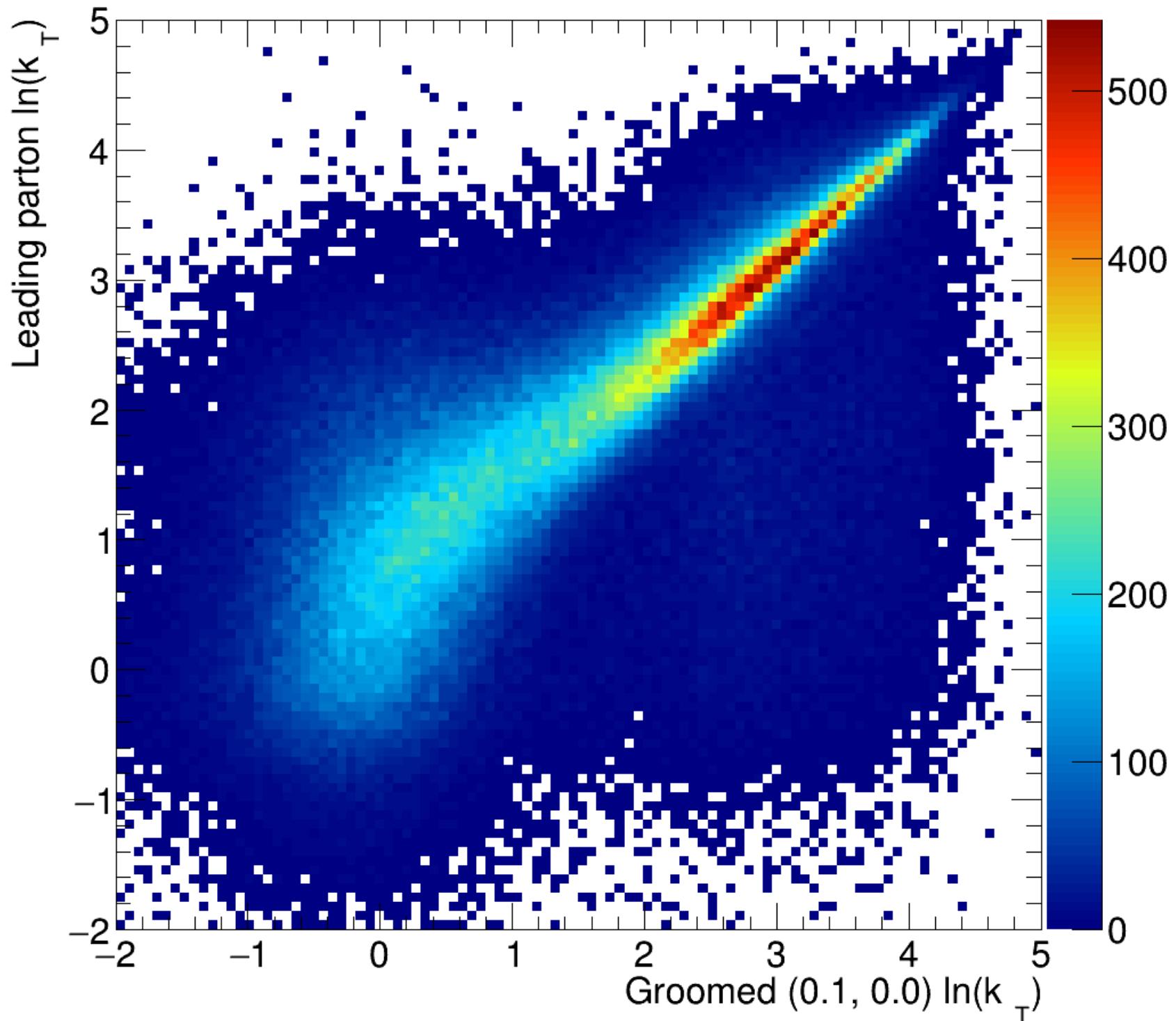
# PYTHIA8 Pthat300 Jet pT>350 GeV



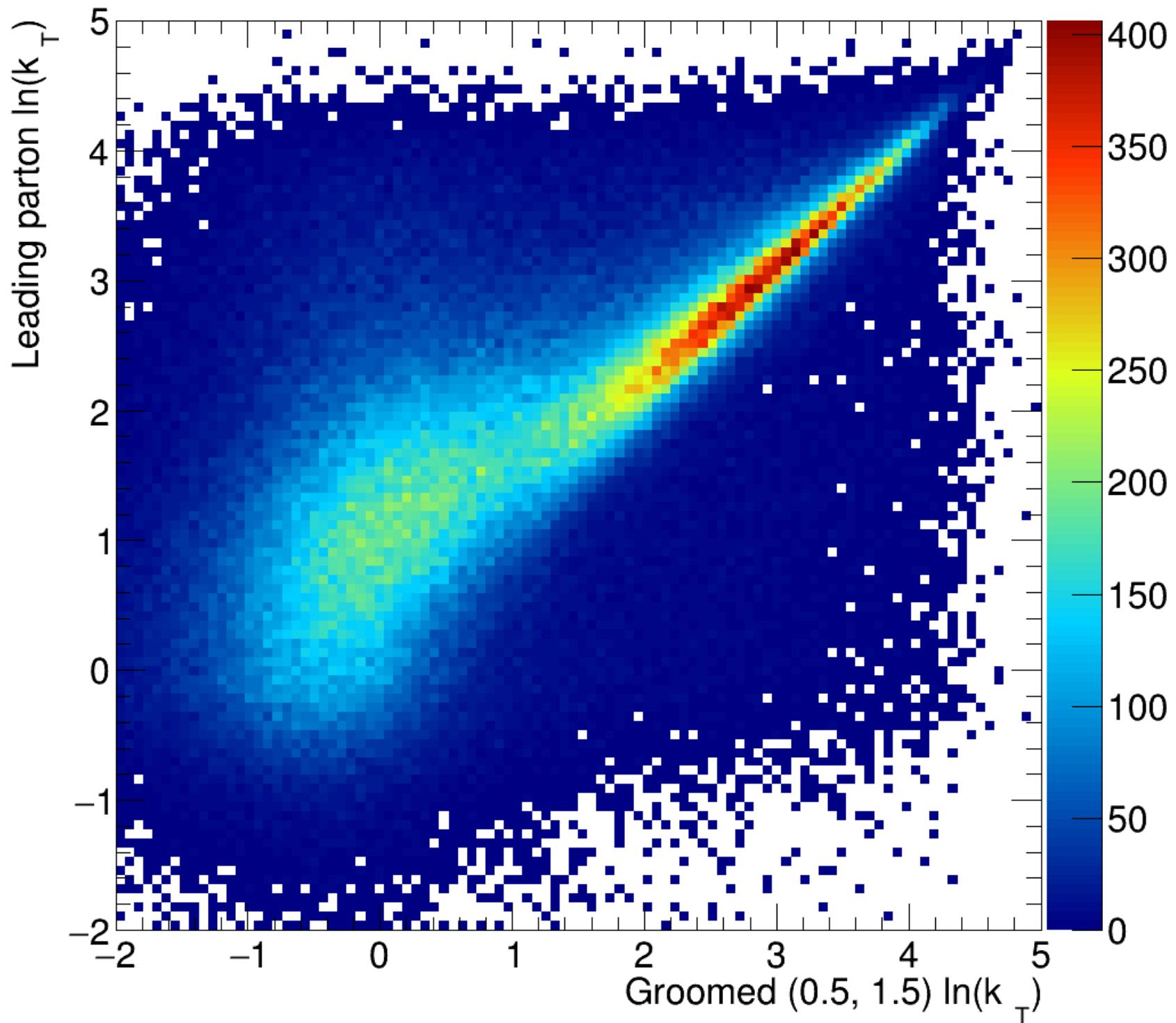
# PYTHIA8 Pthat300 Jet pT>350 GeV



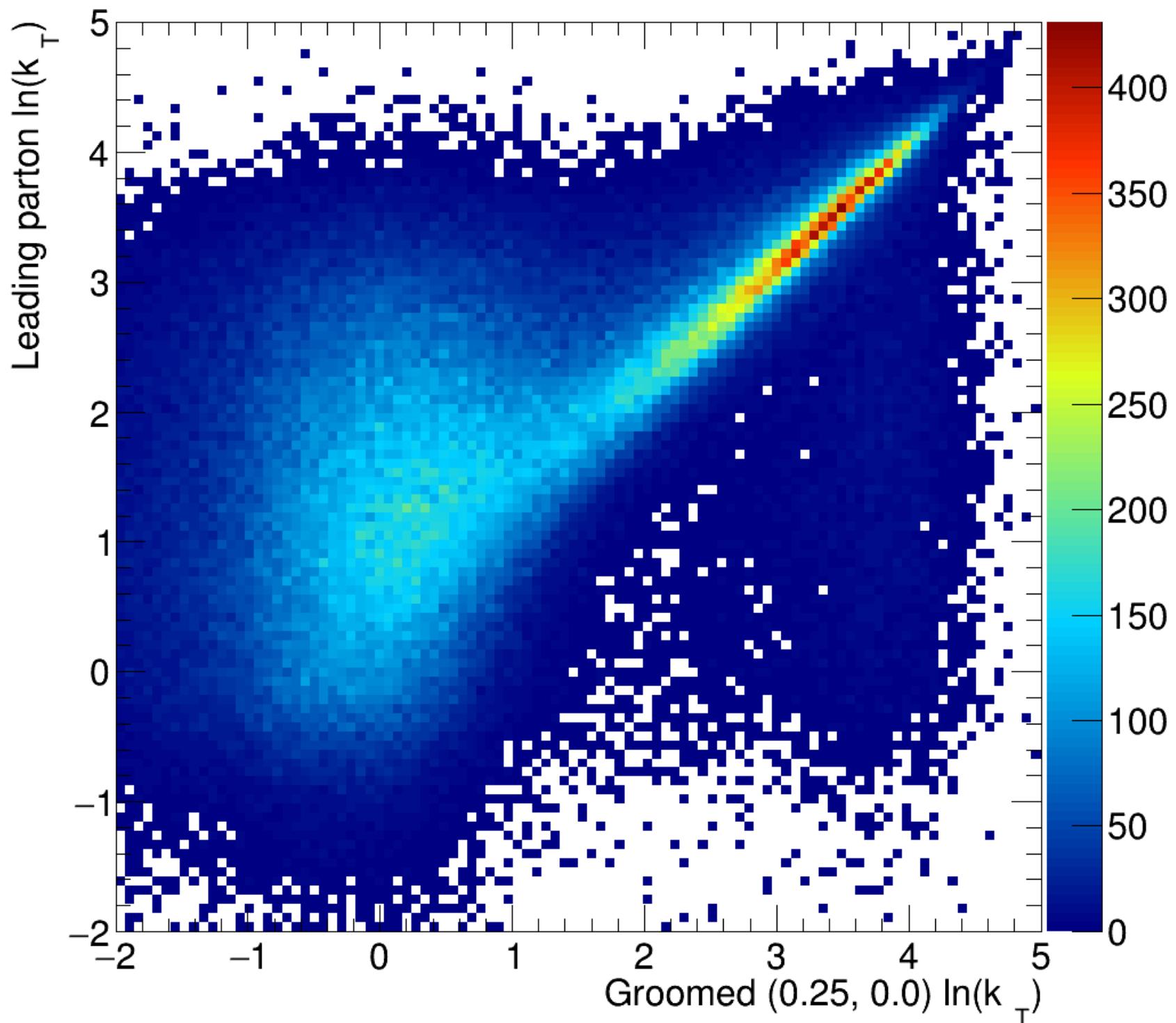
# PYTHIA8 Pthat300 Jet pT>350 GeV



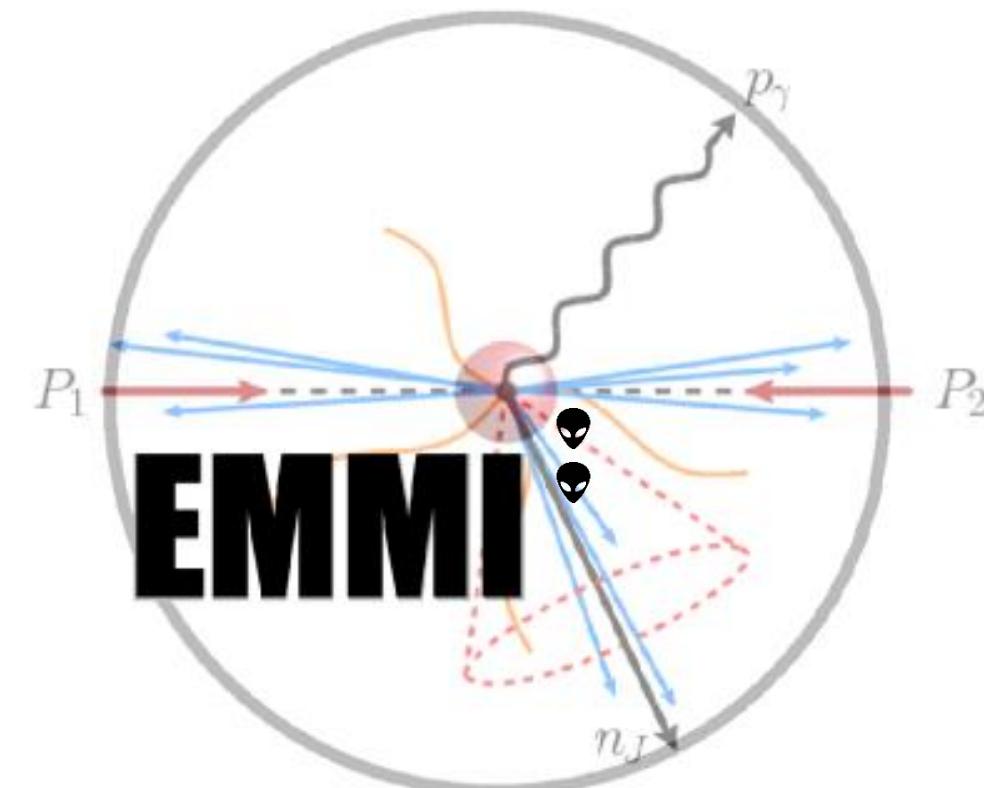
# PYTHIA8 Pthat300 Jet pT>350 GeV



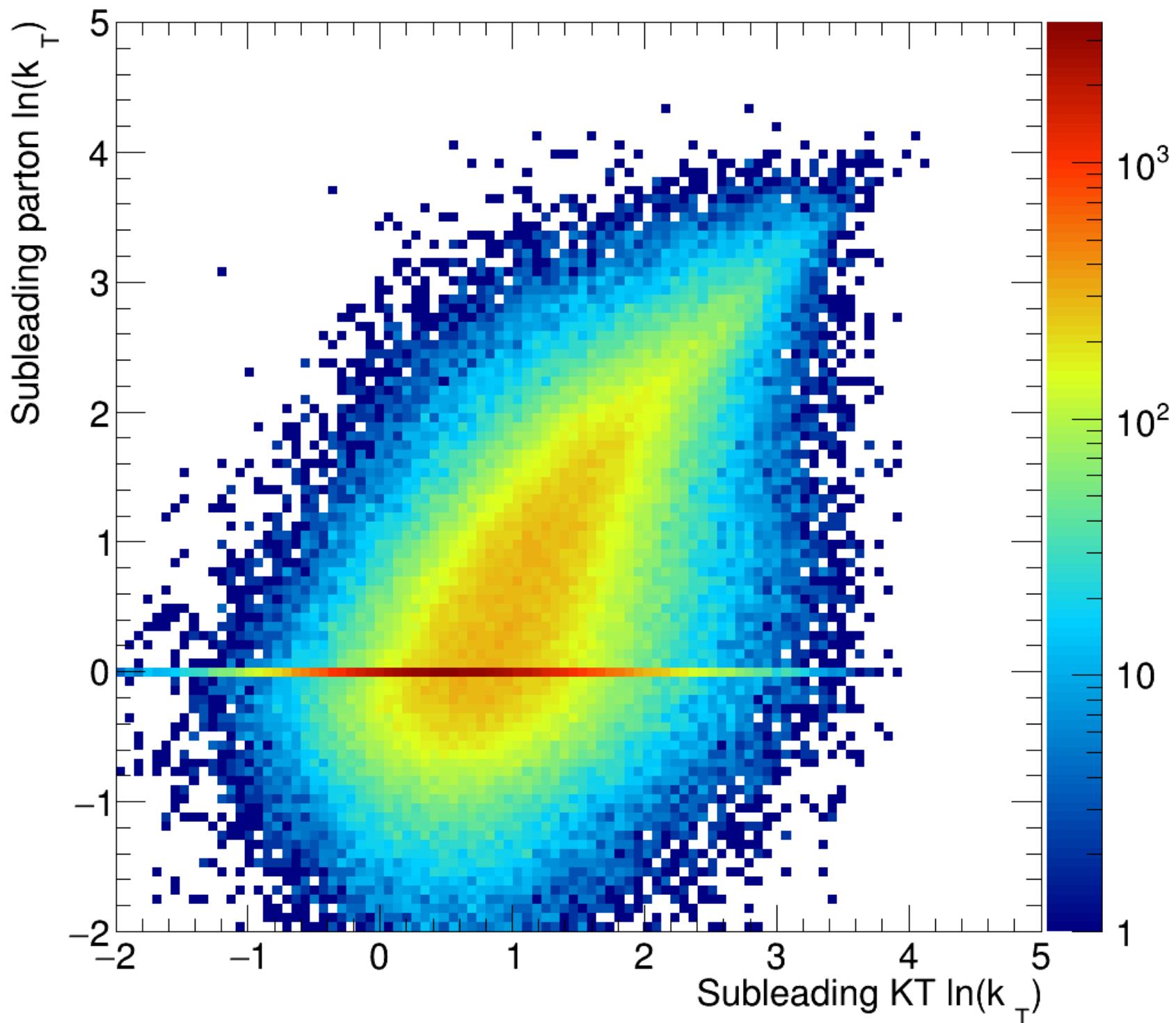
# PYTHIA8 Pthat300 Jet pT>350 GeV



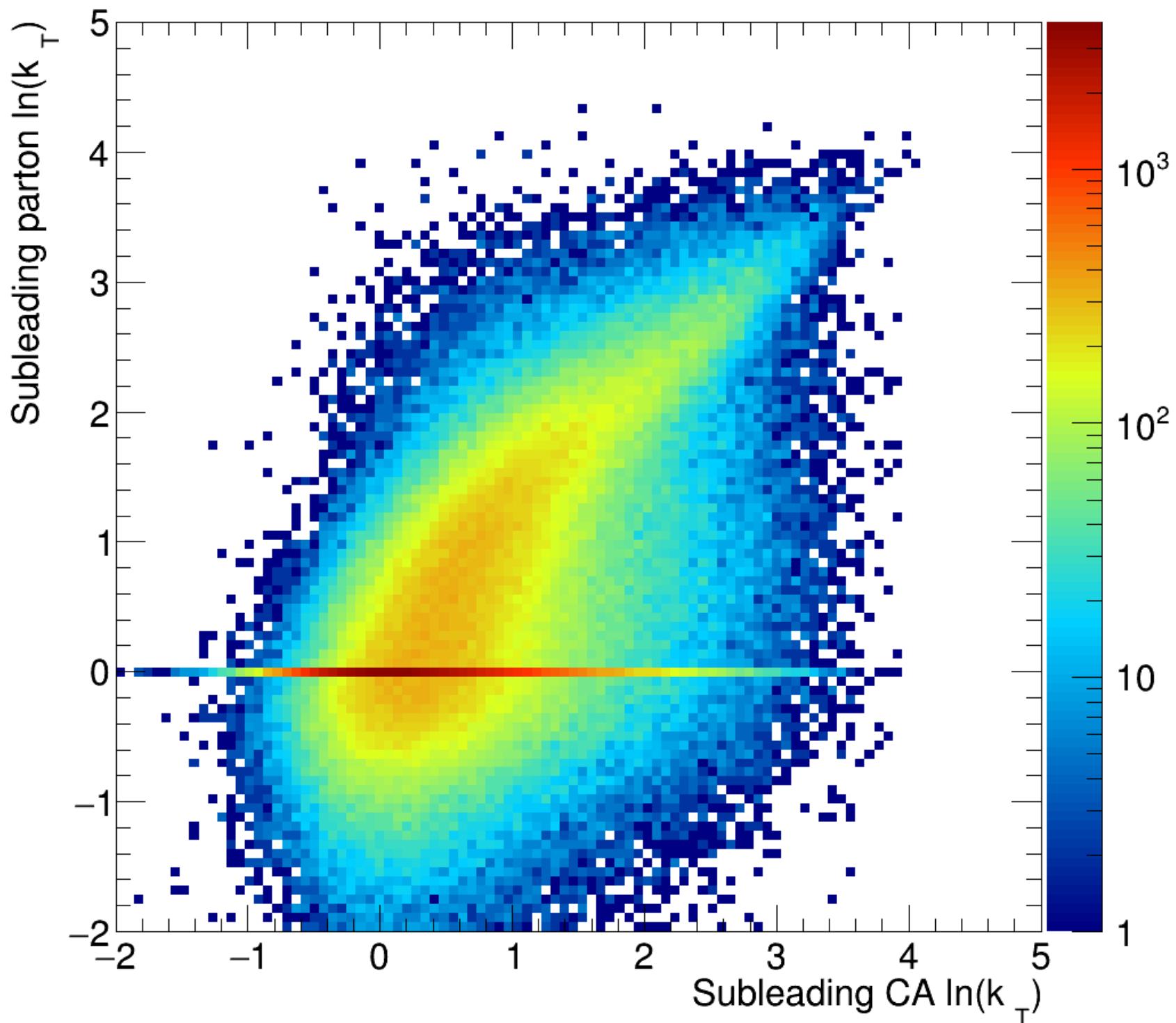
# Performance of Subleading KT Vertex



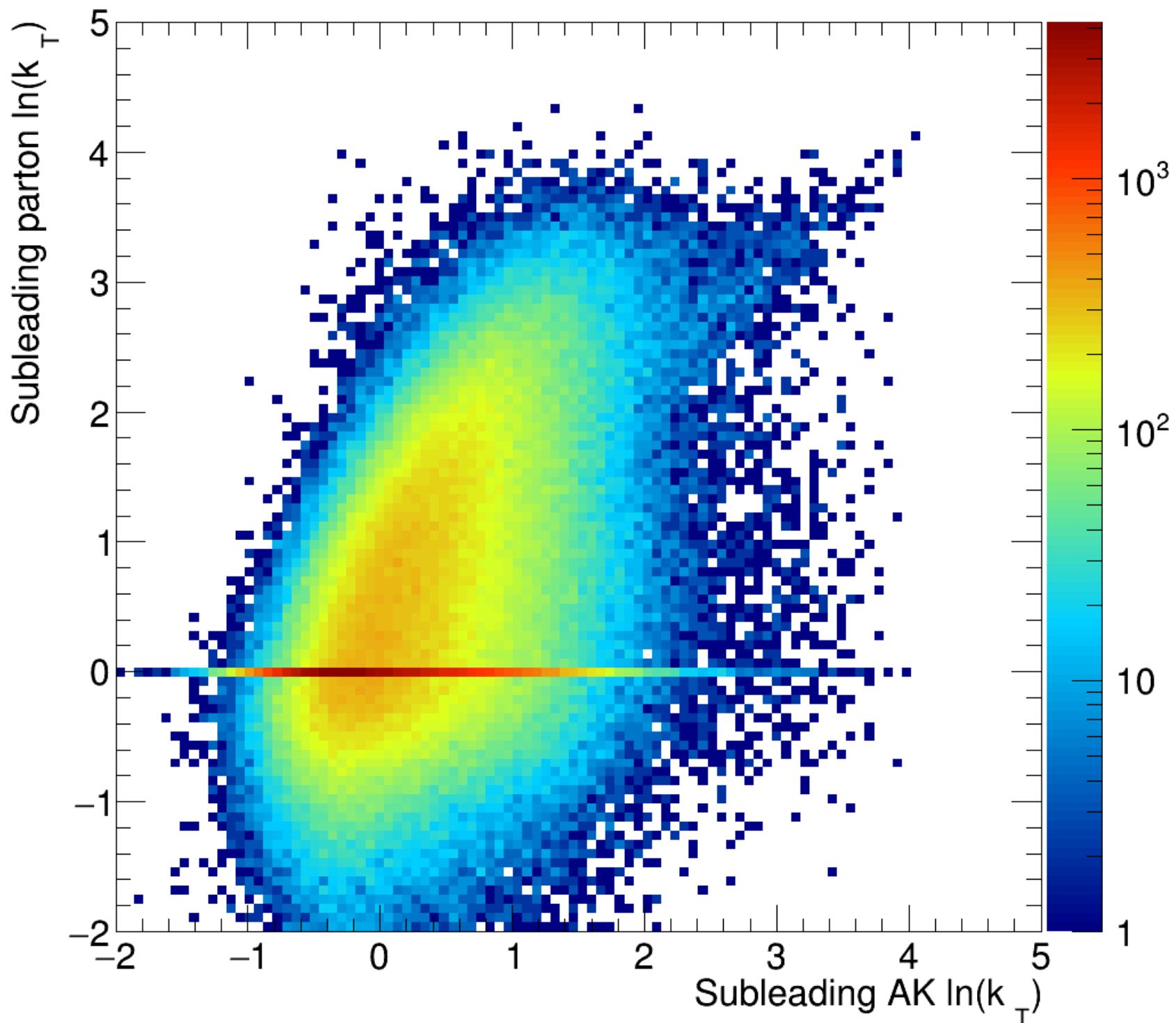
# PYTHIA8 Pthat300 Jet pT>350 GeV



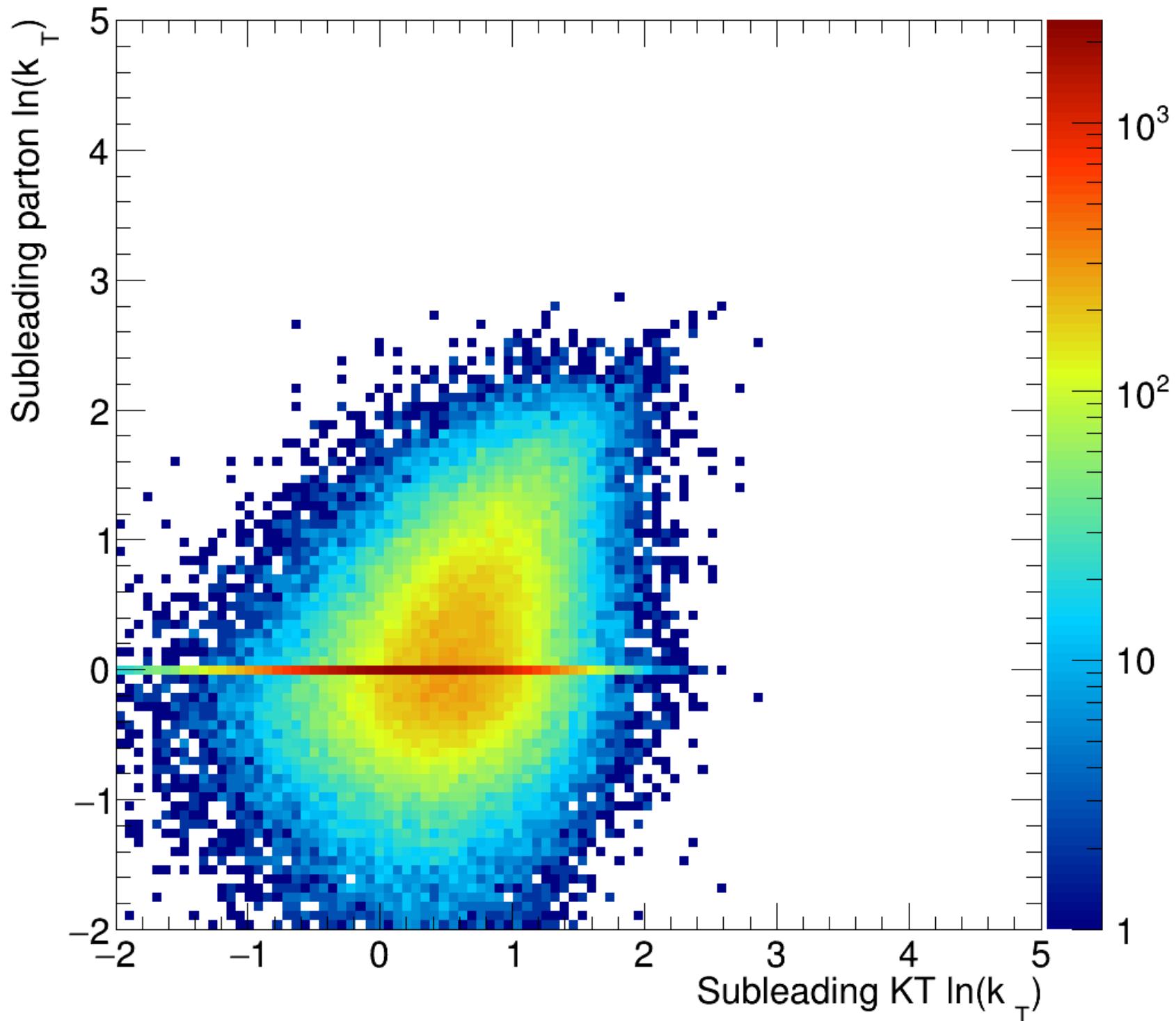
# PYTHIA8 Pthat300 Jet pT>350 GeV



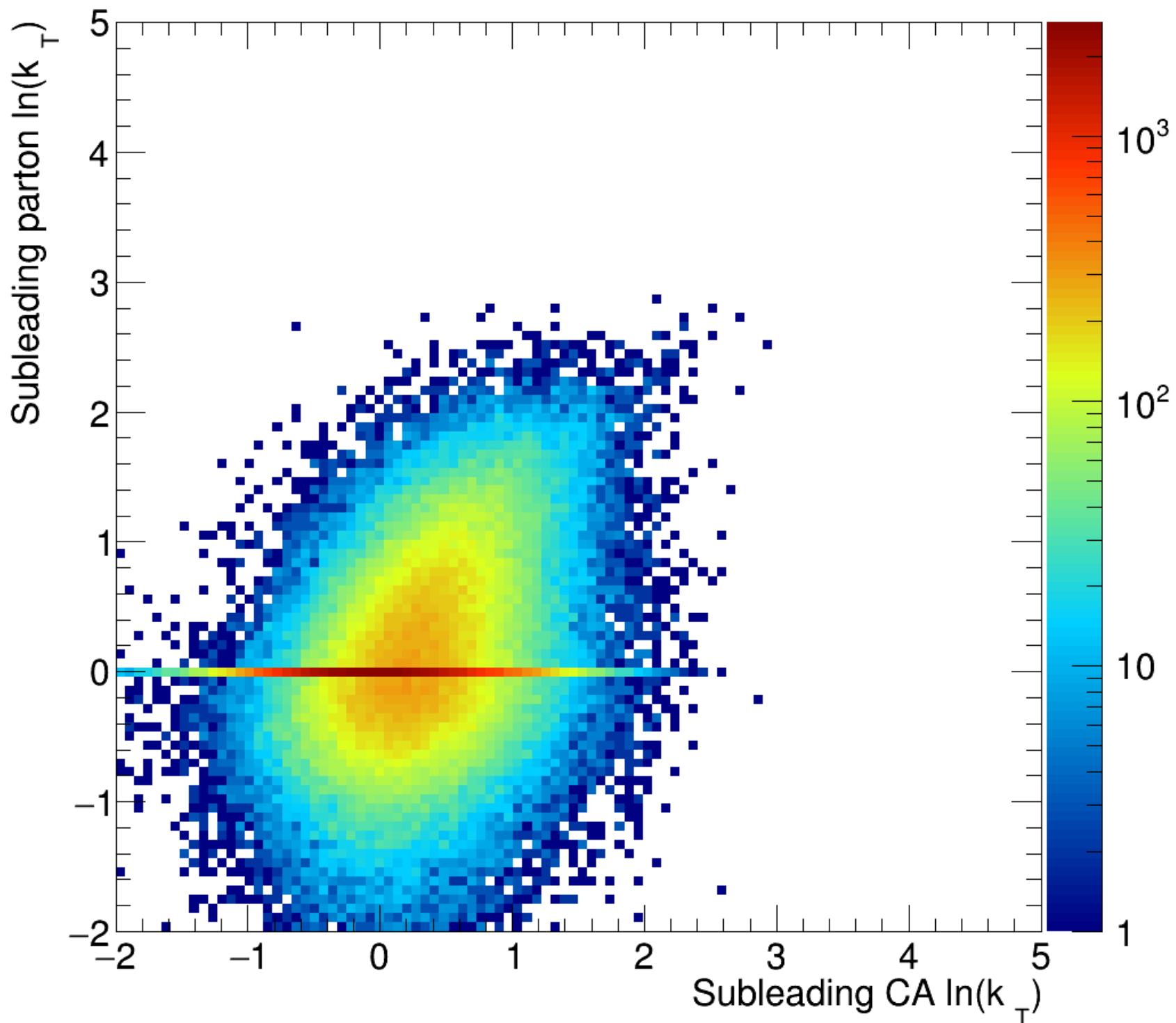
# PYTHIA8 Pthat300 Jet pT>350 GeV



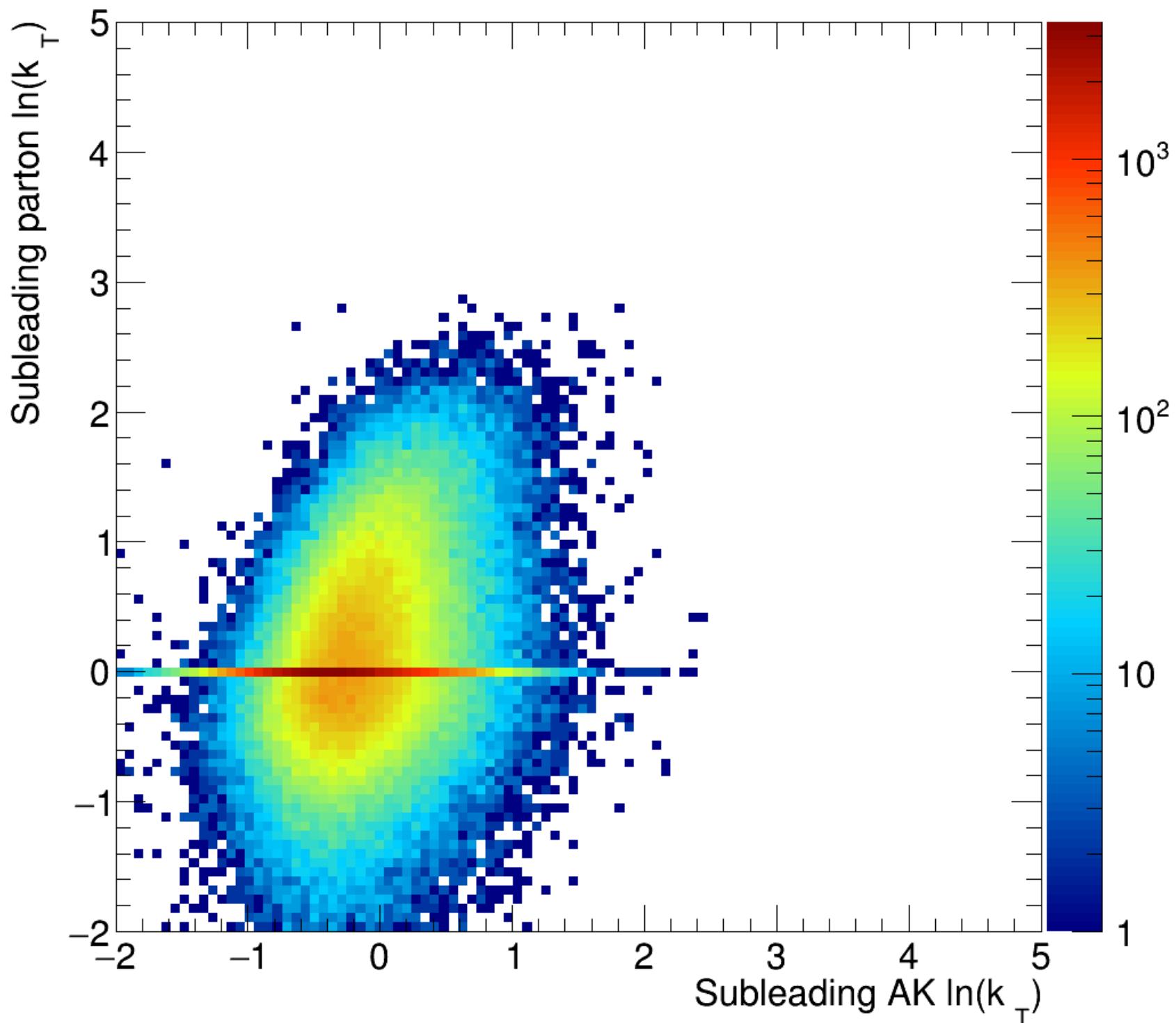
# PYTHIA8 Pthat50 Jet pT>70 GeV



# PYTHIA8 Pthat50 Jet pT>70 GeV



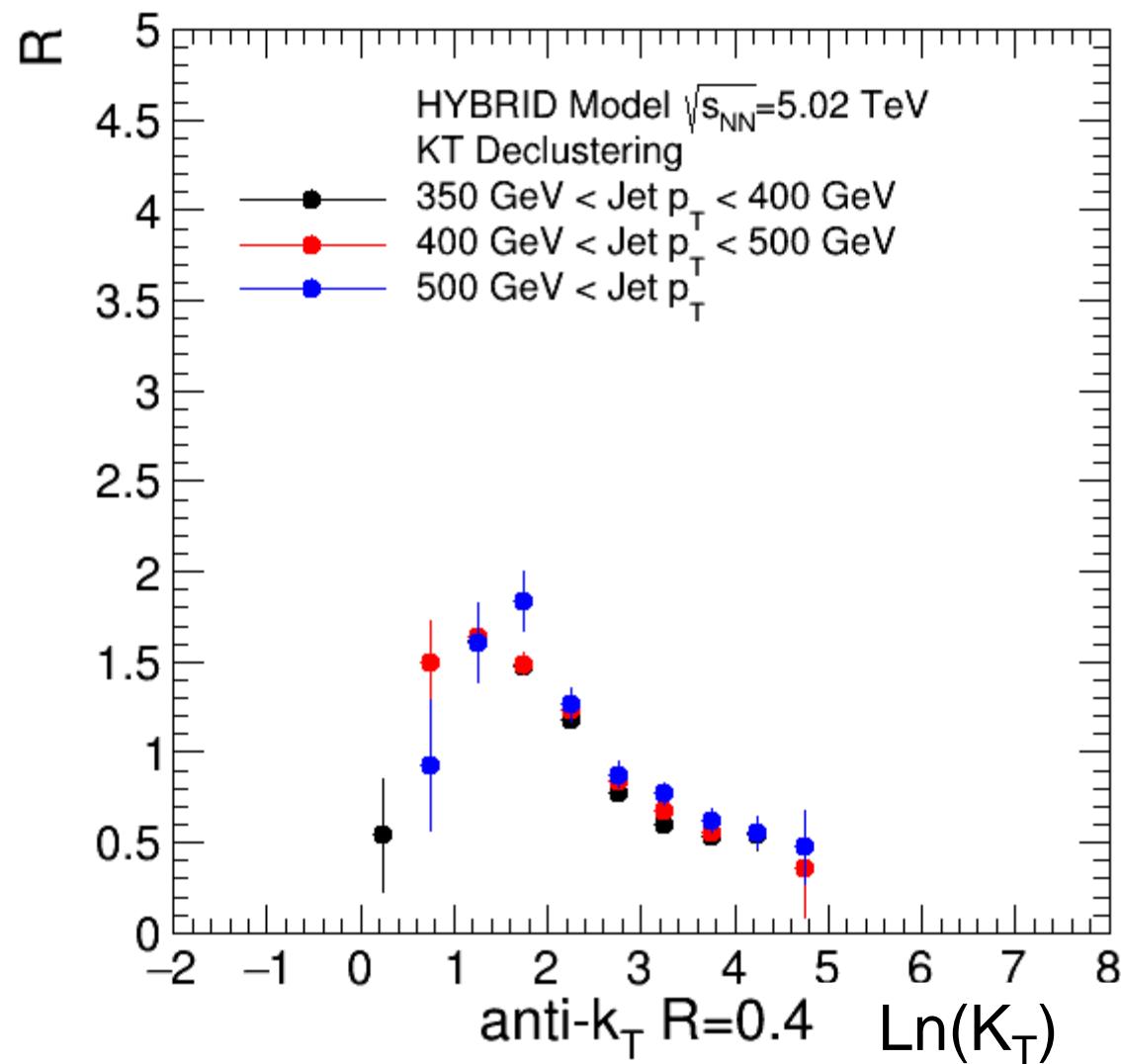
# PYTHIA8 Pthat50 Jet pT>70 GeV



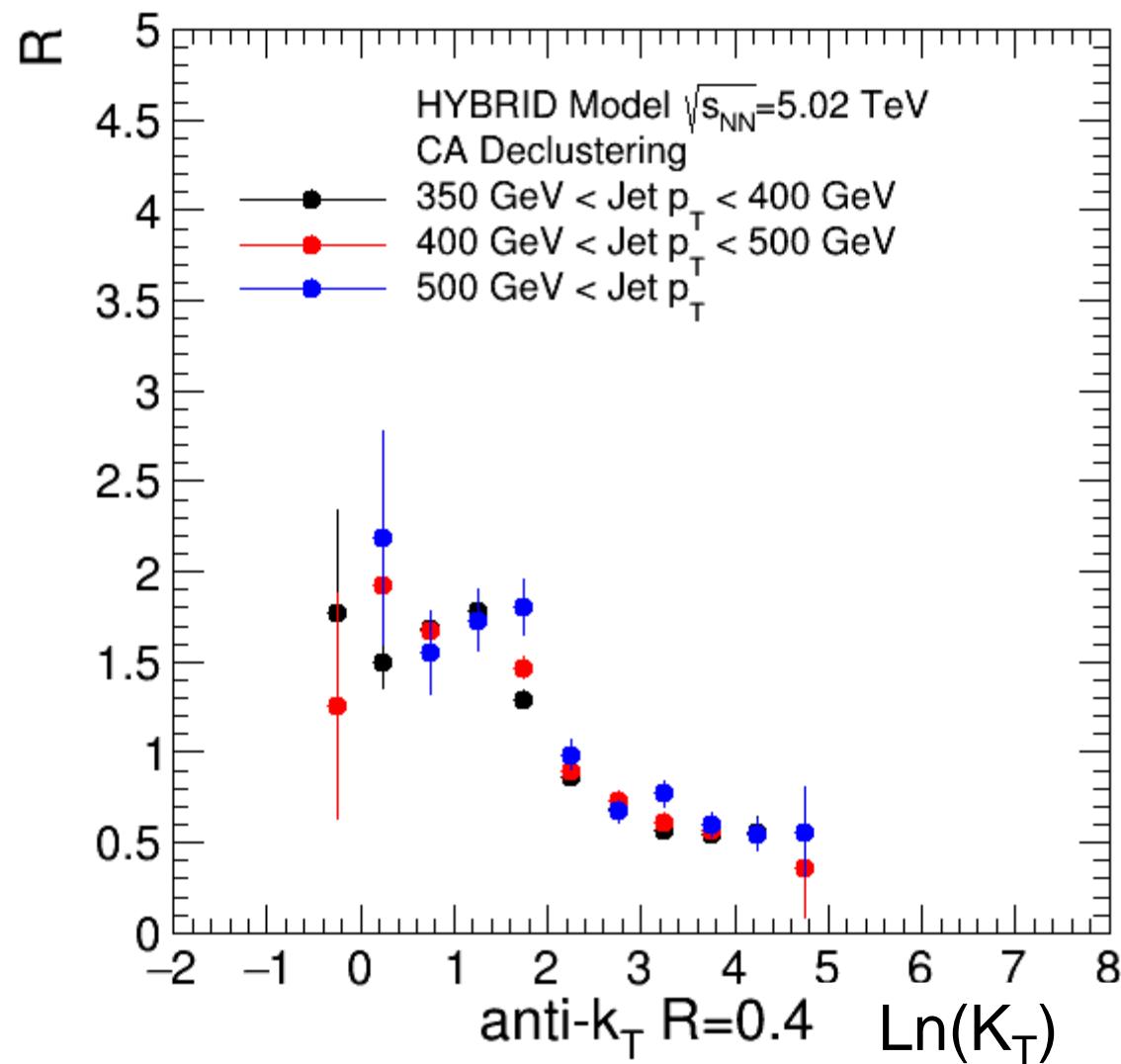
# Physics Performance



# KT Tagged $R_{K_T}$ from HYBRID (KT)

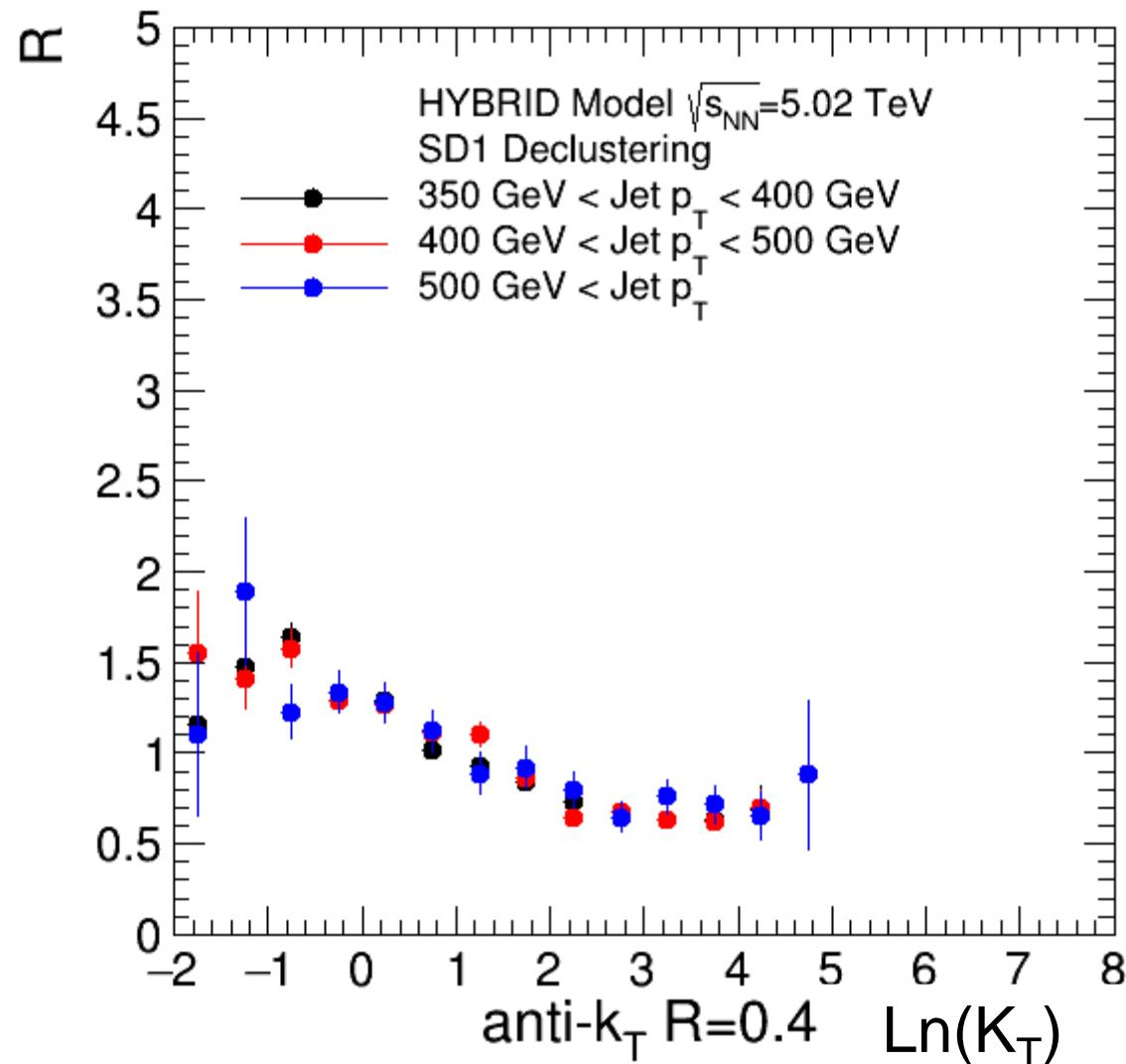


# KT Tagged $R_{K_T}$ from HYBRID (CA)

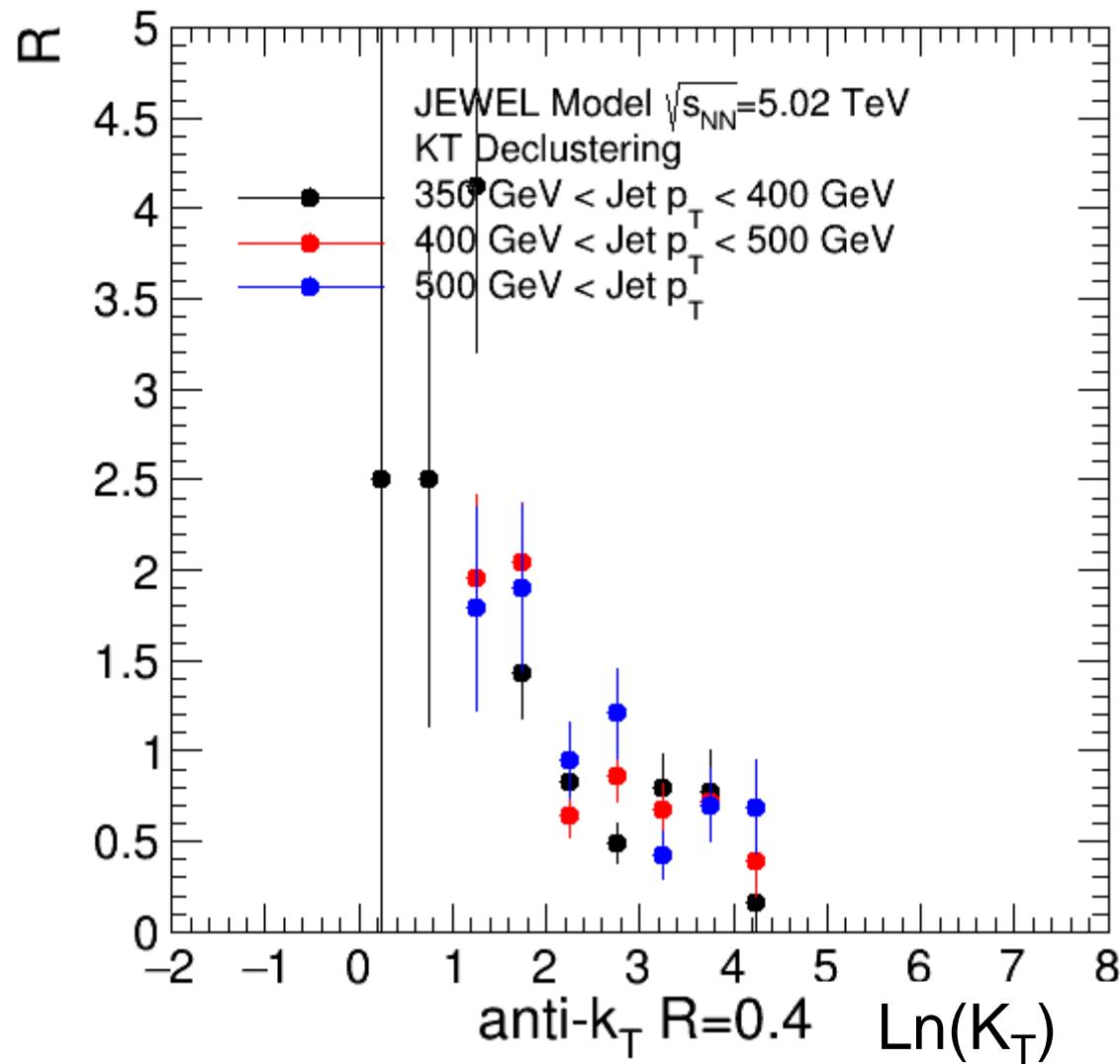


# KT Tagged $R_{K_T}$ from HYBRID (SD)

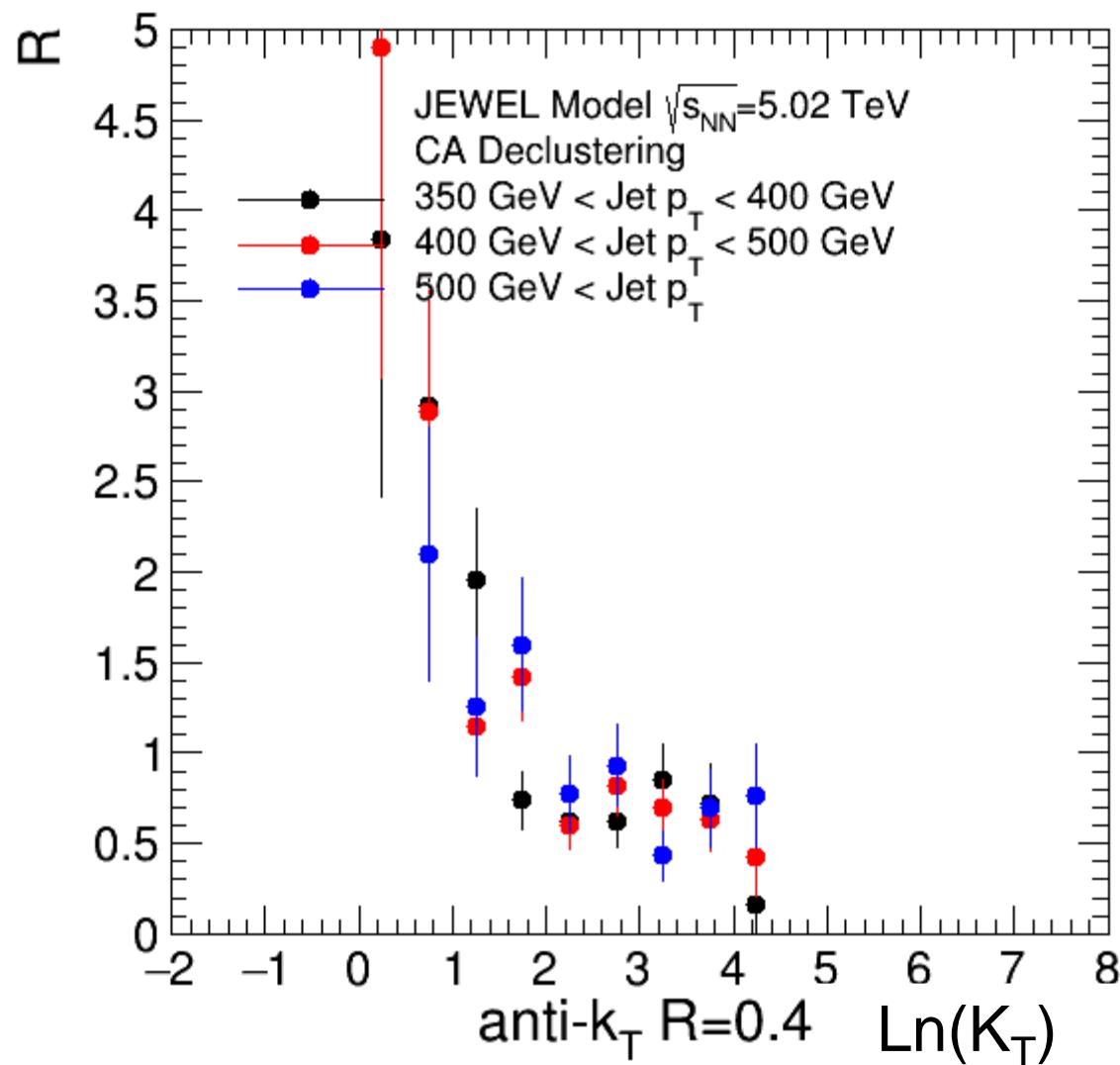
( $Z_{\text{cut}}, \beta$ )=(0.1,0.0)



# KT Tagged $R_{KT}$ from JEWEL (KT)

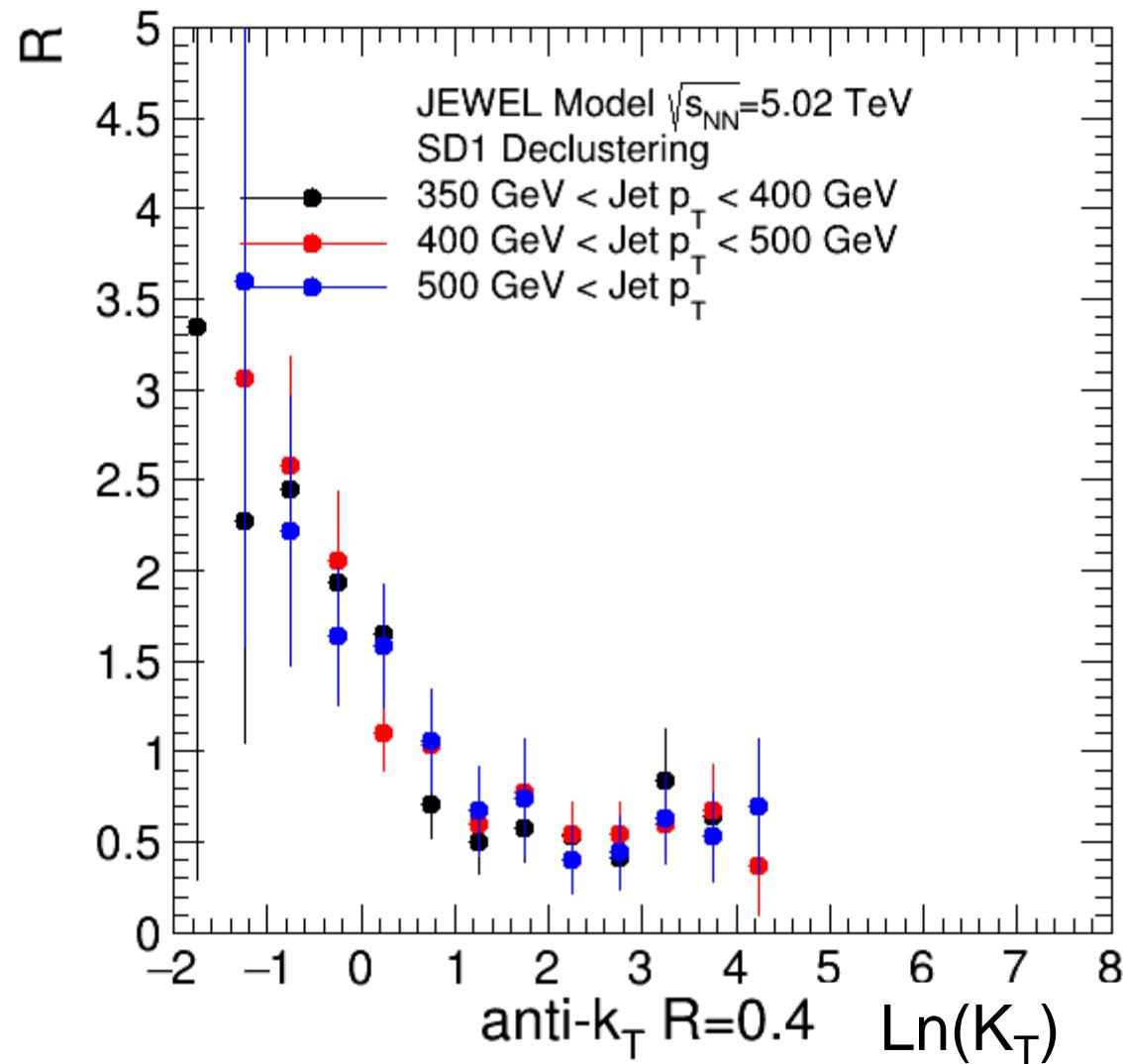


# KT Tagged $R_{KT}$ from JEWEL (CA)

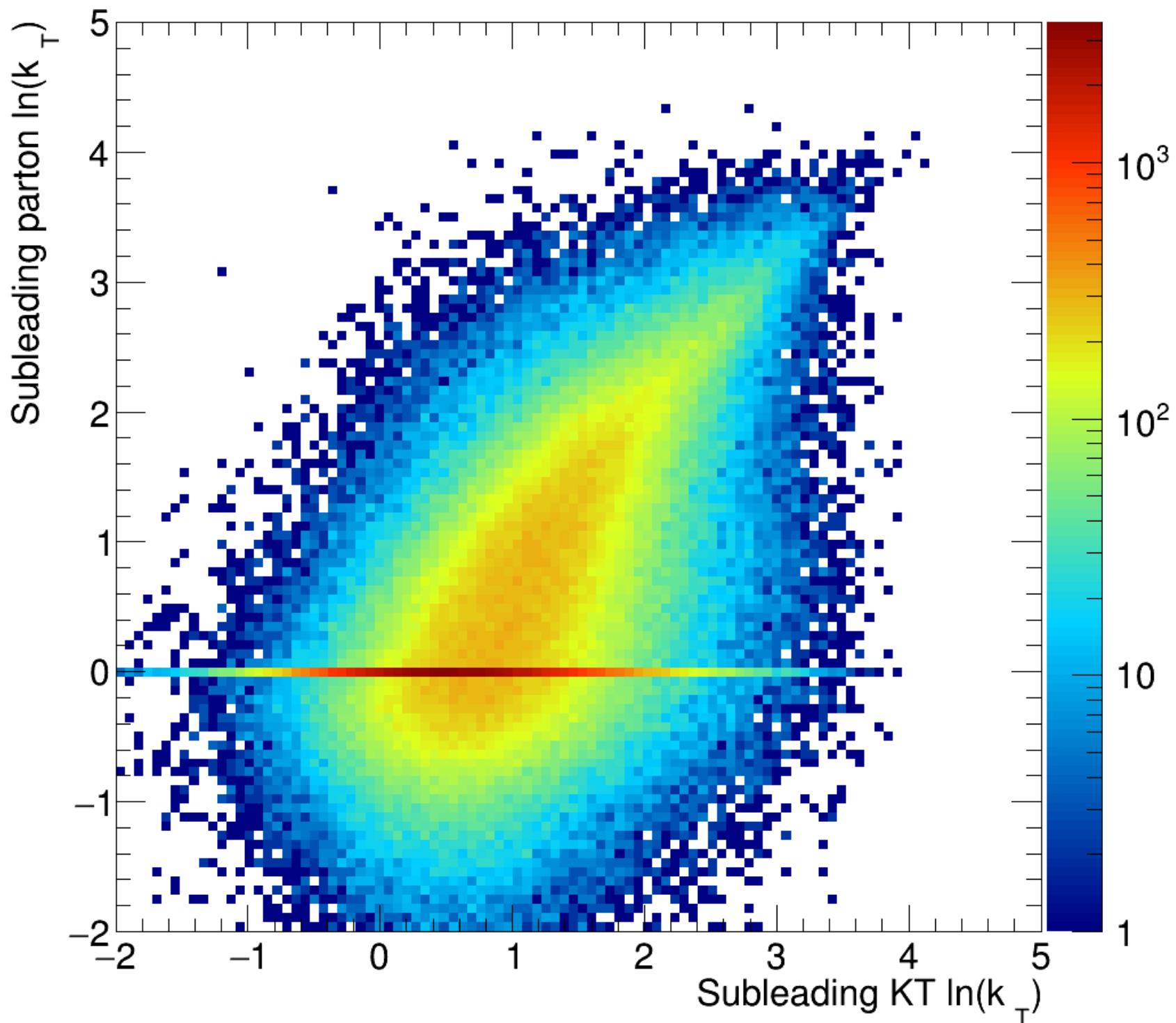


# KT Tagged $R_{KT}$ from JEWEL (SD)

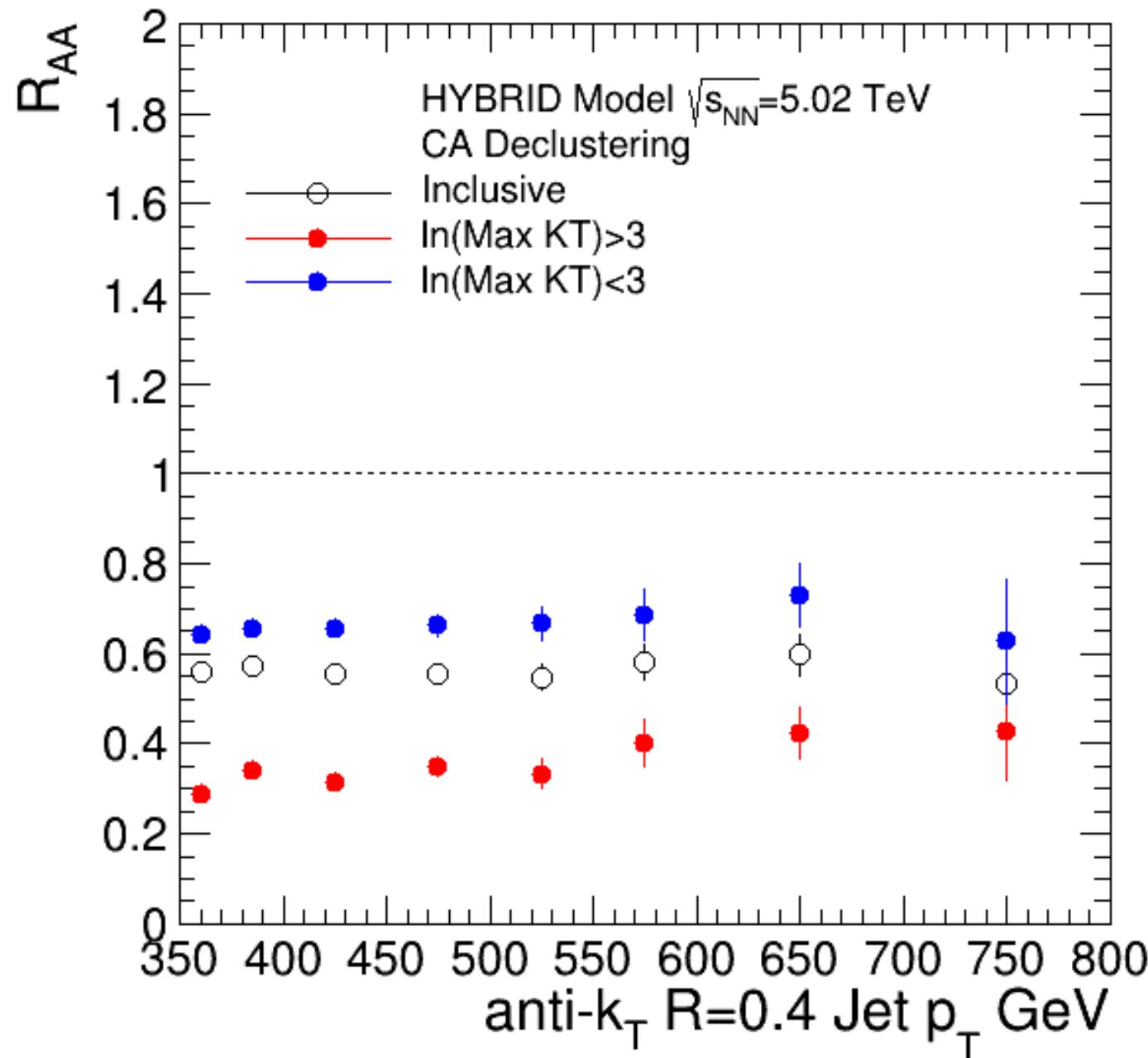
(Zcut,  $\beta$ )=(0.1,0.0)



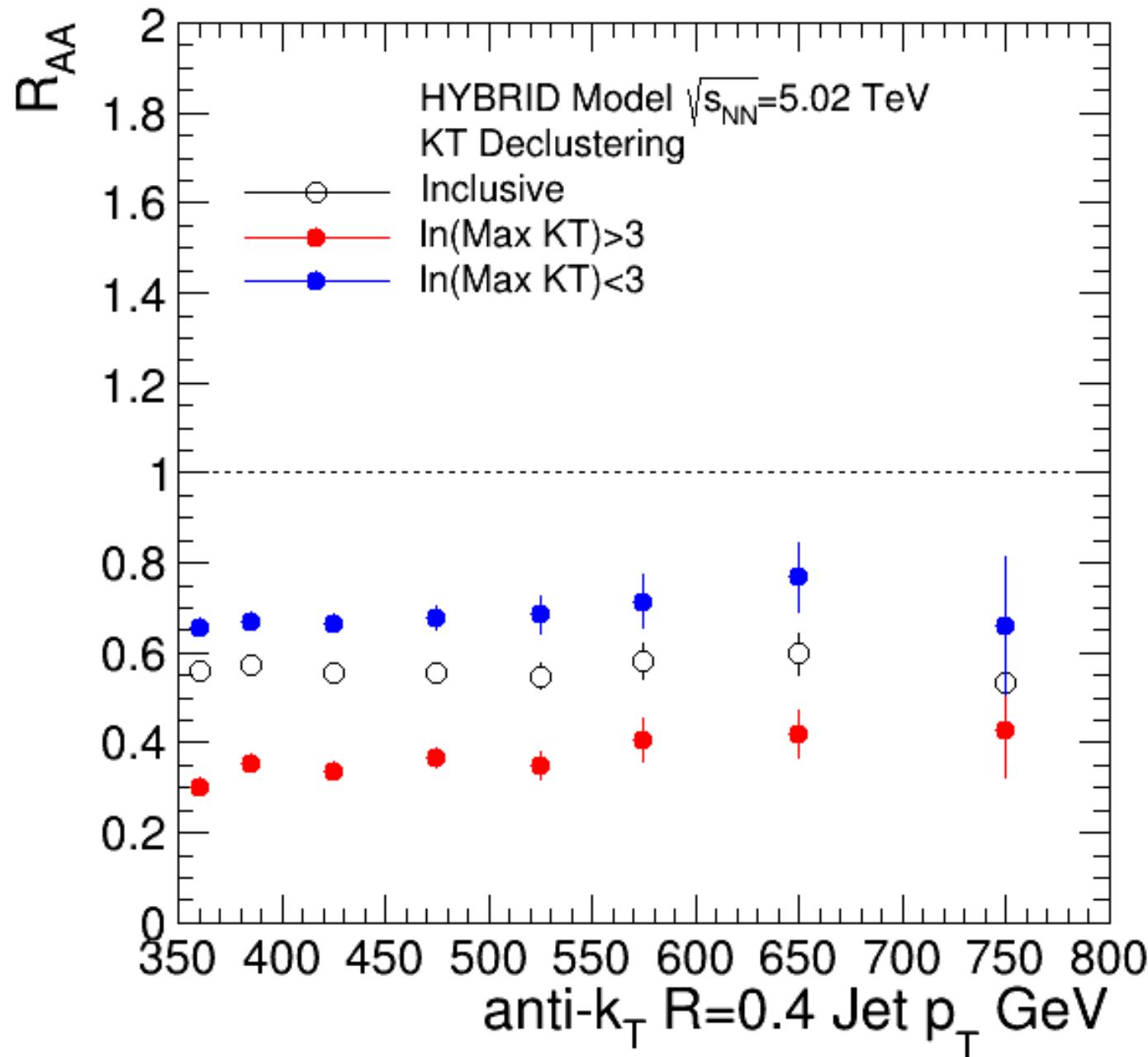
# PYTHIA8 Pthat300 Jet pT>350 GeV



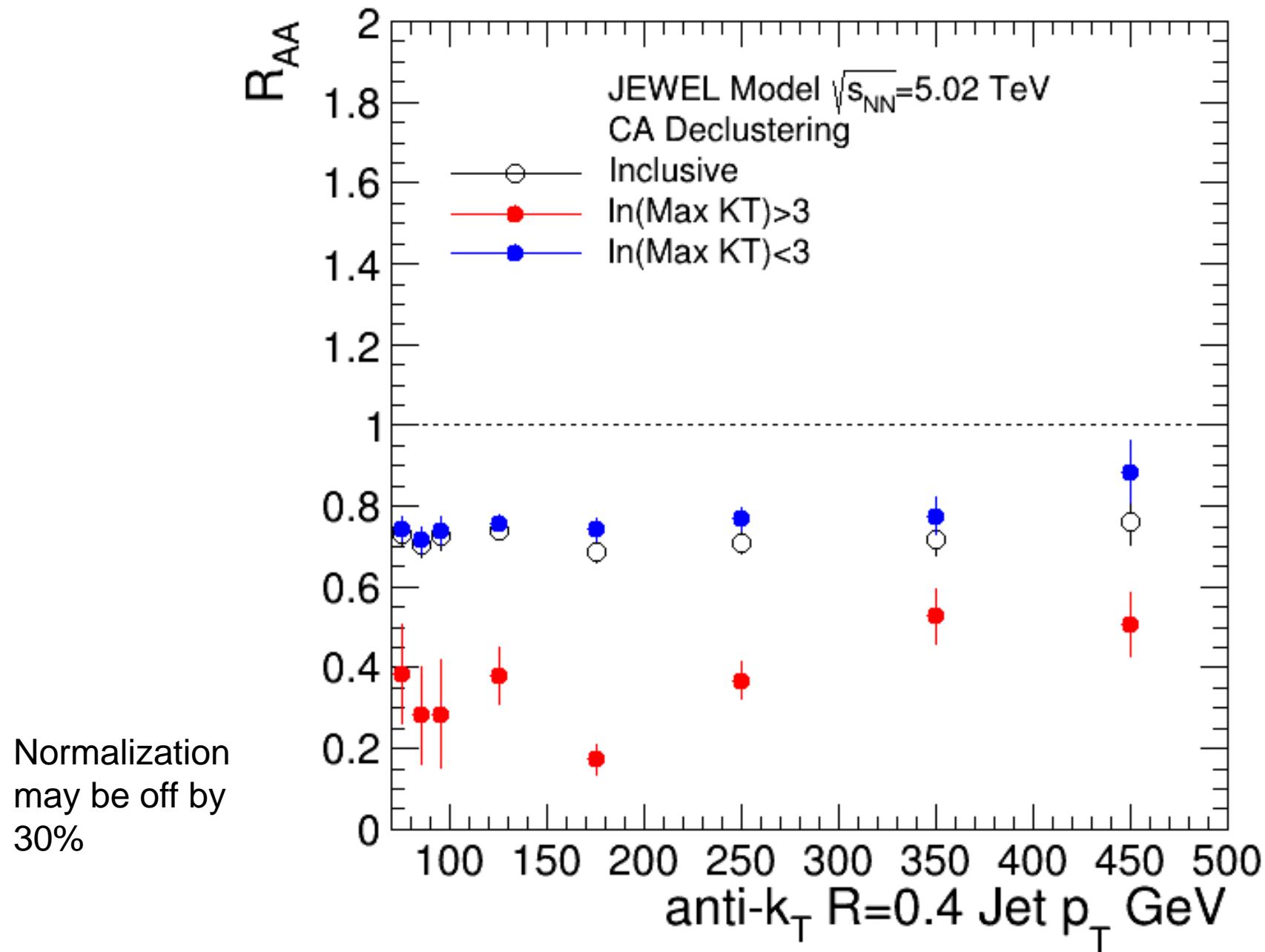
# KT Tagged Jet $R_{AA}$ from HYBRID (CA)



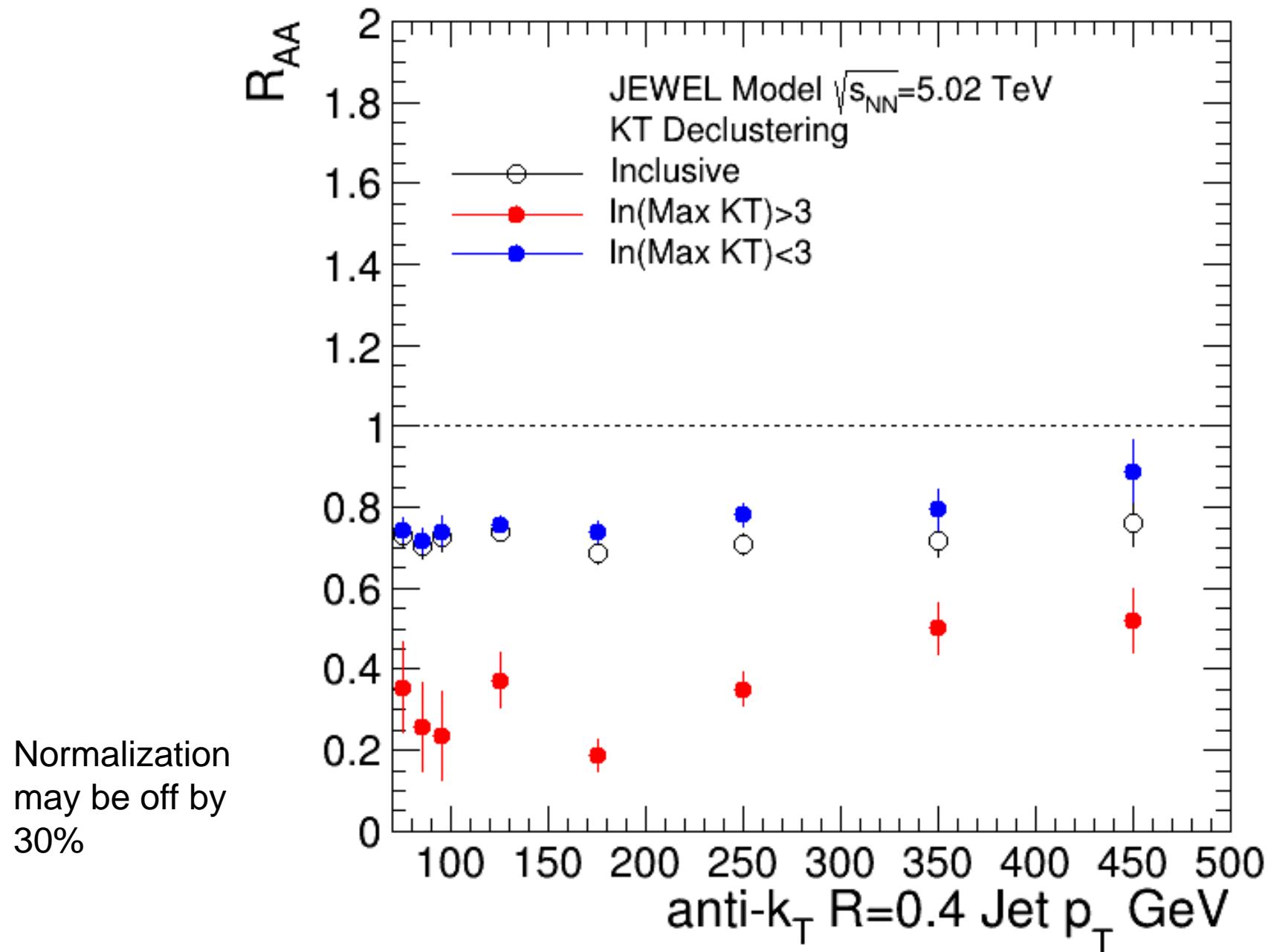
# KT Tagged Jet $R_{AA}$ from HYBRID (KT)



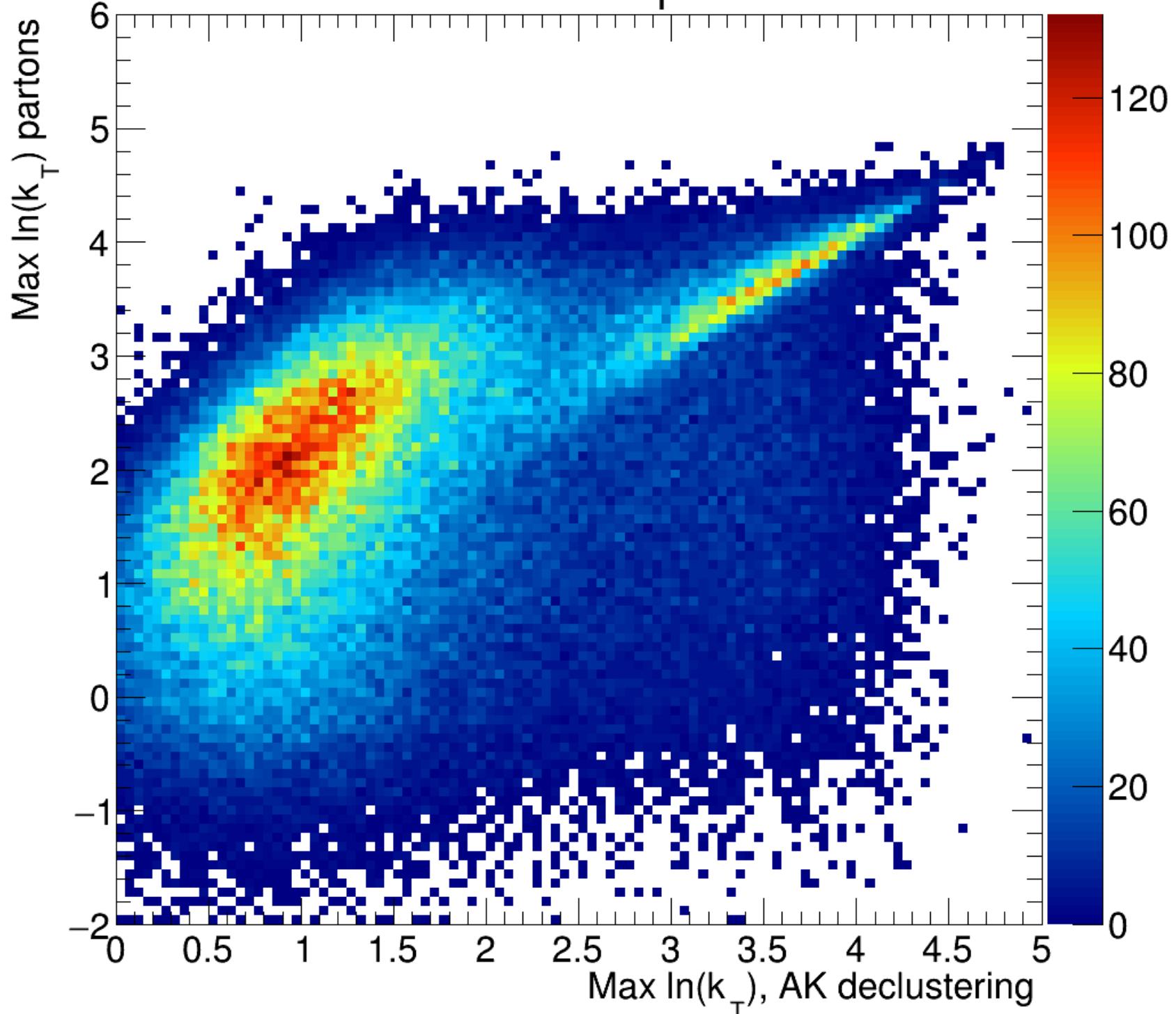
# KT Tagged Jet $R_{AA}$ from JEWEL No-Recoil (CA)



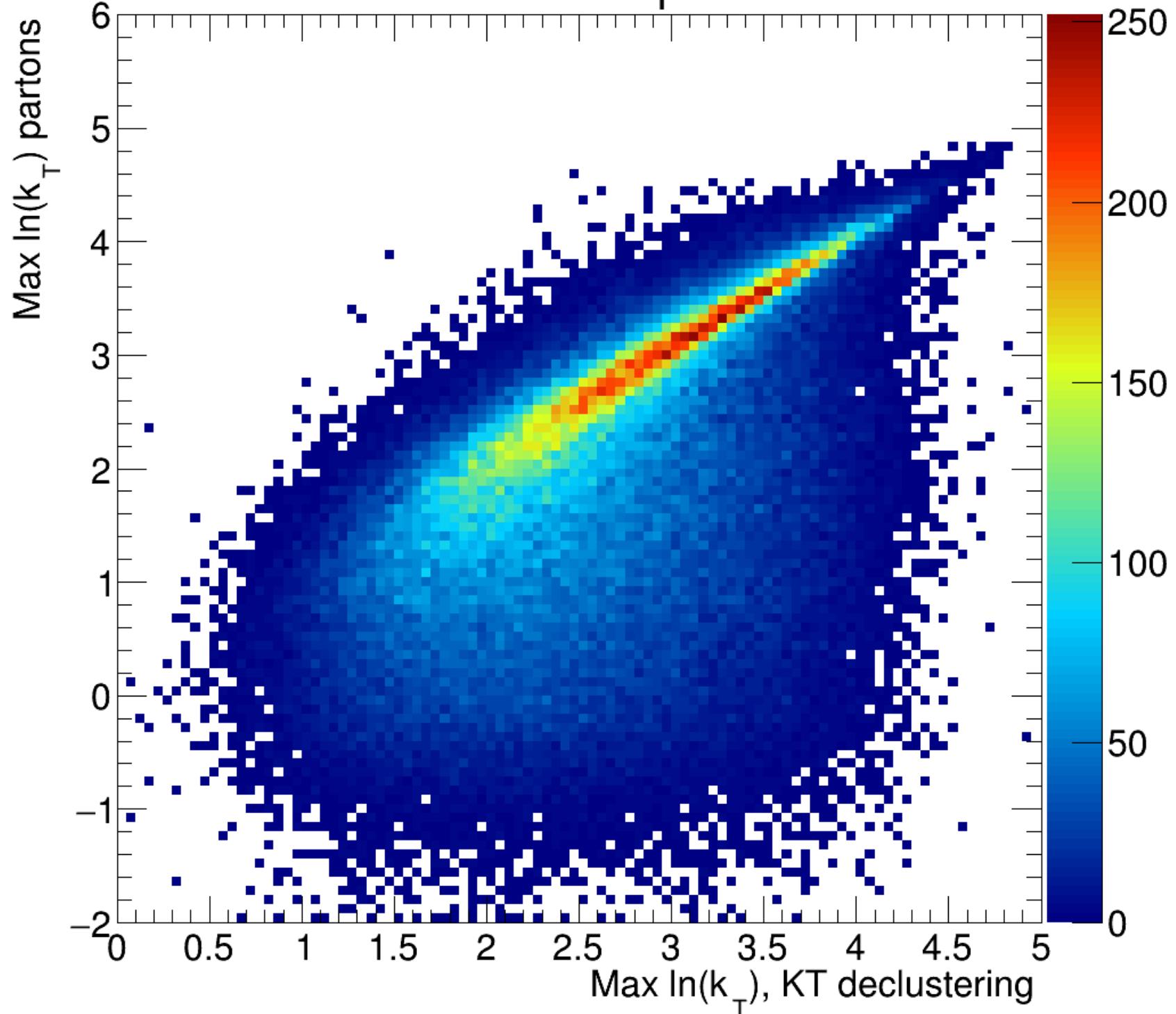
# KT Tagged Jet $R_{AA}$ from JEWEL No-Recoil (KT)



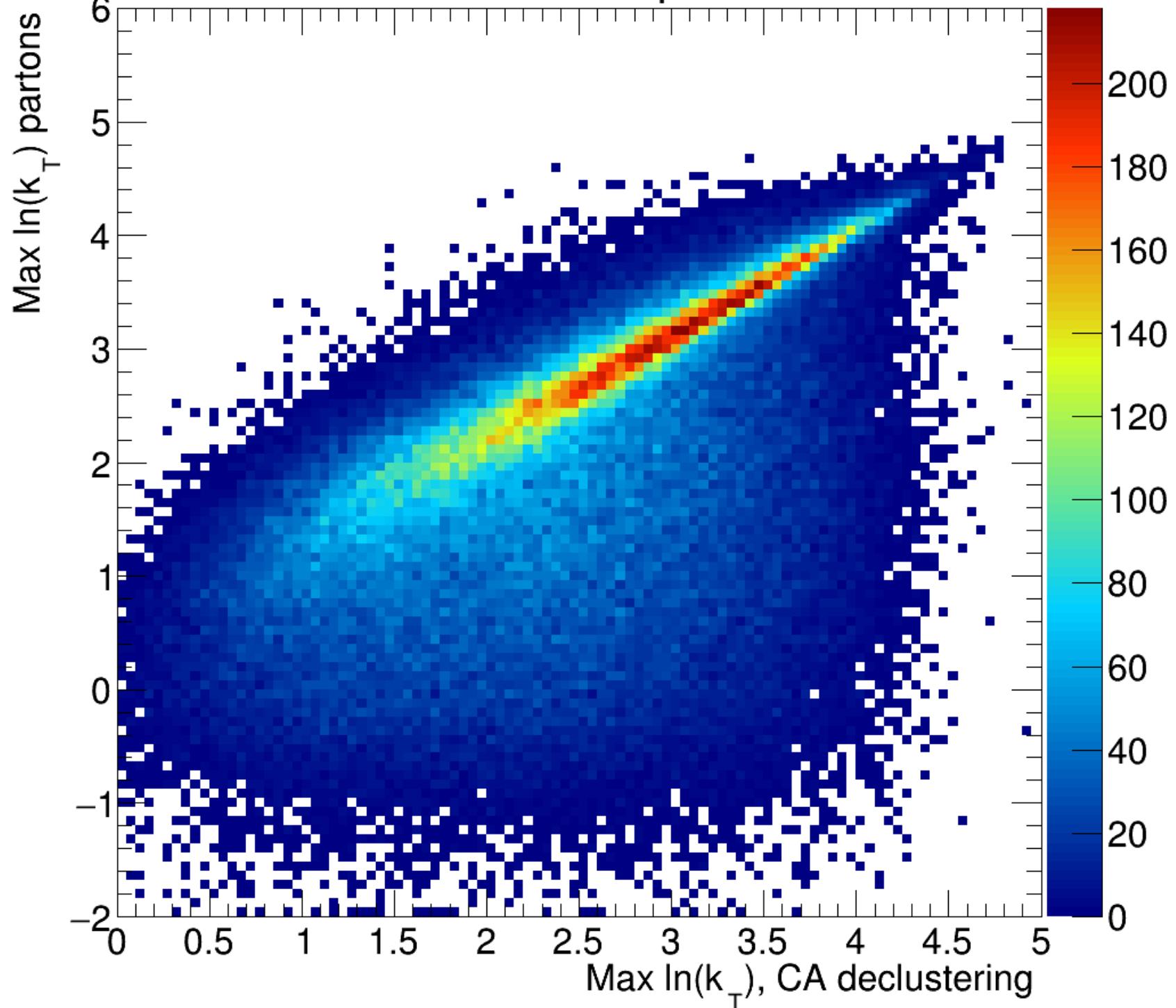
# Pythia8 UEOn $p_T^{\text{jet}} > 350 \text{ GeV}$



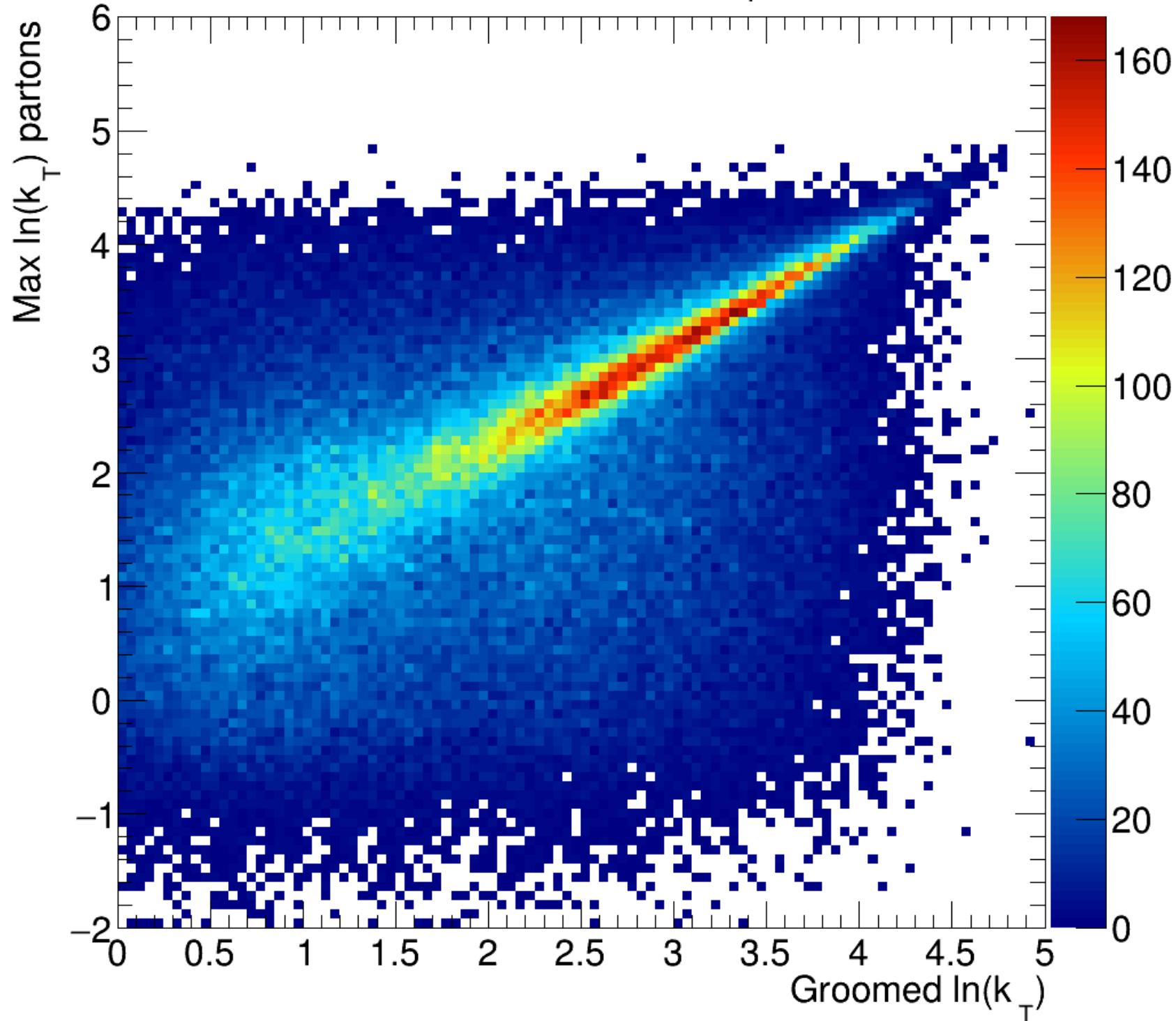
# Pythia8 UEOn $p_T^{\text{jet}} > 350 \text{ GeV}$



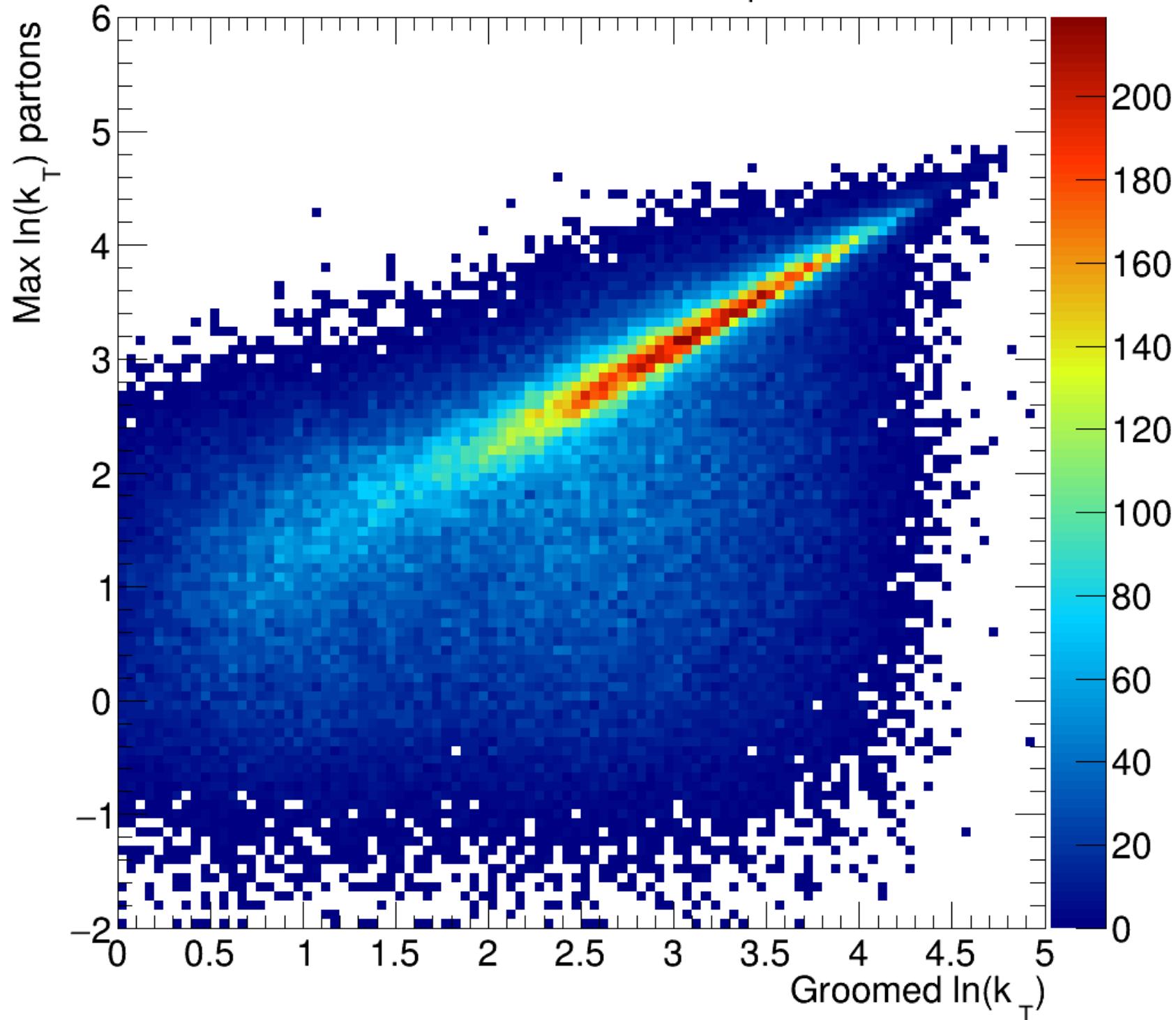
# Pythia8 UEOn $p_T^{\text{jet}} > 350 \text{ GeV}$



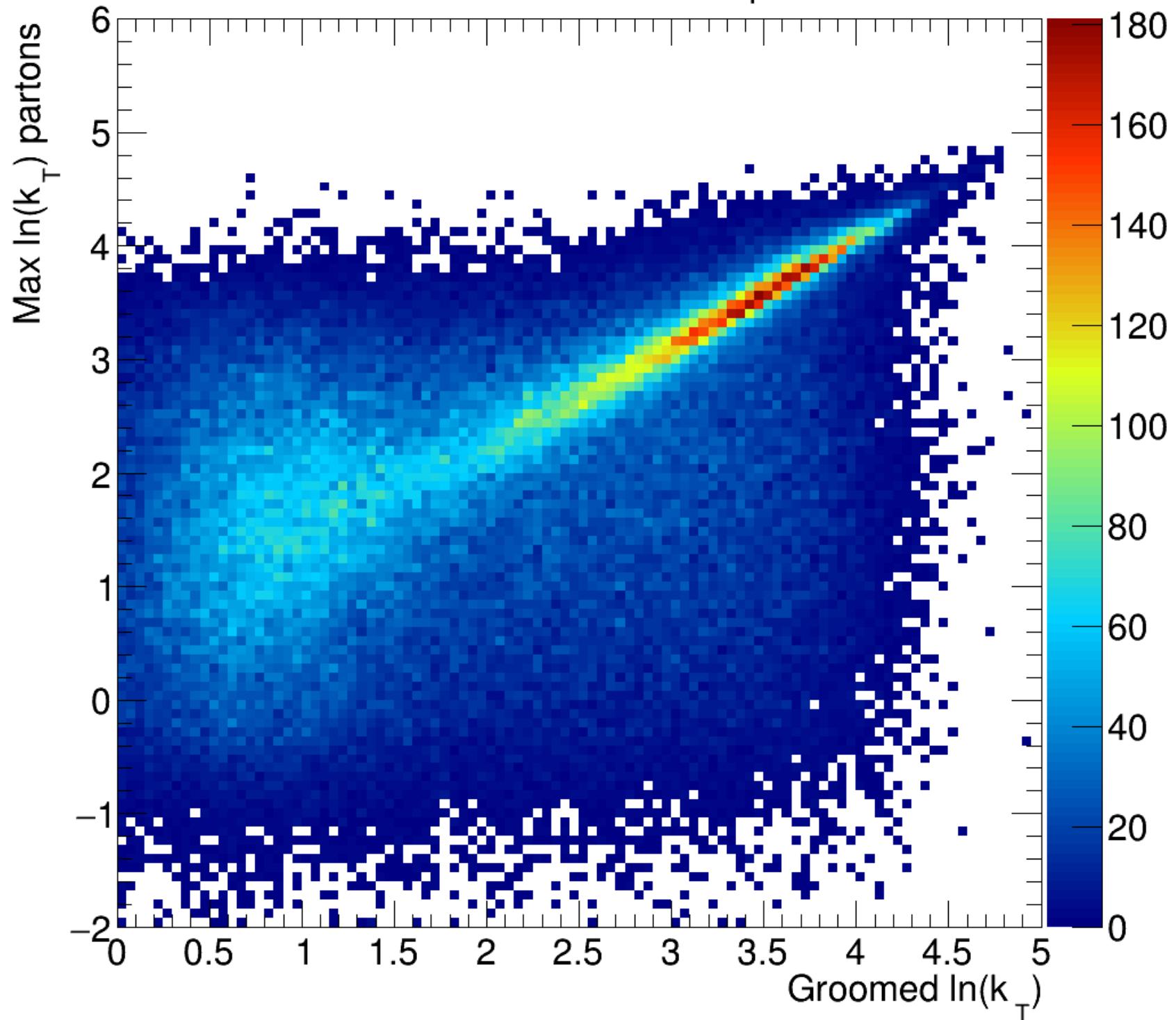
Pythia8 UEOn (0.5, 1.5)  $p_T^{\text{jet}} > 350 \text{ GeV}$



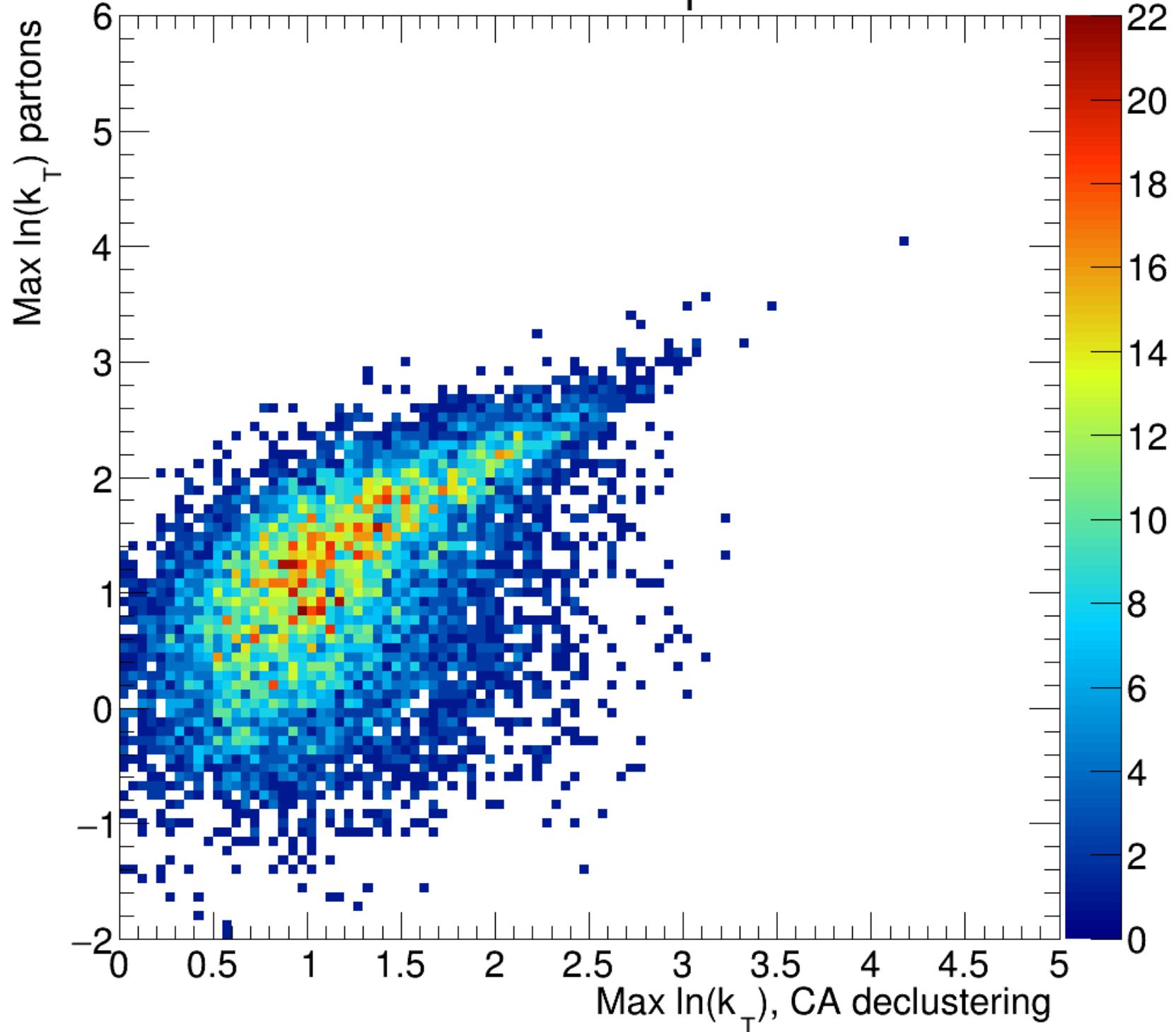
Pythia8 UEOn (0.1, 0.0)  $p_T^{\text{jet}} > 350 \text{ GeV}$



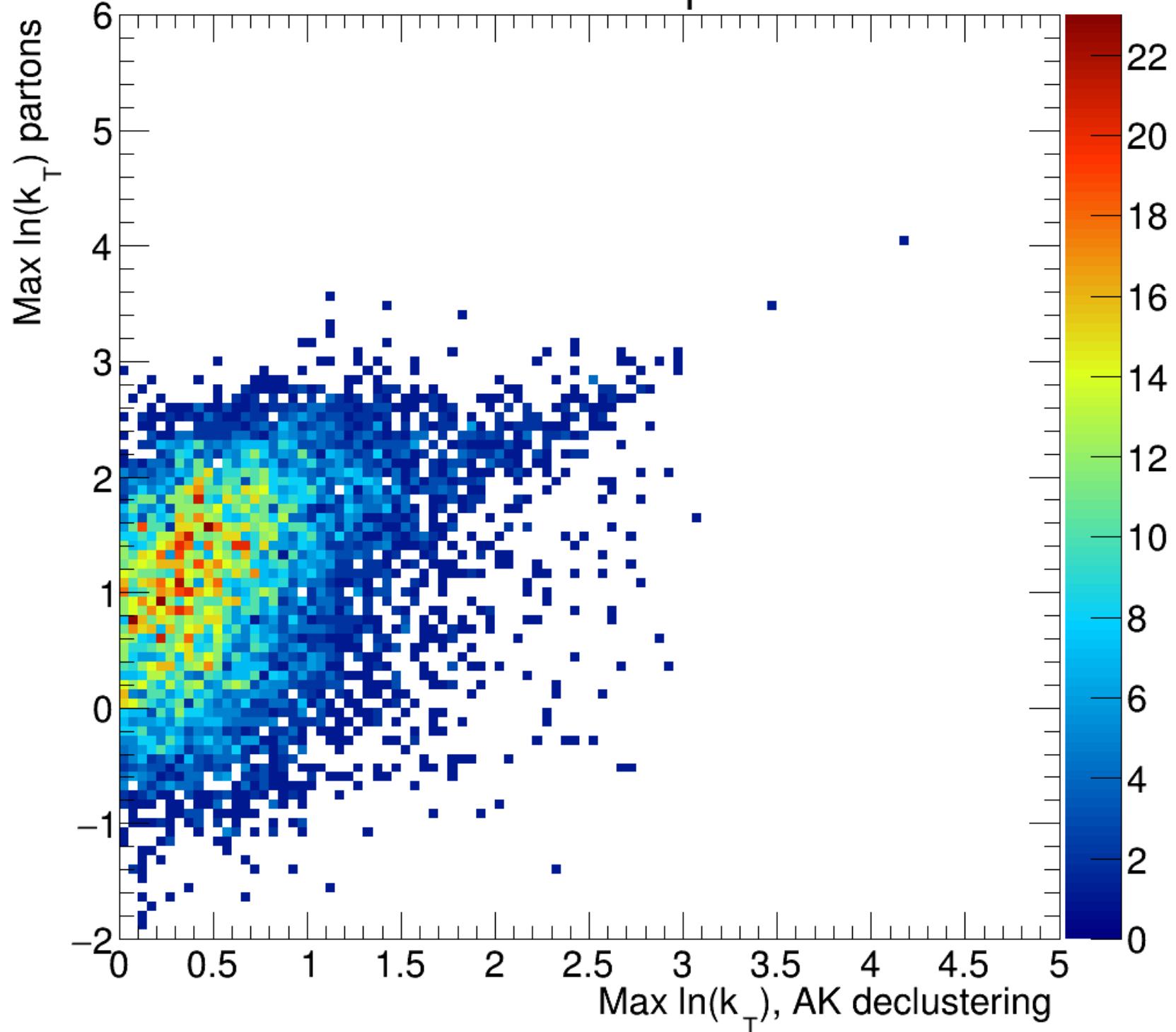
Pythia8 UEOn (0.25, 0.0)  $p_T^{\text{jet}} > 350 \text{ GeV}$



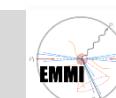
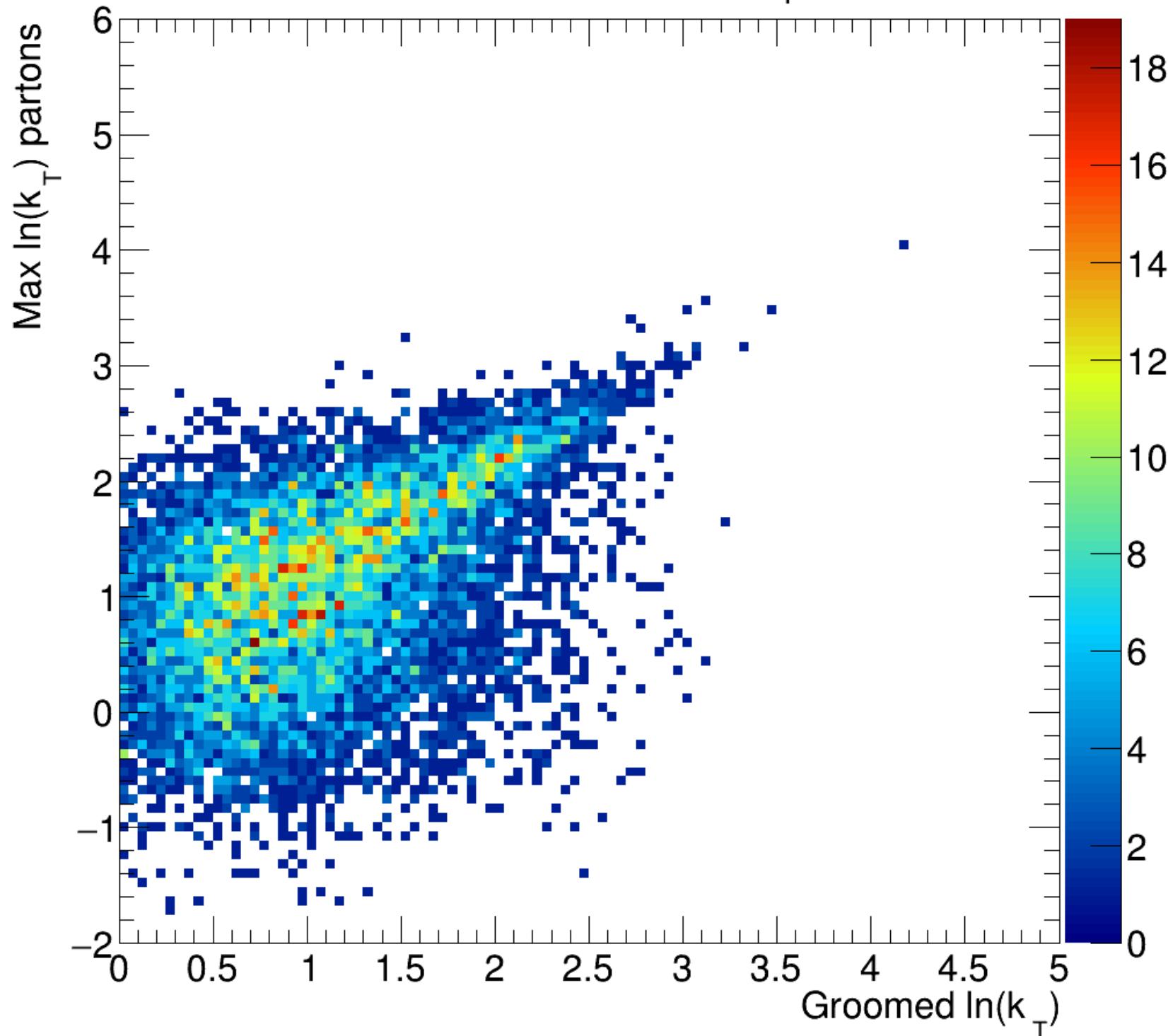
# Pythia8 UEOn $p_T^{\text{jet}} > 60 \text{ GeV}$



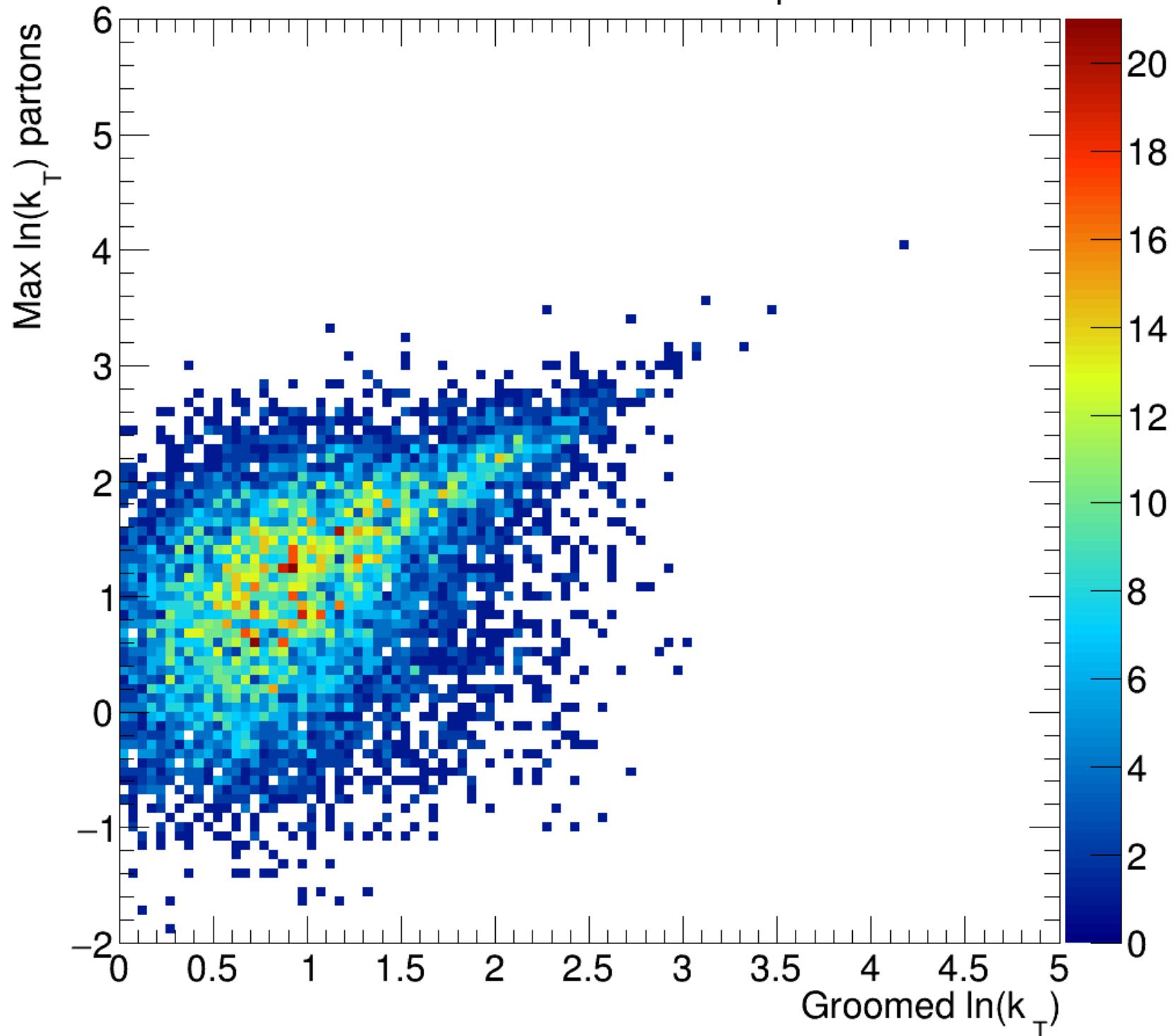
# Pythia8 UEOn $p_T^{\text{jet}} > 60 \text{ GeV}$



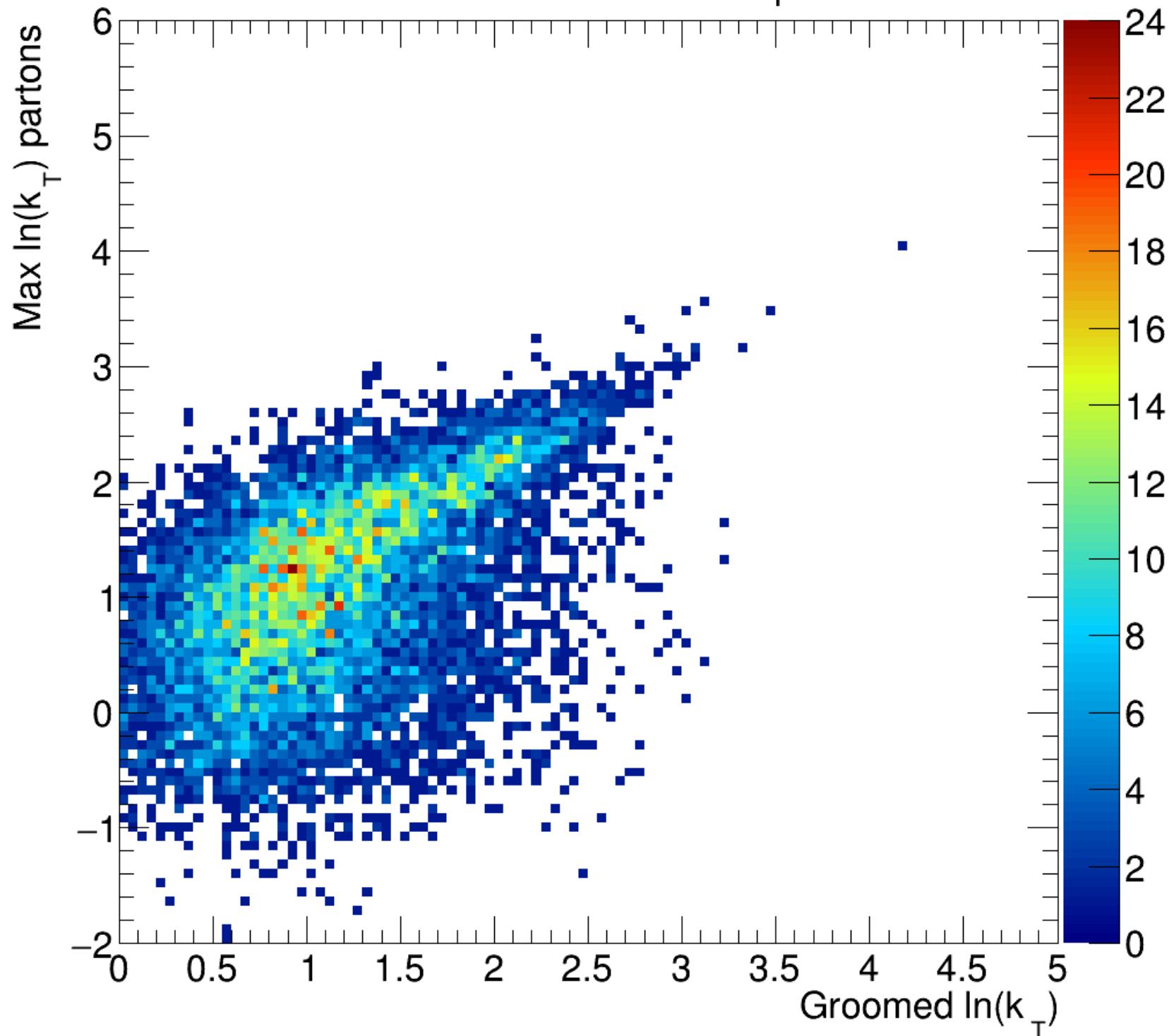
Pythia8 UEOn (0.25, 0.0)  $p_T^{\text{jet}} > 60 \text{ GeV}$



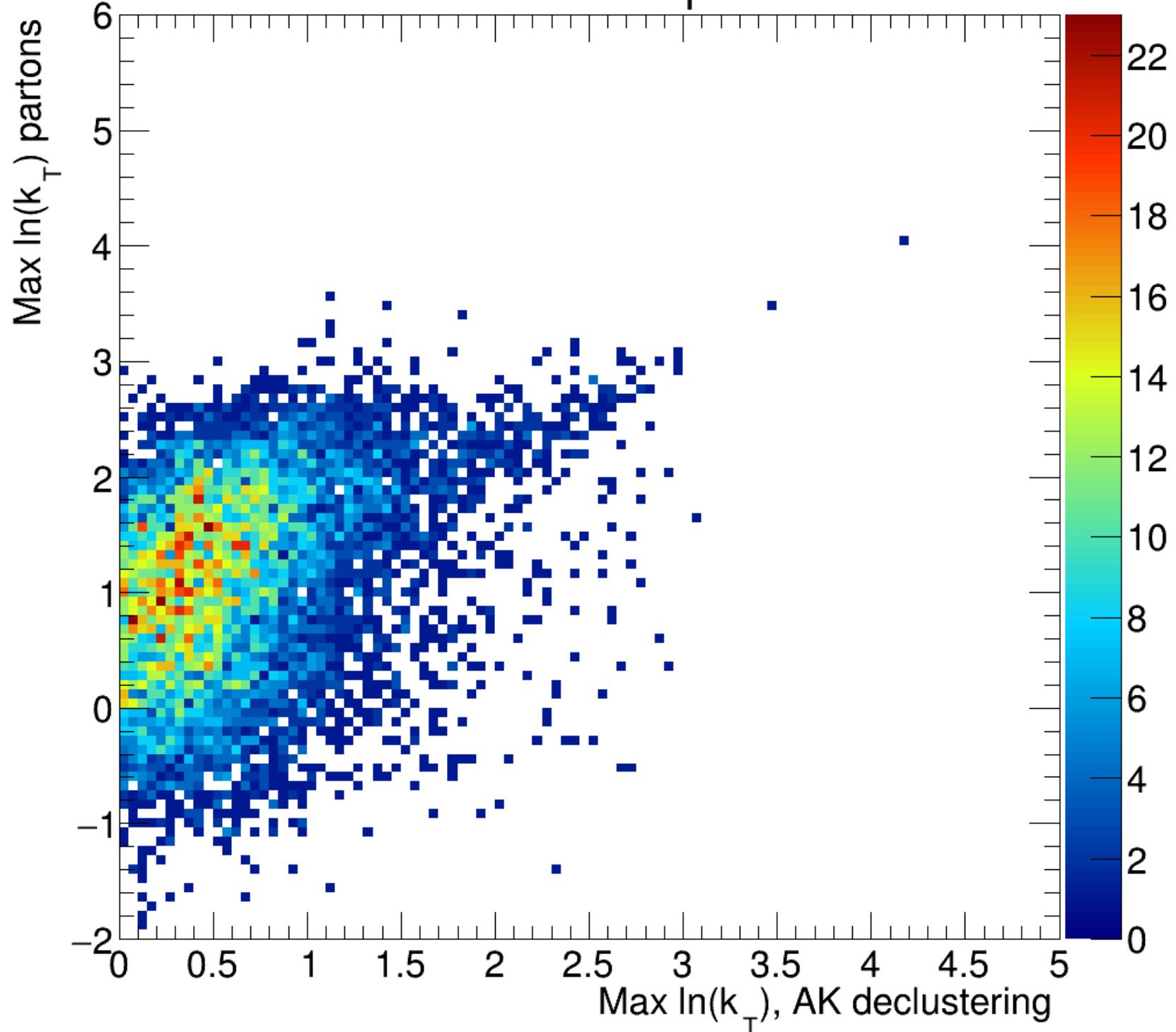
Pythia8 UEOn (0.5, 1.5)  $p_T^{\text{jet}} > 60 \text{ GeV}$



Pythia8 UEOn (0.1, 0.0)  $p_T^{\text{jet}} > 60 \text{ GeV}$



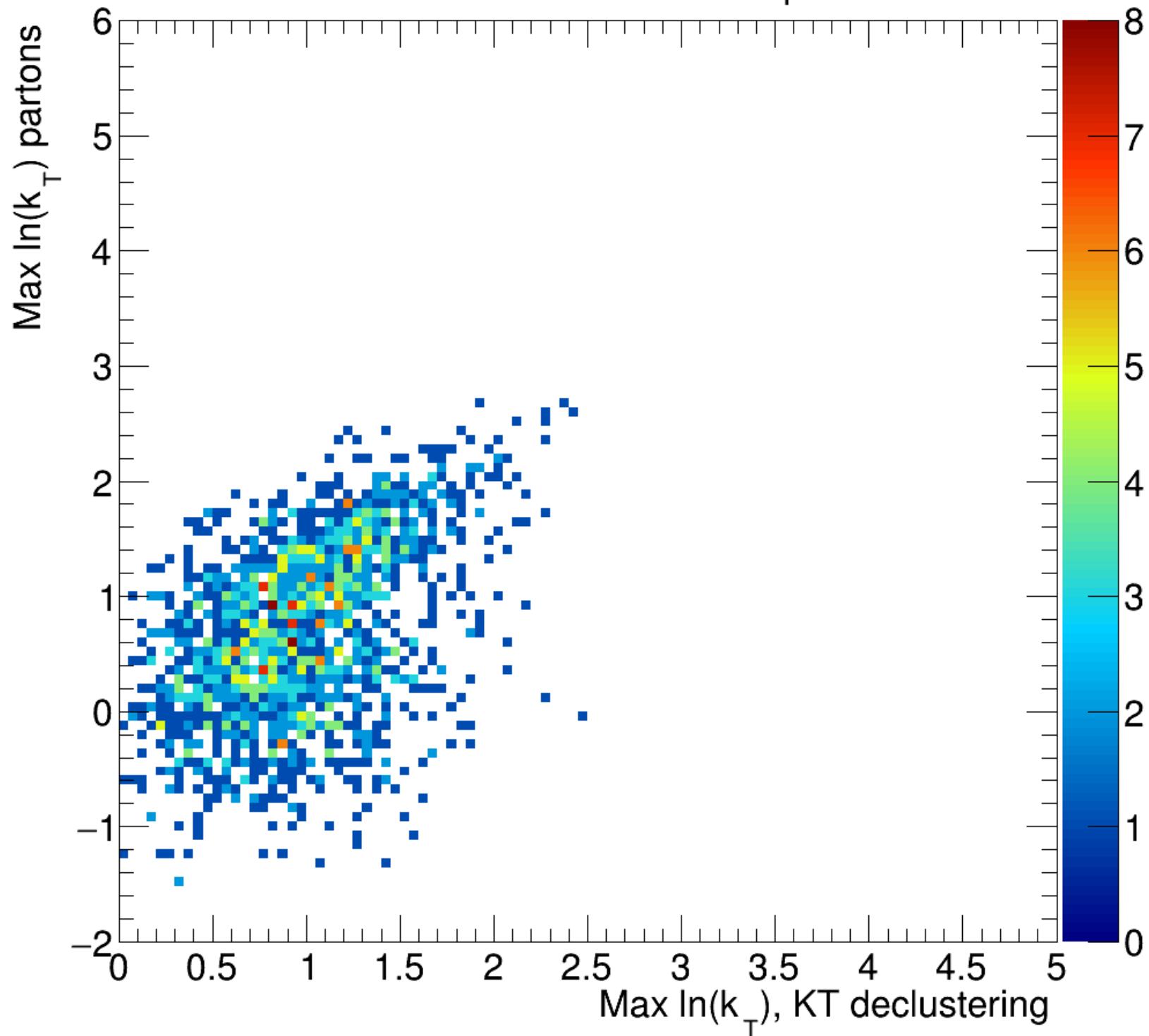
# Pythia8 UEOn $p_T^{\text{jet}} > 60 \text{ GeV}$



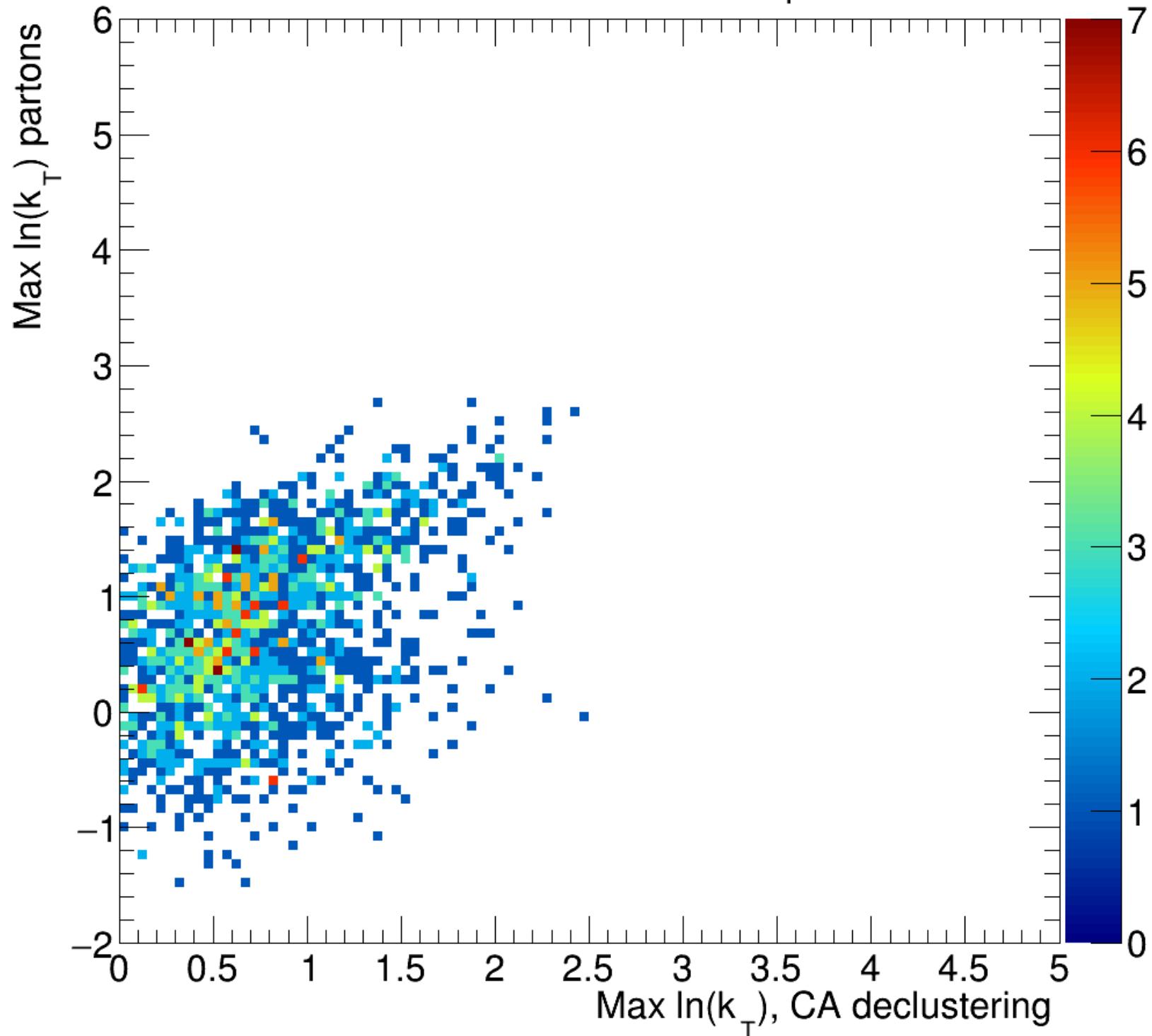
# Investigation of R dependence

R=0.2

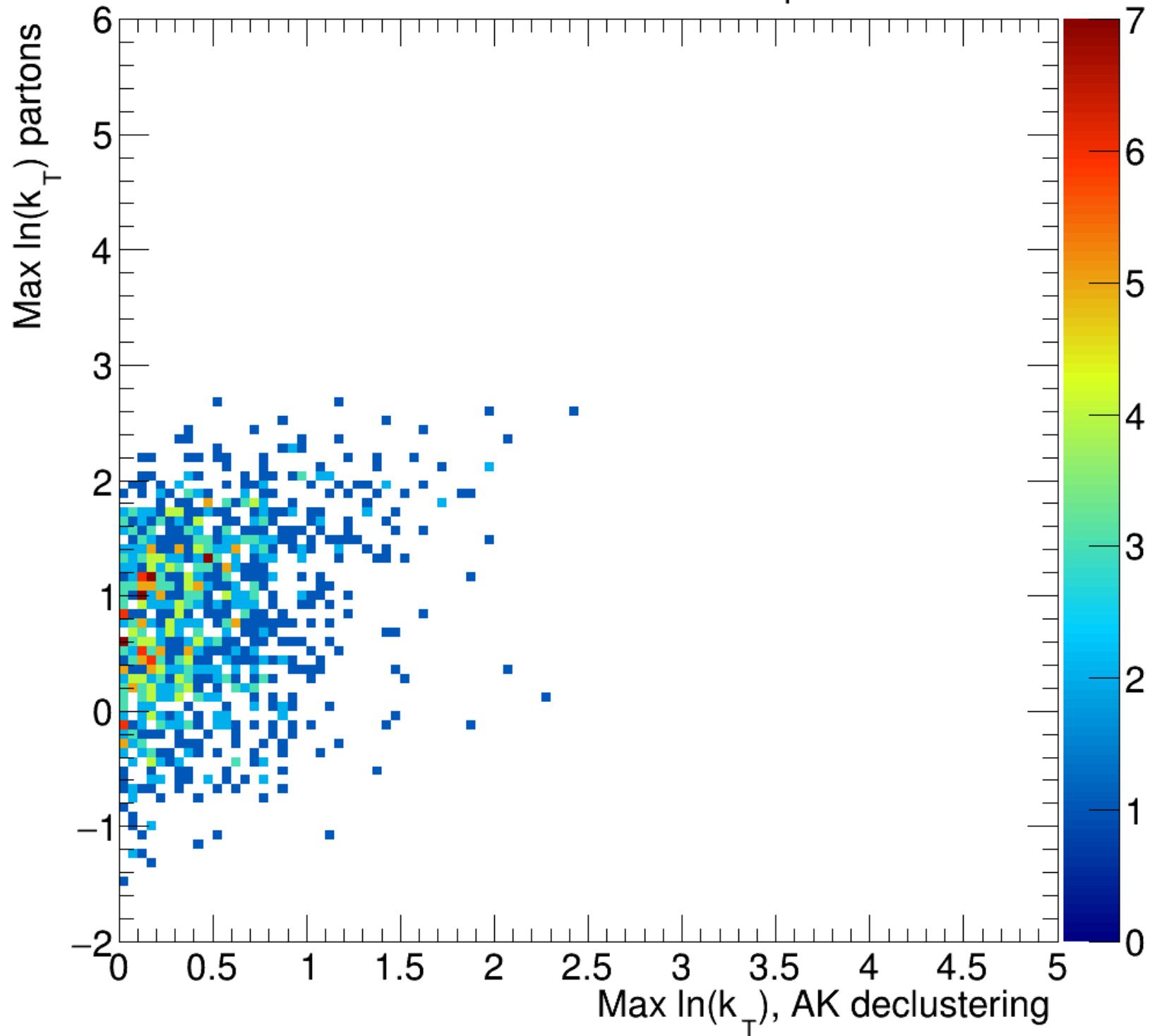
$R = 0.2$ , Pythia8 PTHat 50  $p_T^{\text{jet}} > 70 \text{ GeV}$



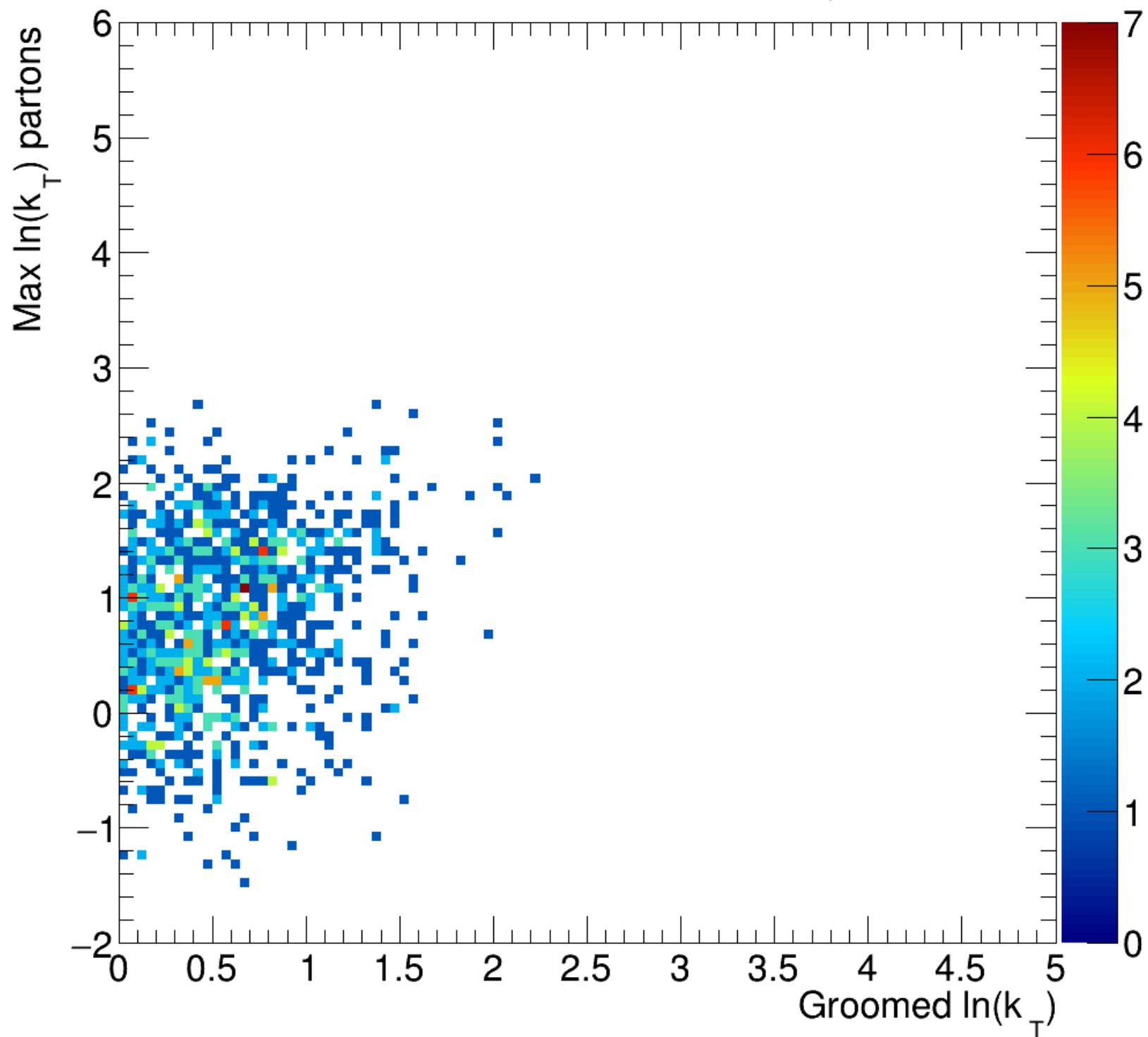
$R = 0.2$ , Pythia8 PTHat 50  $p_T^{\text{jet}} > 70 \text{ GeV}$



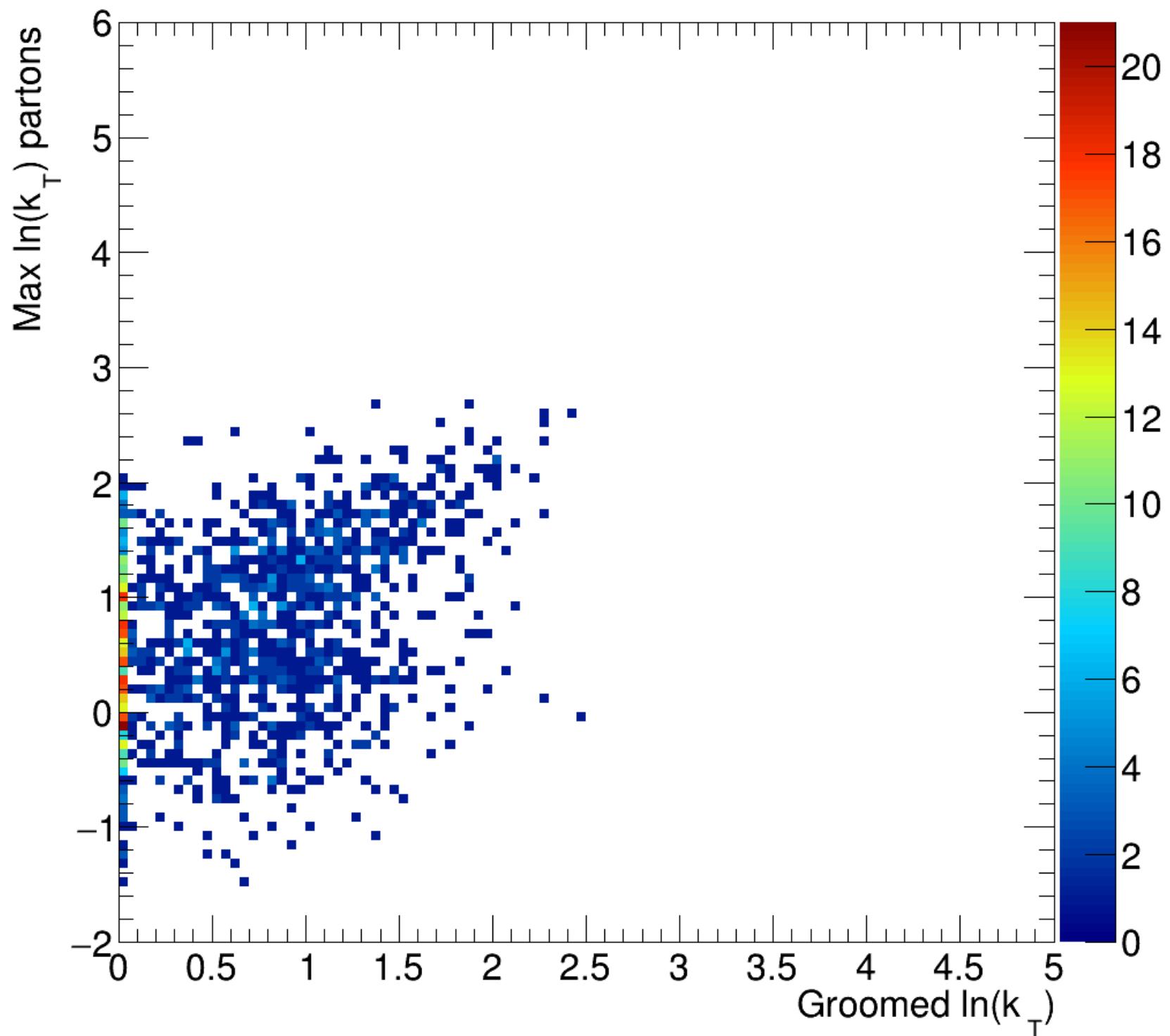
$R = 0.2$ , Pythia8 PTHat 50  $p_T^{\text{jet}} > 70 \text{ GeV}$



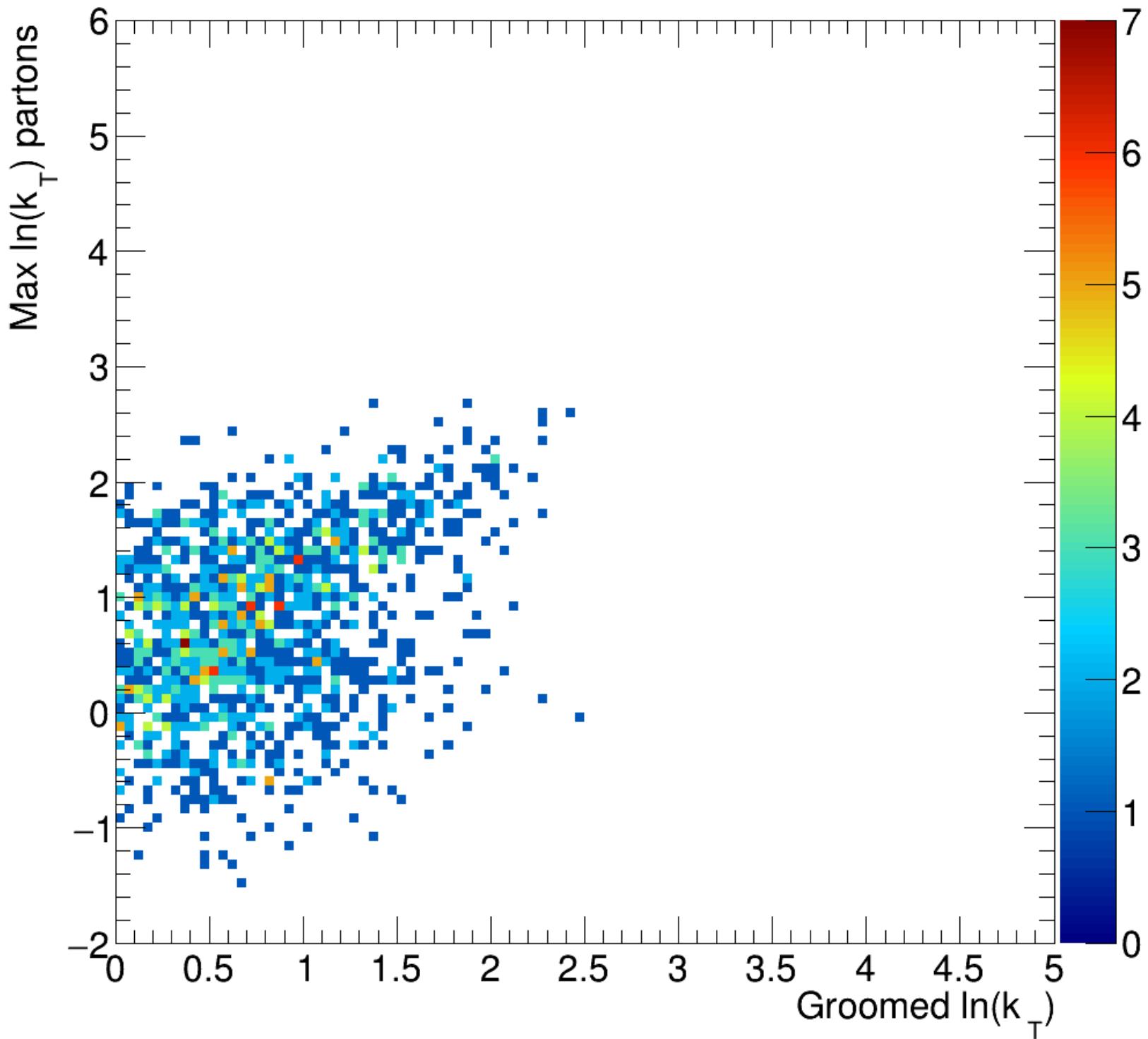
$R = 0.2$ , Pythia8 PTHat 50 (5.0, 5.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$



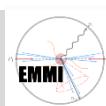
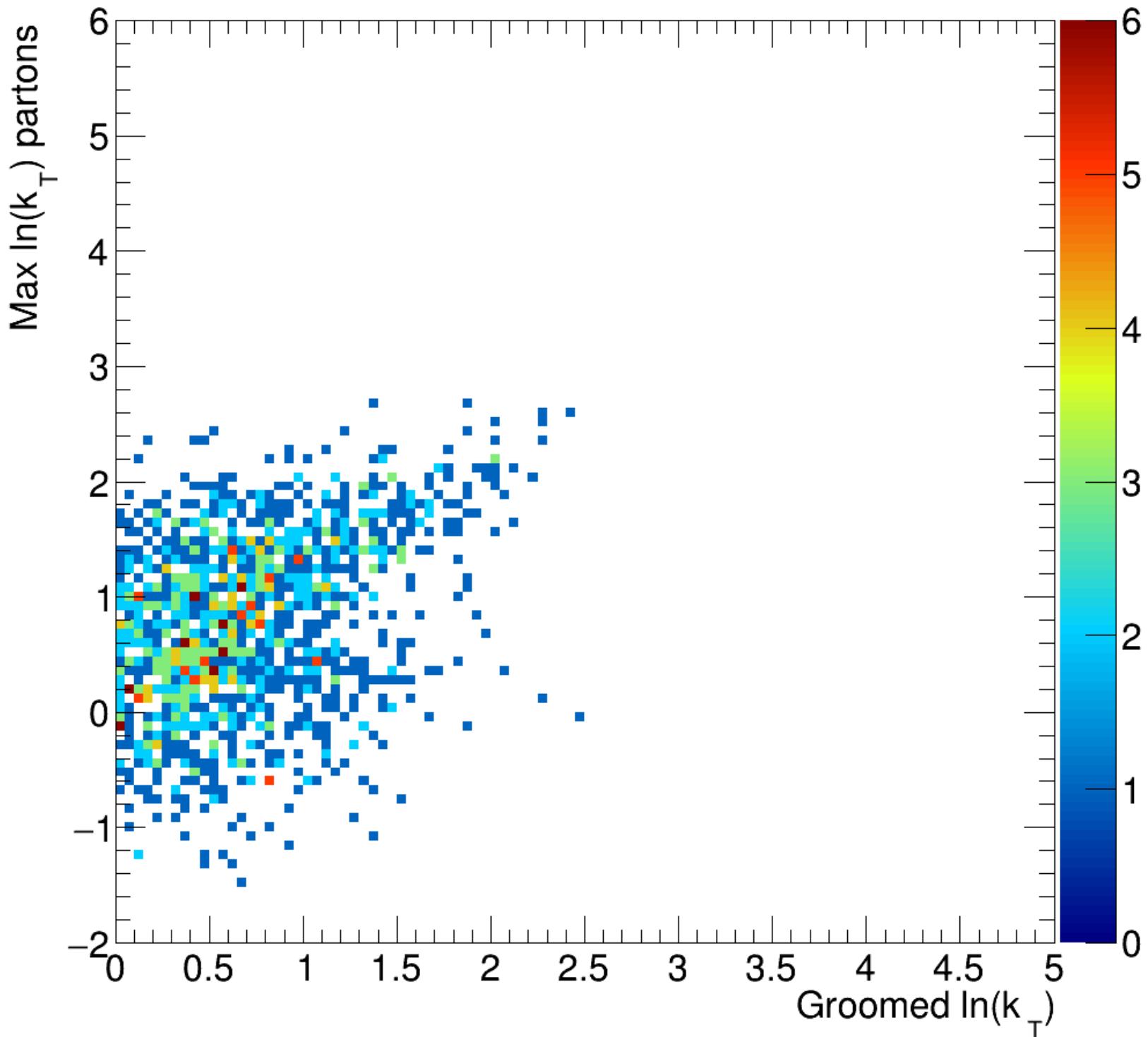
$R = 0.2$ , Pythia8 PTHat 50 (0.15, -1.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$



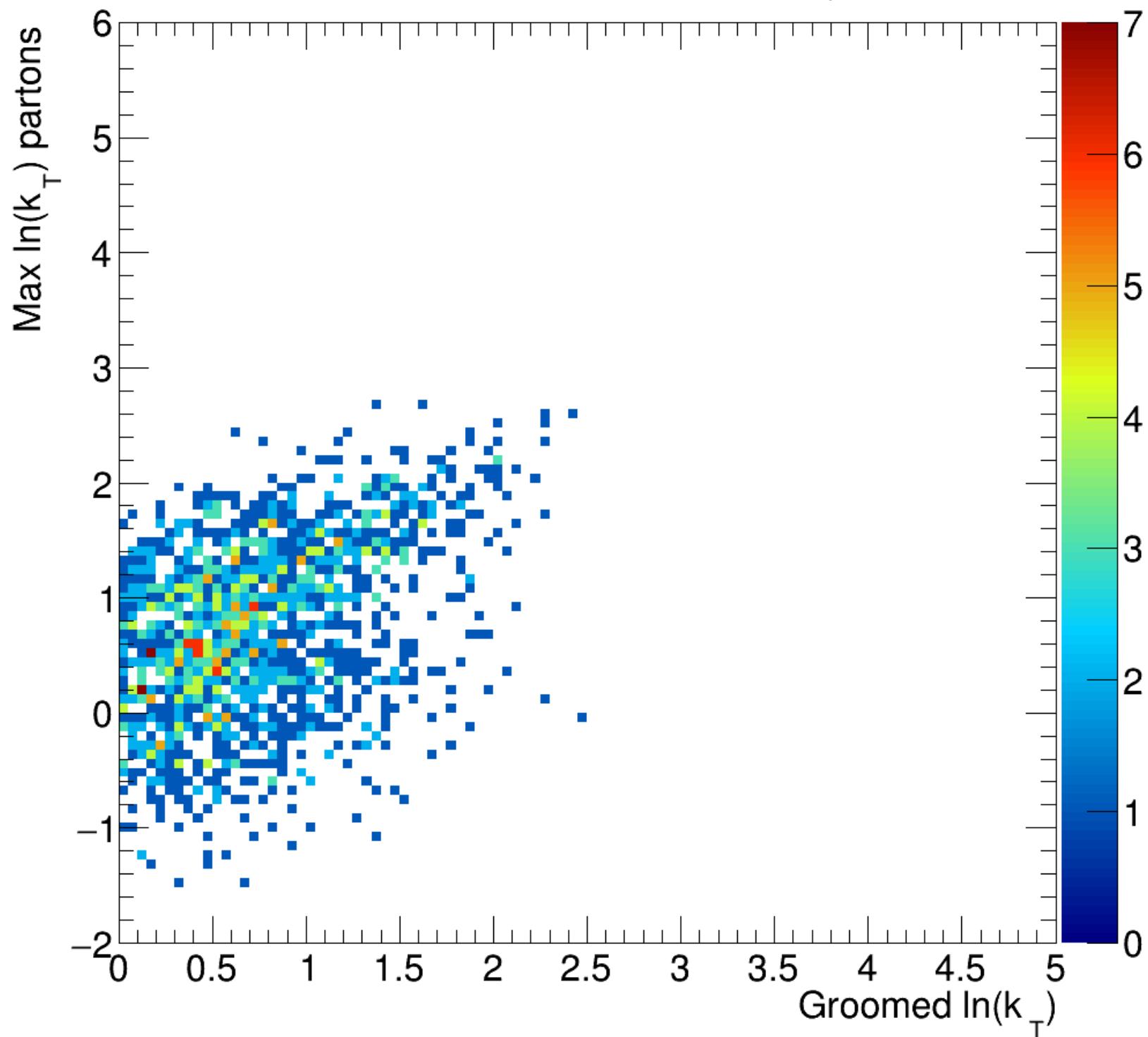
$R = 0.2$ , Pythia8 PTHat 50 (0.25, 0.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$



$R = 0.2$ , Pythia8 PTHat 50 (0.5, 1.5)  $p_T^{\text{jet}} > 70 \text{ GeV}$



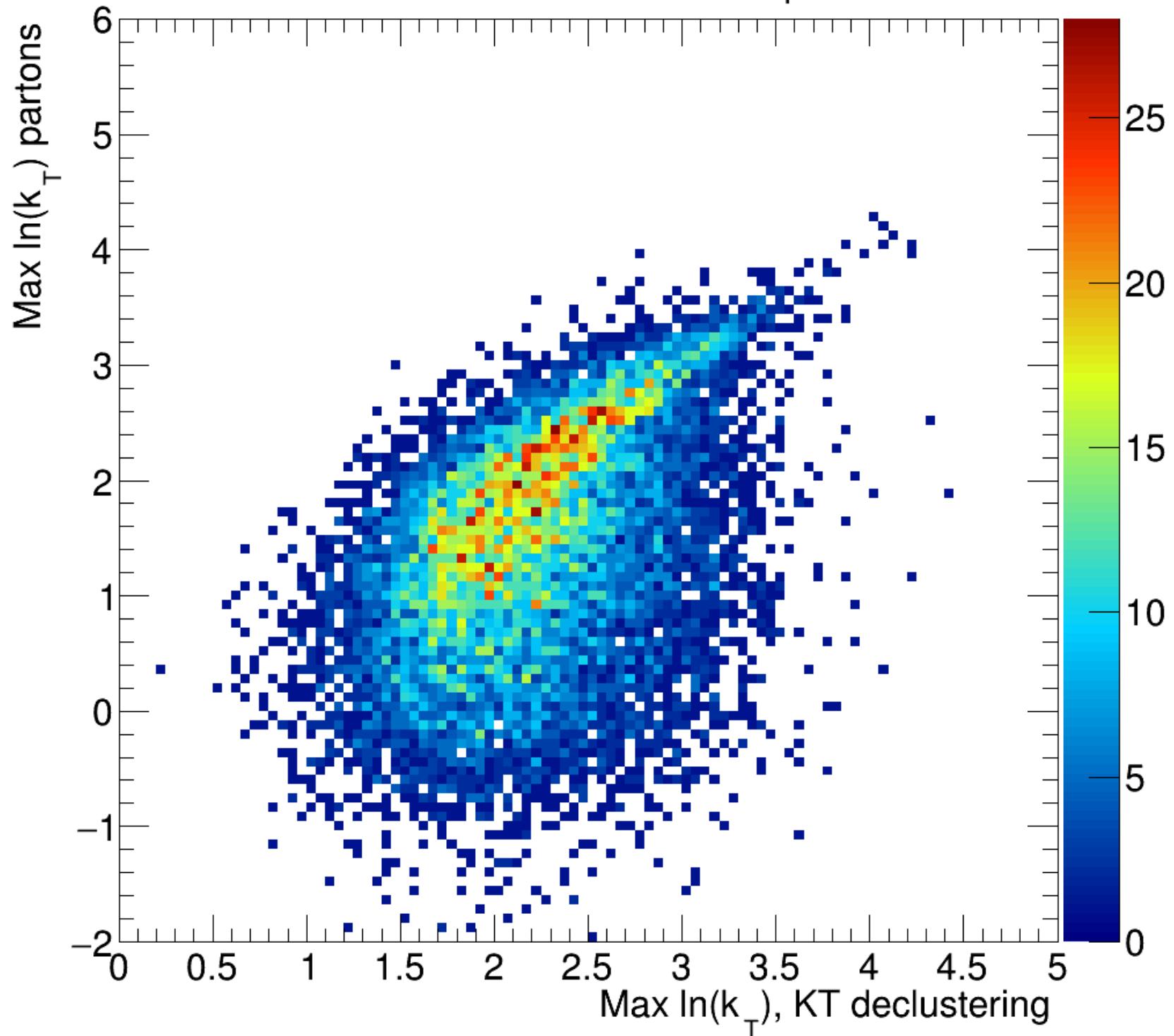
$R = 0.2$ , Pythia8 PTHat 50 (0.1, 0.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$



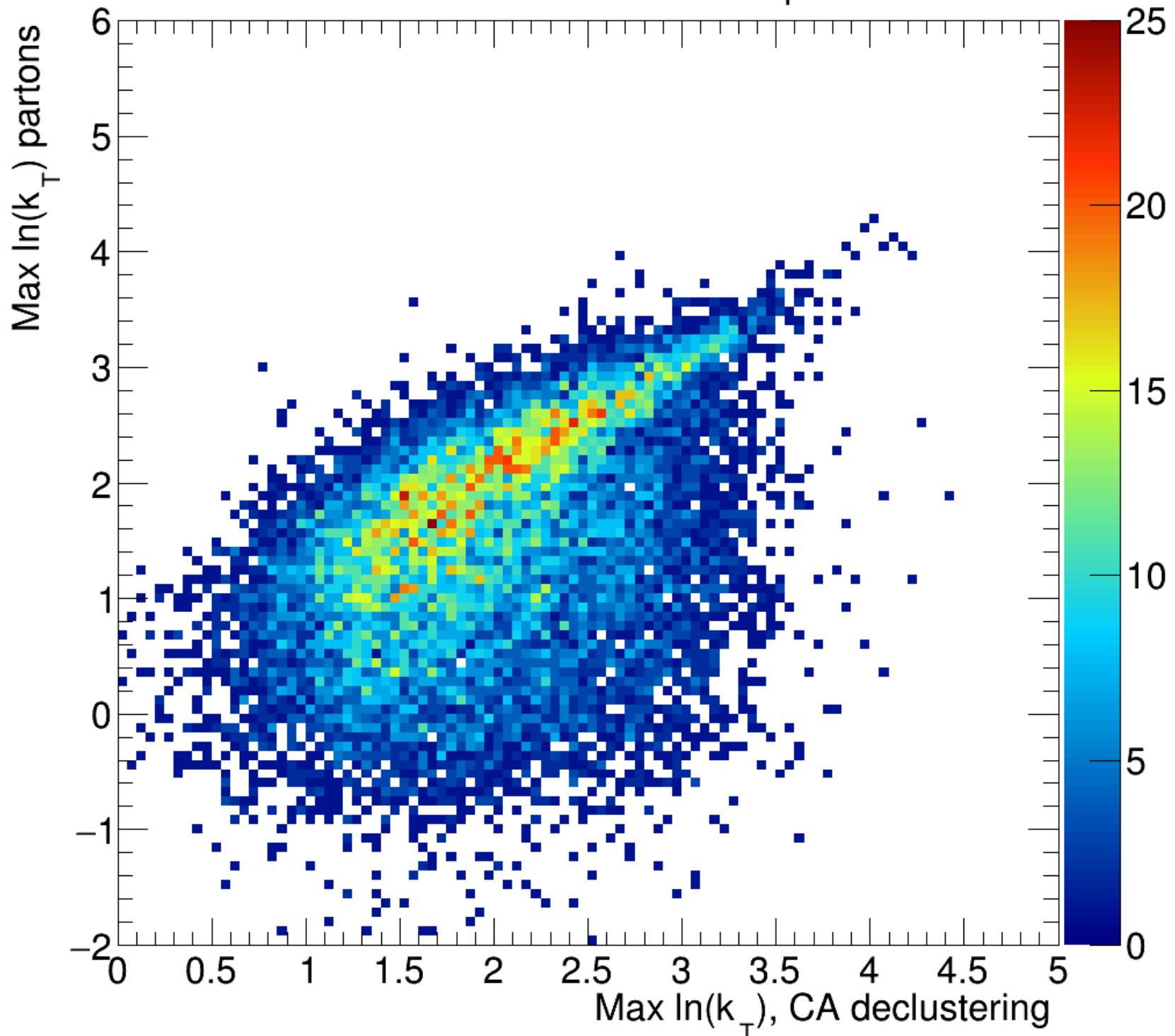
# Investigation of R dependence

R=0.8

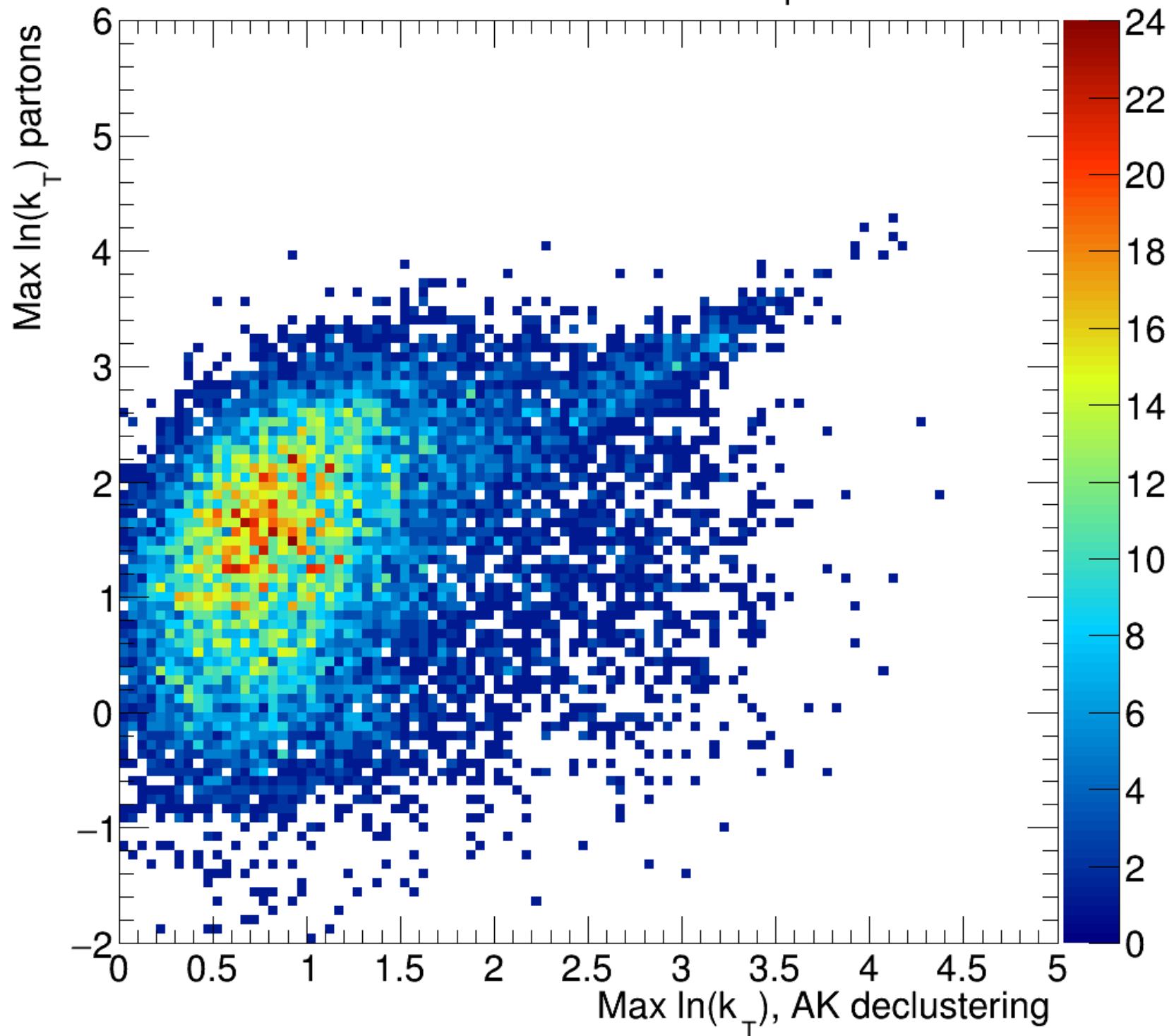
$R = 0.8$ , Pythia8 PTHat 50  $p_T^{\text{jet}} > 70 \text{ GeV}$



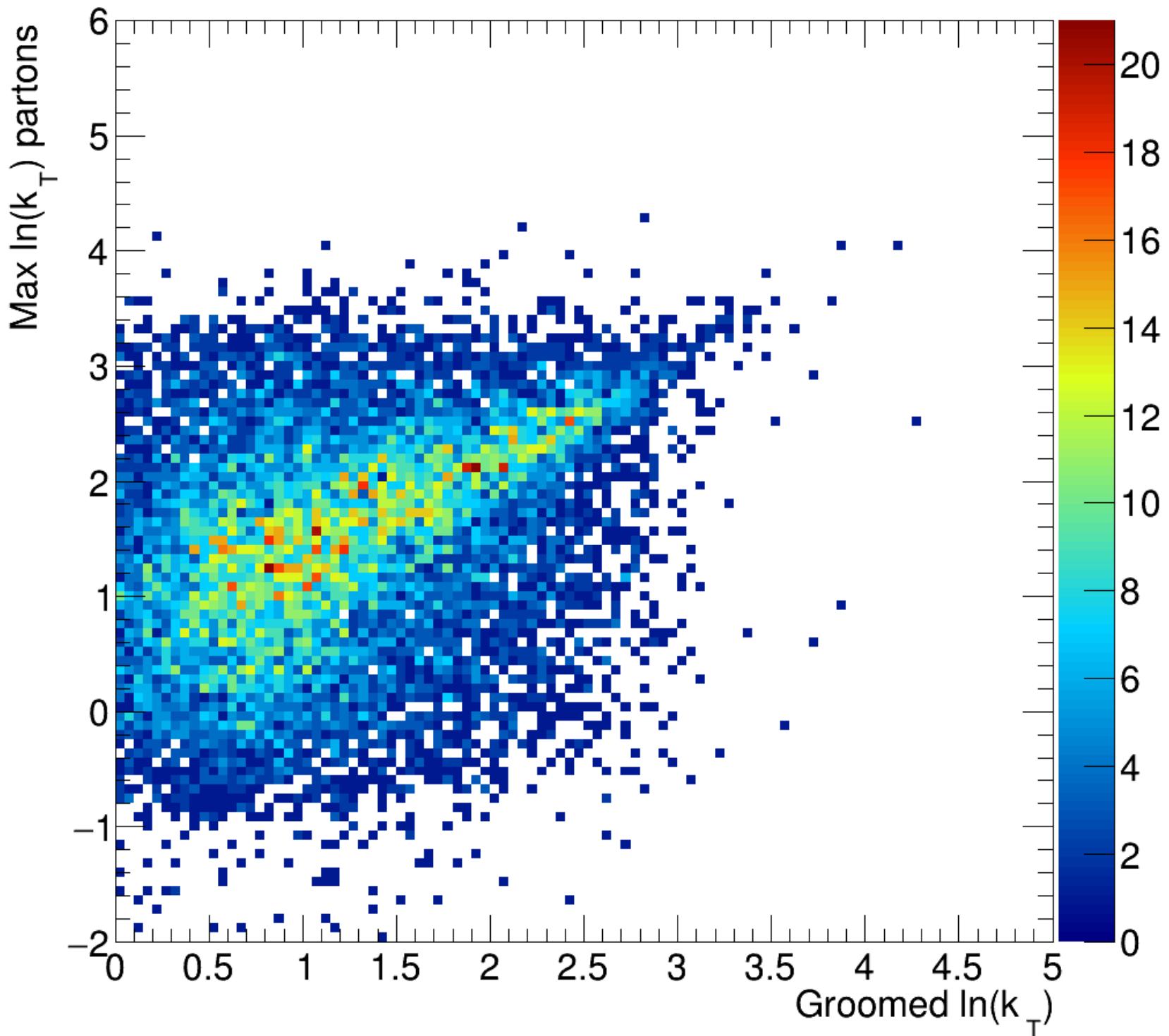
$R = 0.8$ , Pythia8 PTHat 50  $p_T^{\text{jet}} > 70 \text{ GeV}$



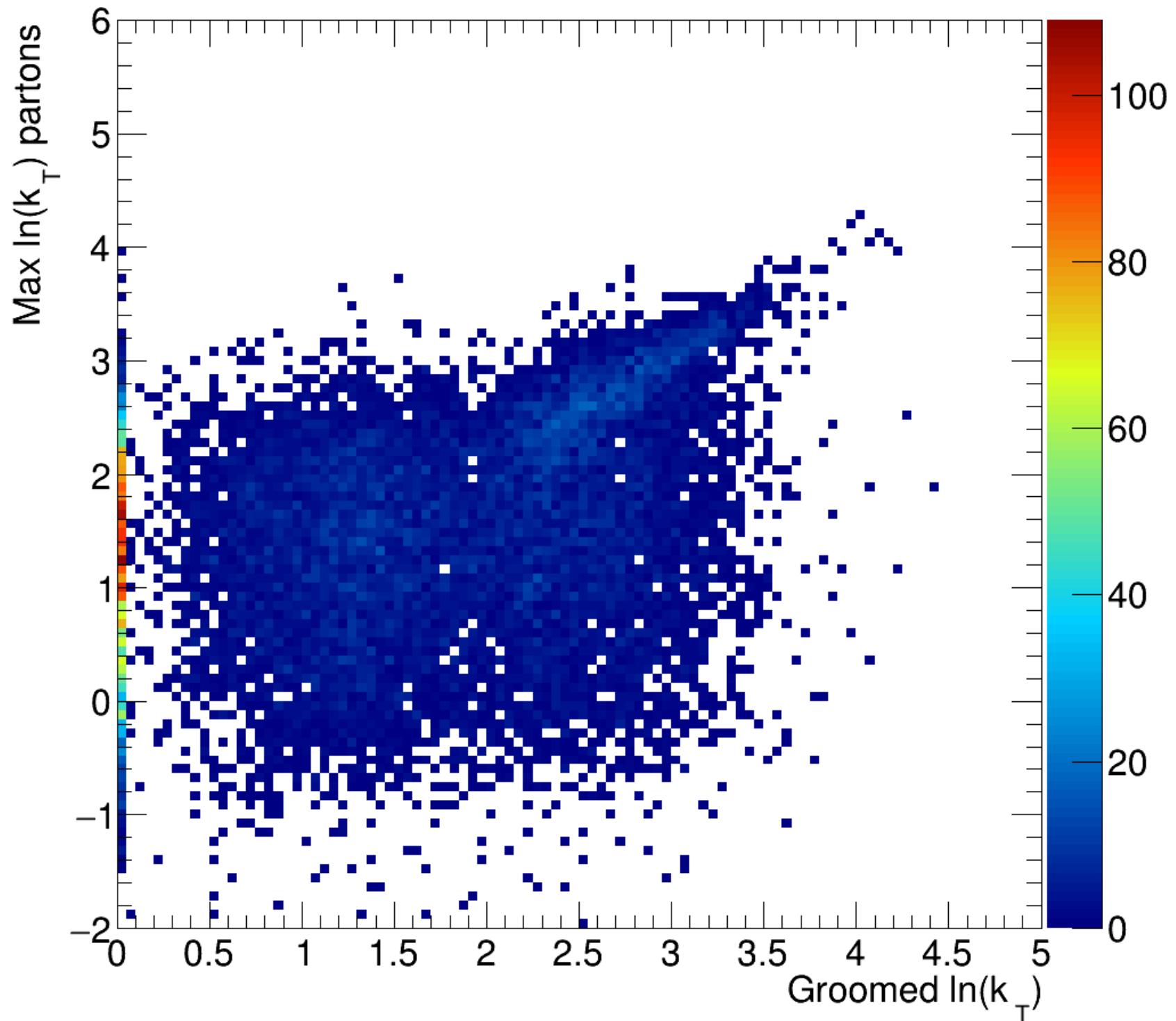
$R = 0.8$ , Pythia8 PTHat 50  $p_T^{\text{jet}} > 70 \text{ GeV}$



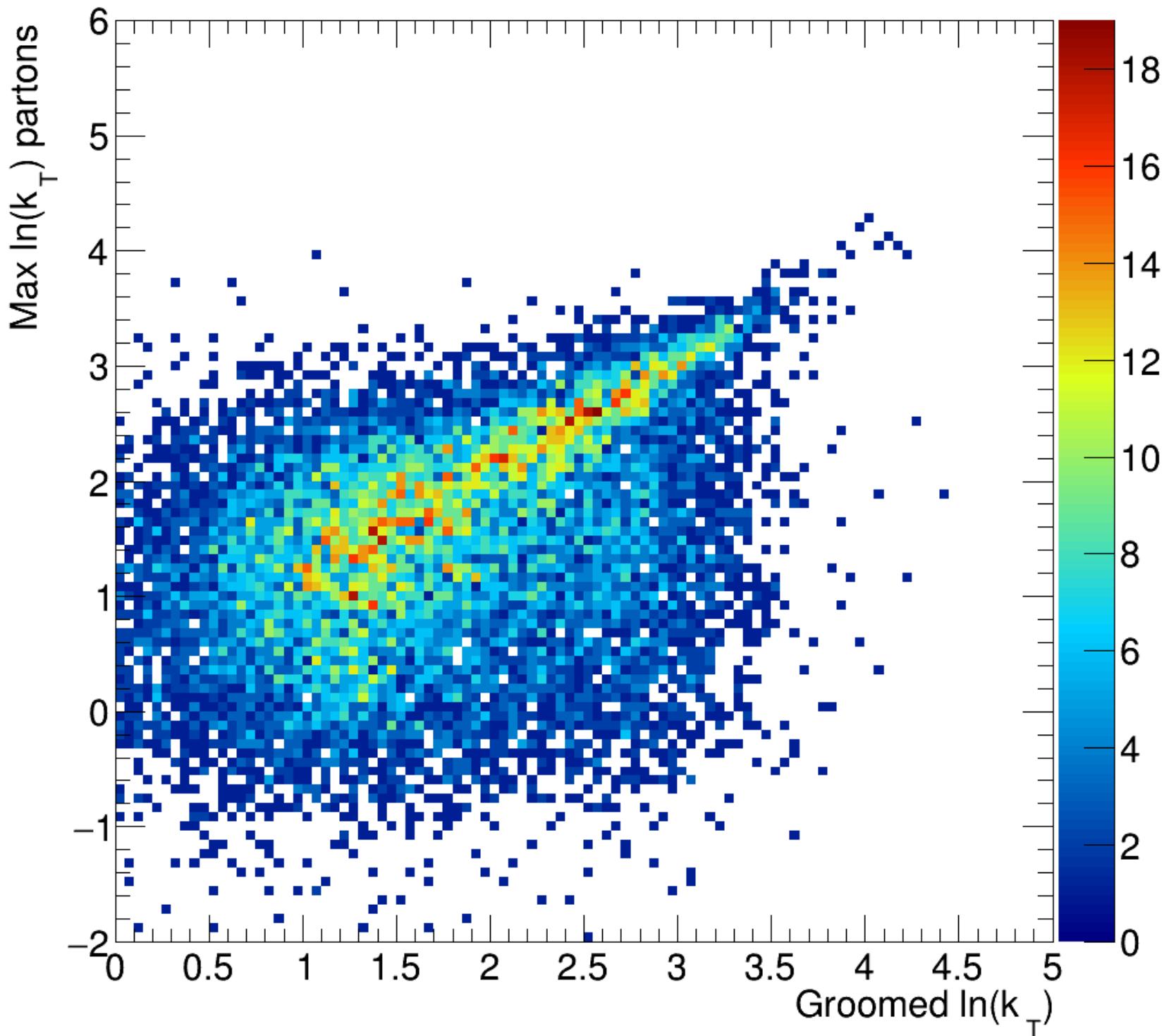
$R = 0.8$ , Pythia8 PTHat 50 (5.0, 5.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$



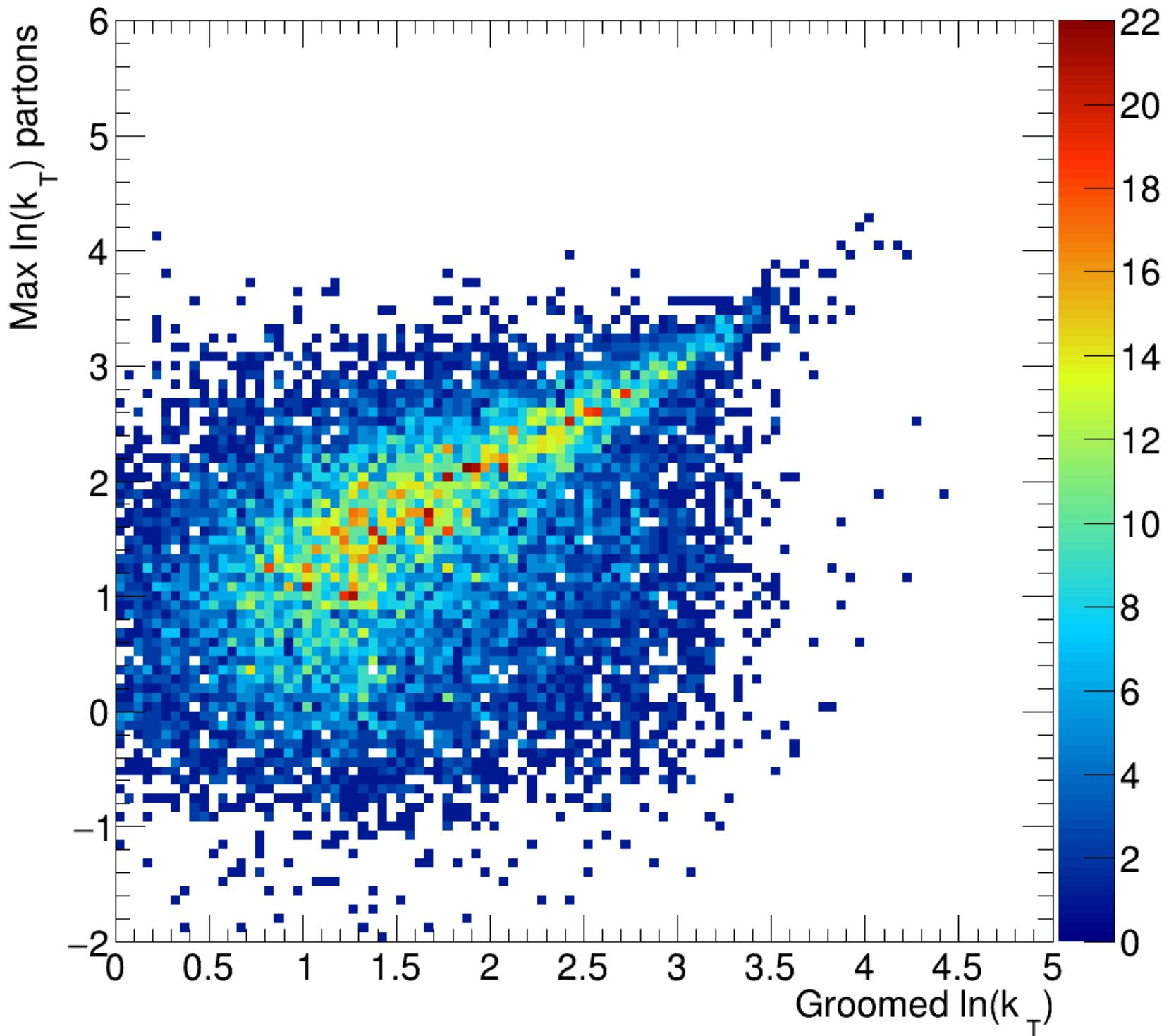
$R = 0.8$ , Pythia8 PTHat 50 (0.15, -1.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$



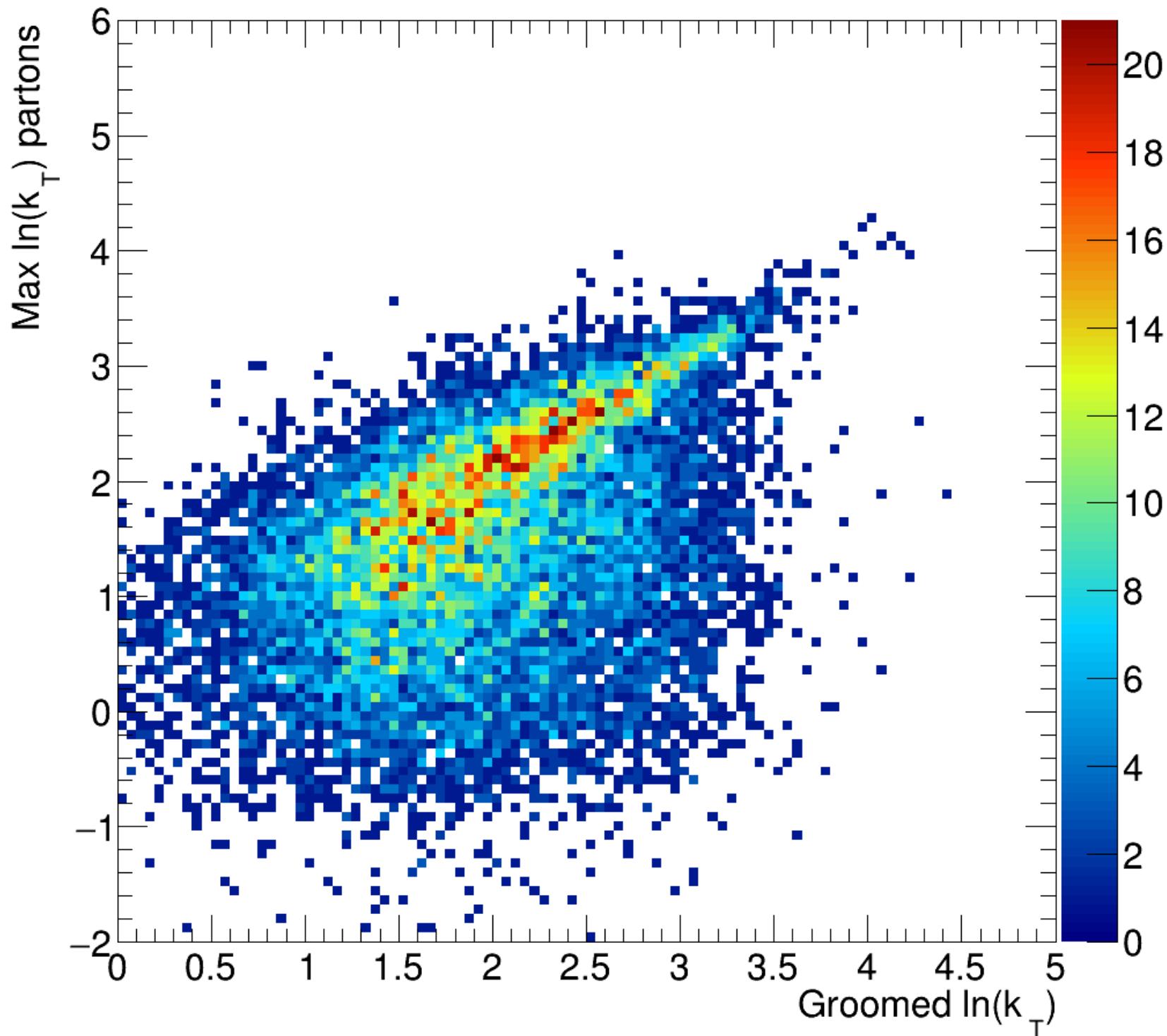
$R = 0.8$ , Pythia8 PTHat 50 (0.25, 0.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$



$R = 0.8$ , Pythia8 PTHat 50 (0.5, 1.5)  $p_T^{\text{jet}} > 70 \text{ GeV}$



$R = 0.8$ , Pythia8 PTHat 50 (0.1, 0.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$



# Check on HERWIG

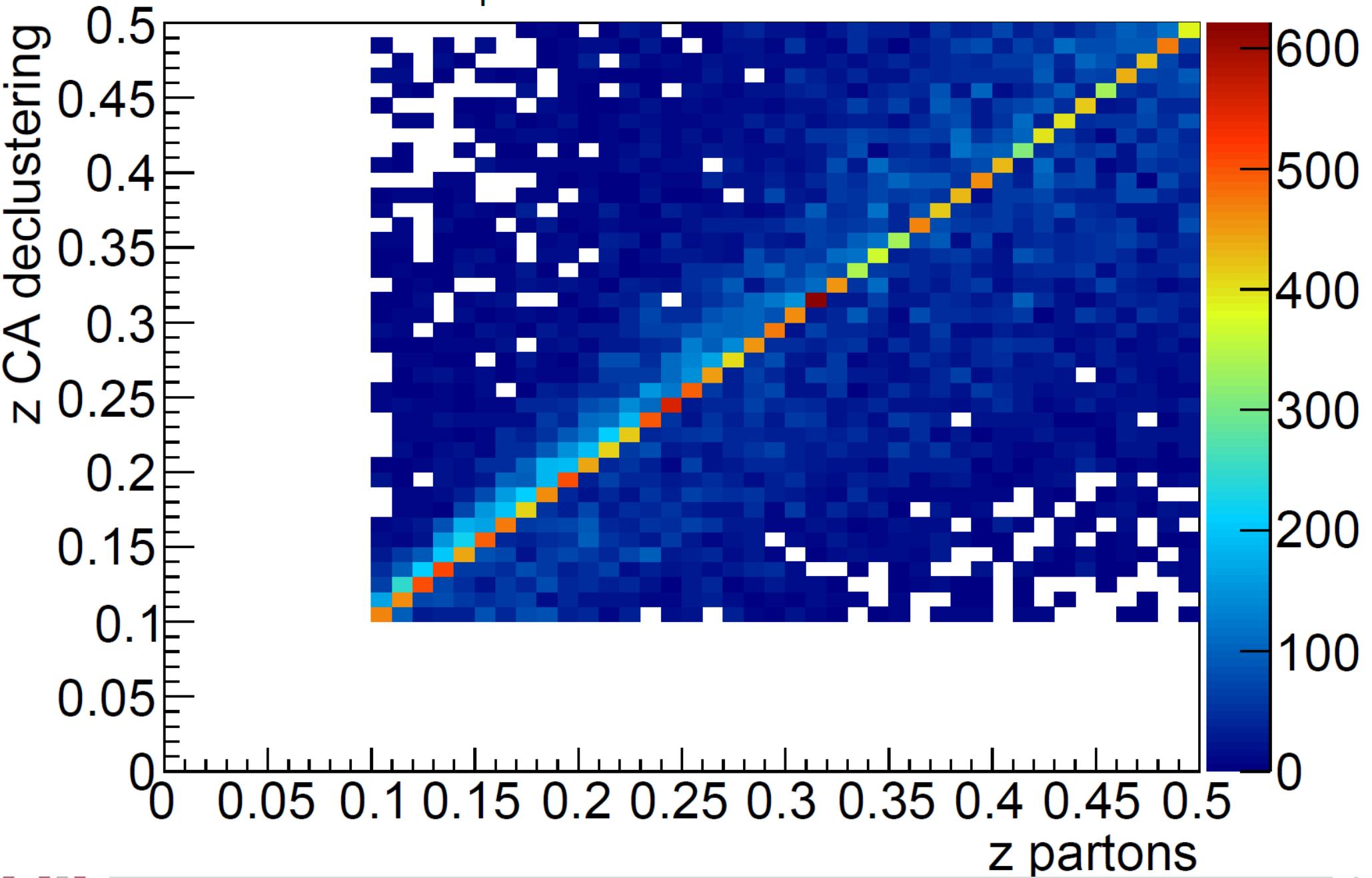
HERWIG is  
Parton Level



Herwig, dijet tune,  $\sqrt{s} = 5.02$  TeV

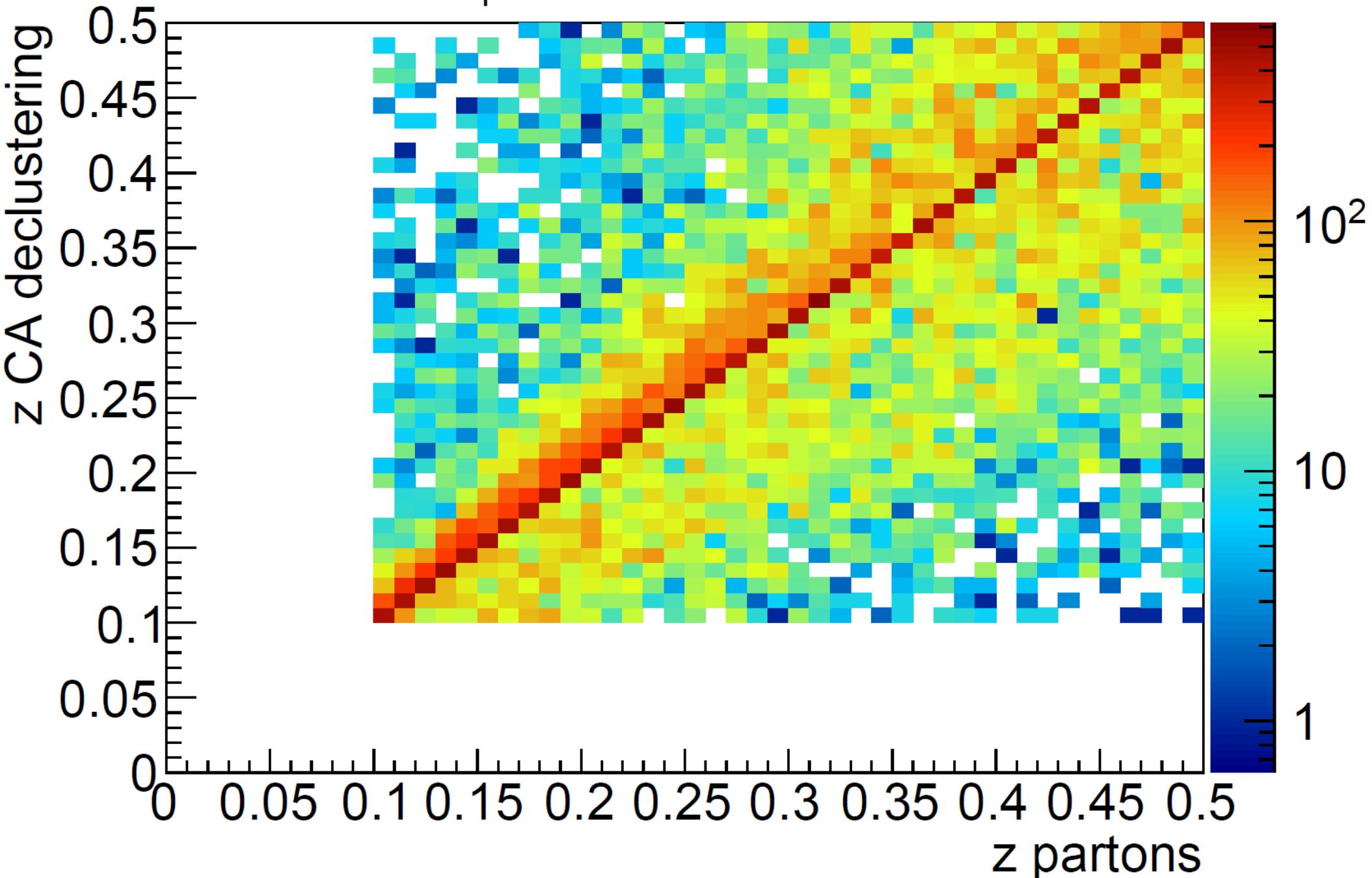
$p_{\text{jet}}^{\text{jet}} > 70$  GeV,  $|\eta| < 2$

Max  $\ln(k_T)$  selection, soft drop (0.1, 0)



Herwig, dijet tune,  $\sqrt{s} = 5.02$  TeV

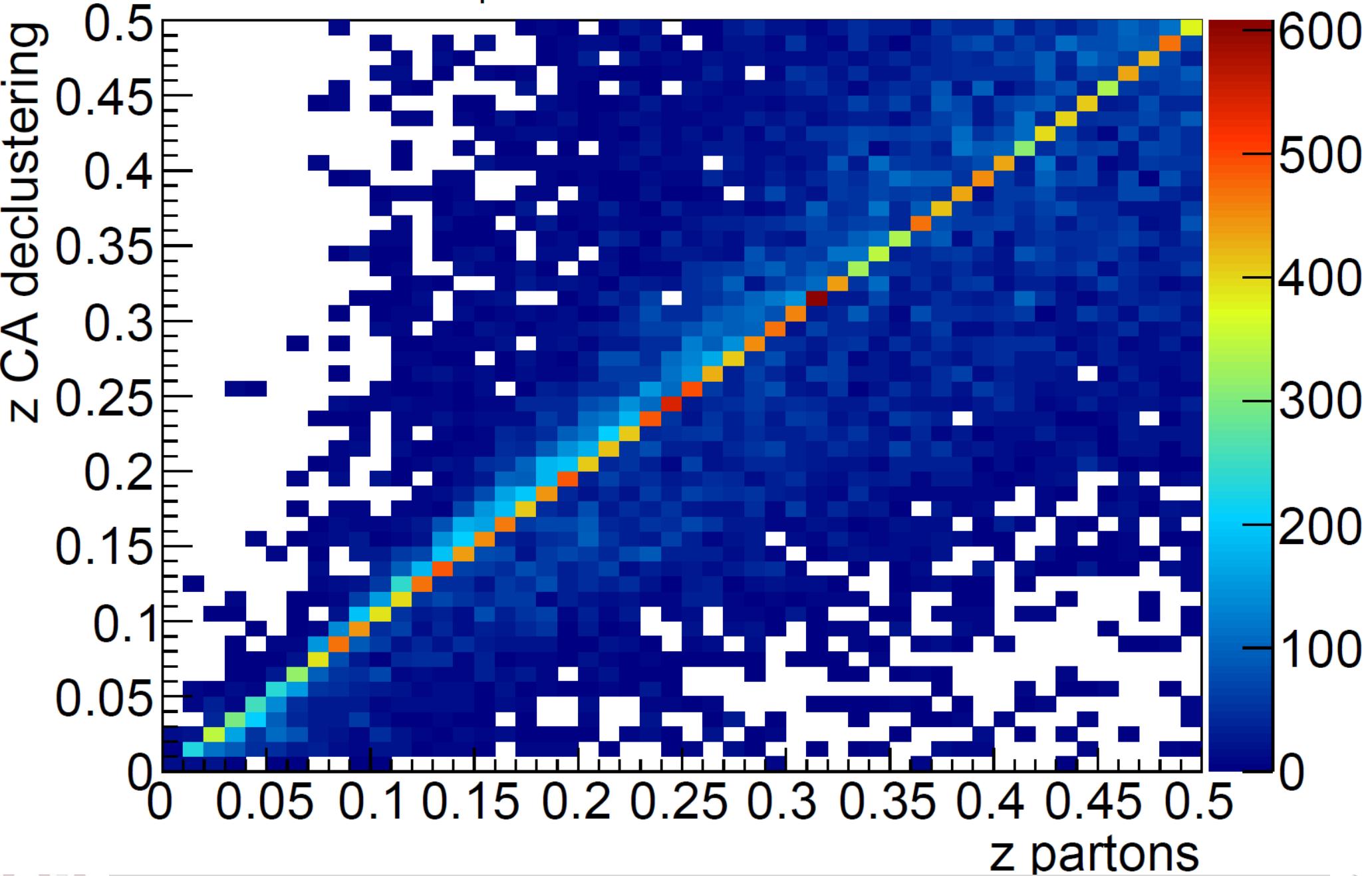
$p_{\text{jet}}^{\text{jet}} > 70$  GeV,  $|\eta| < 2$   
Max  $\ln(k_T)$  selection, soft drop (0.1, 0)



Herwig, dijet tune,  $\sqrt{s} = 5.02$  TeV

$p_{\text{jet}}^{\text{jet}} > 70$  GeV,  $|\eta| < 2$

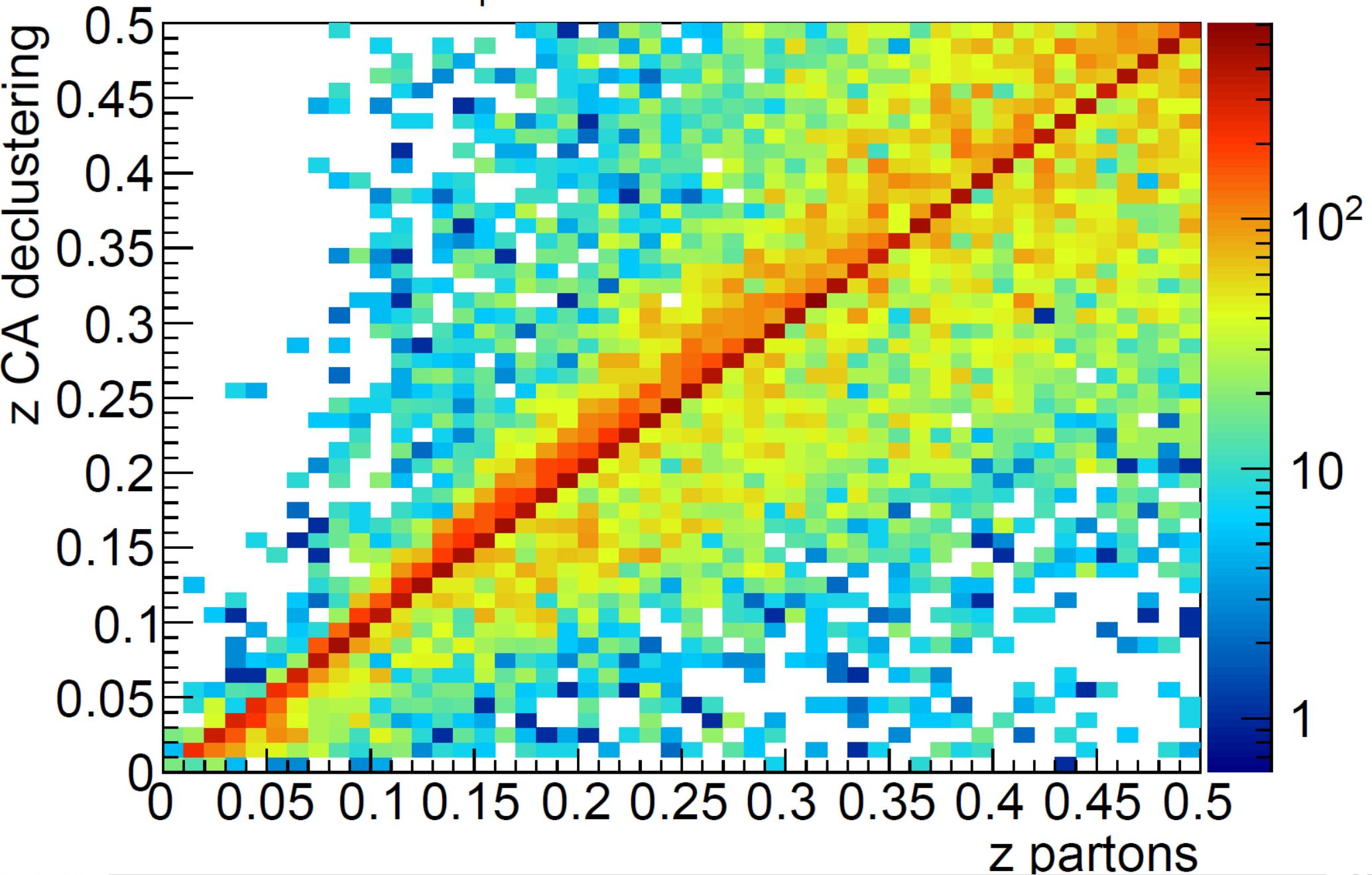
Max  $\ln(k_T)$  selection, no softdrop



Herwig, dijet tune,  $\sqrt{s} = 5.02$  TeV

$p_{\text{jet}}^{\text{jet}} > 70$  GeV,  $|\eta| < 2$

Max  $\ln(k_T)$  selection, no softdrop

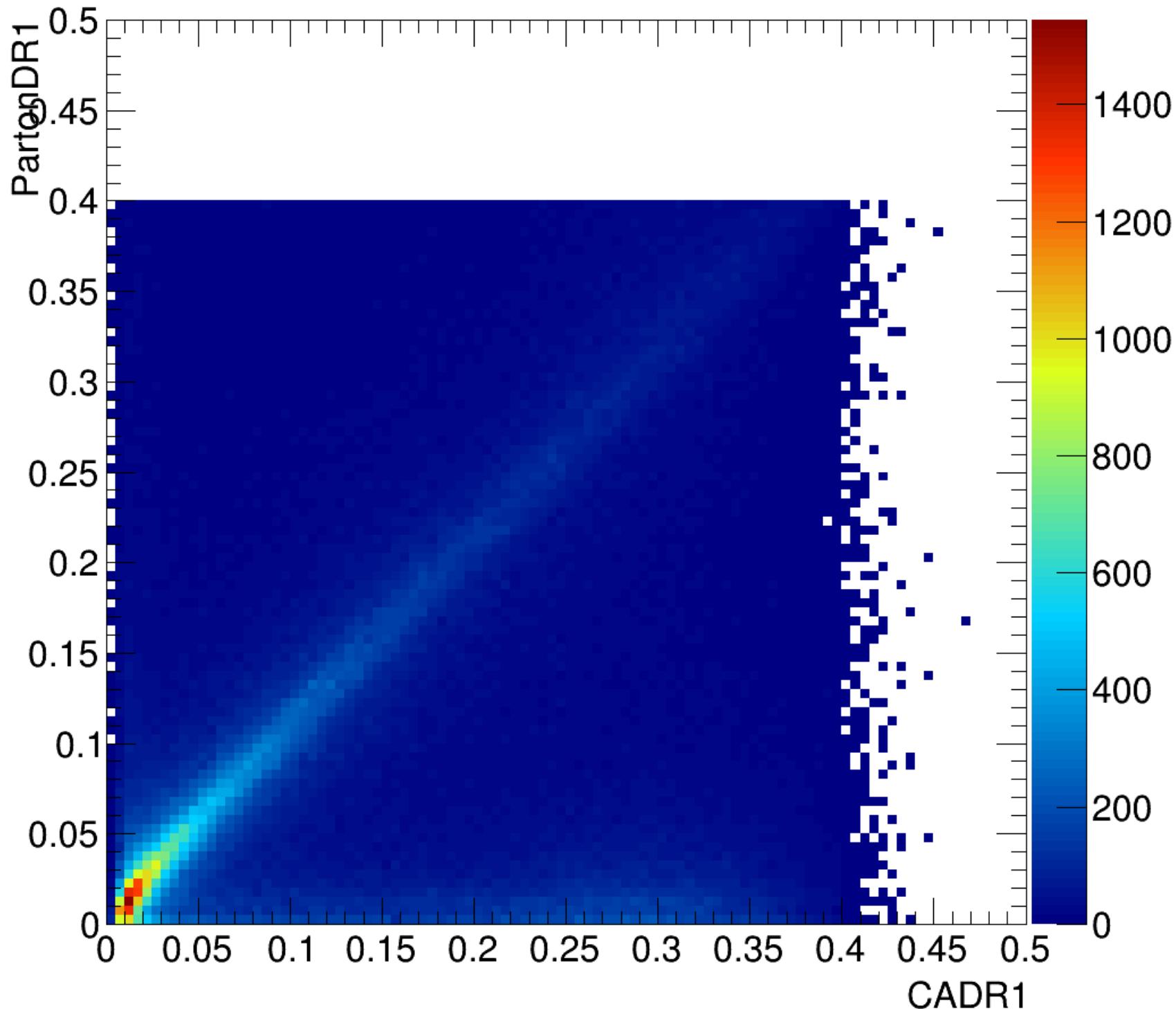


# What Failed?

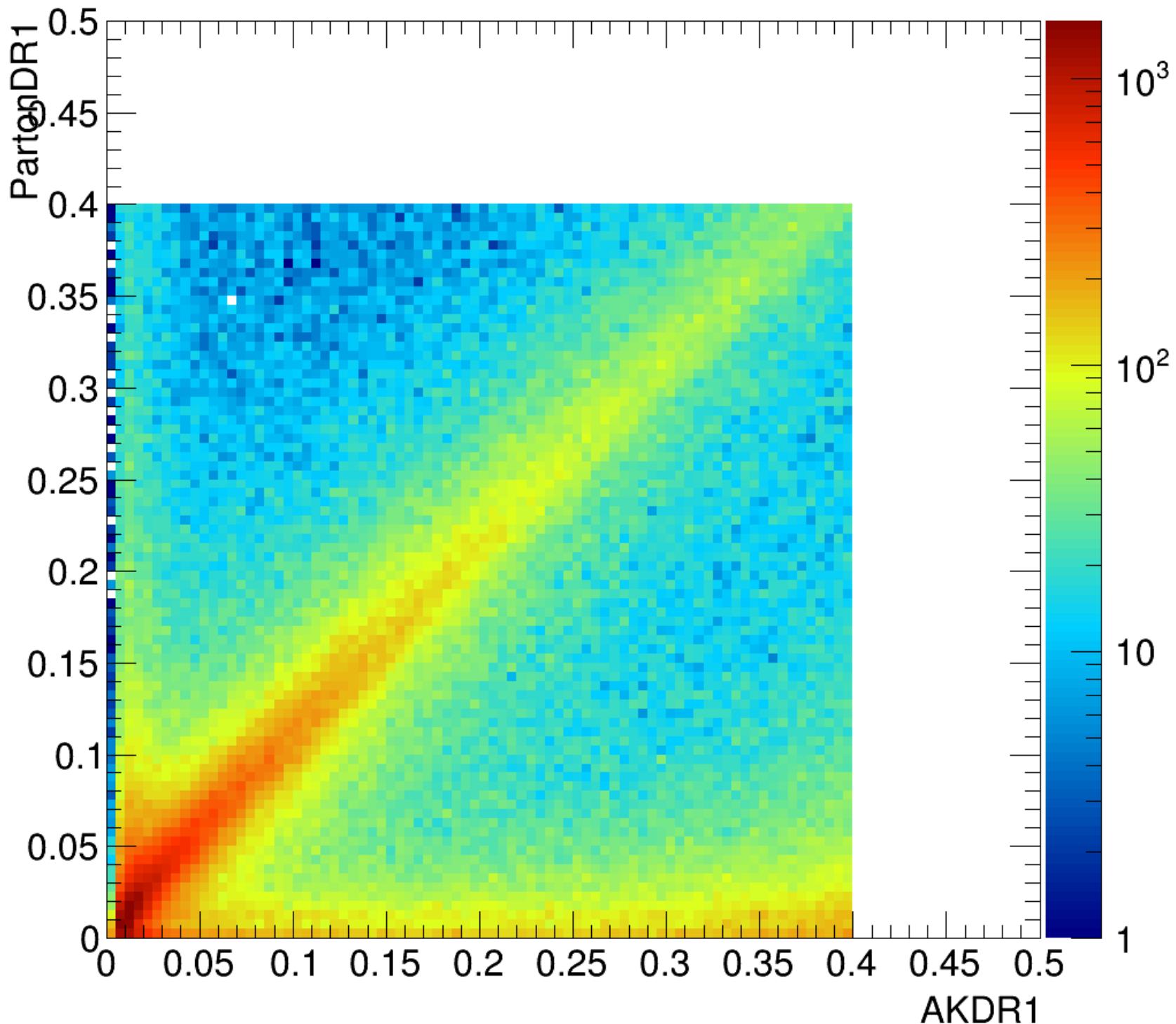
# Check DR



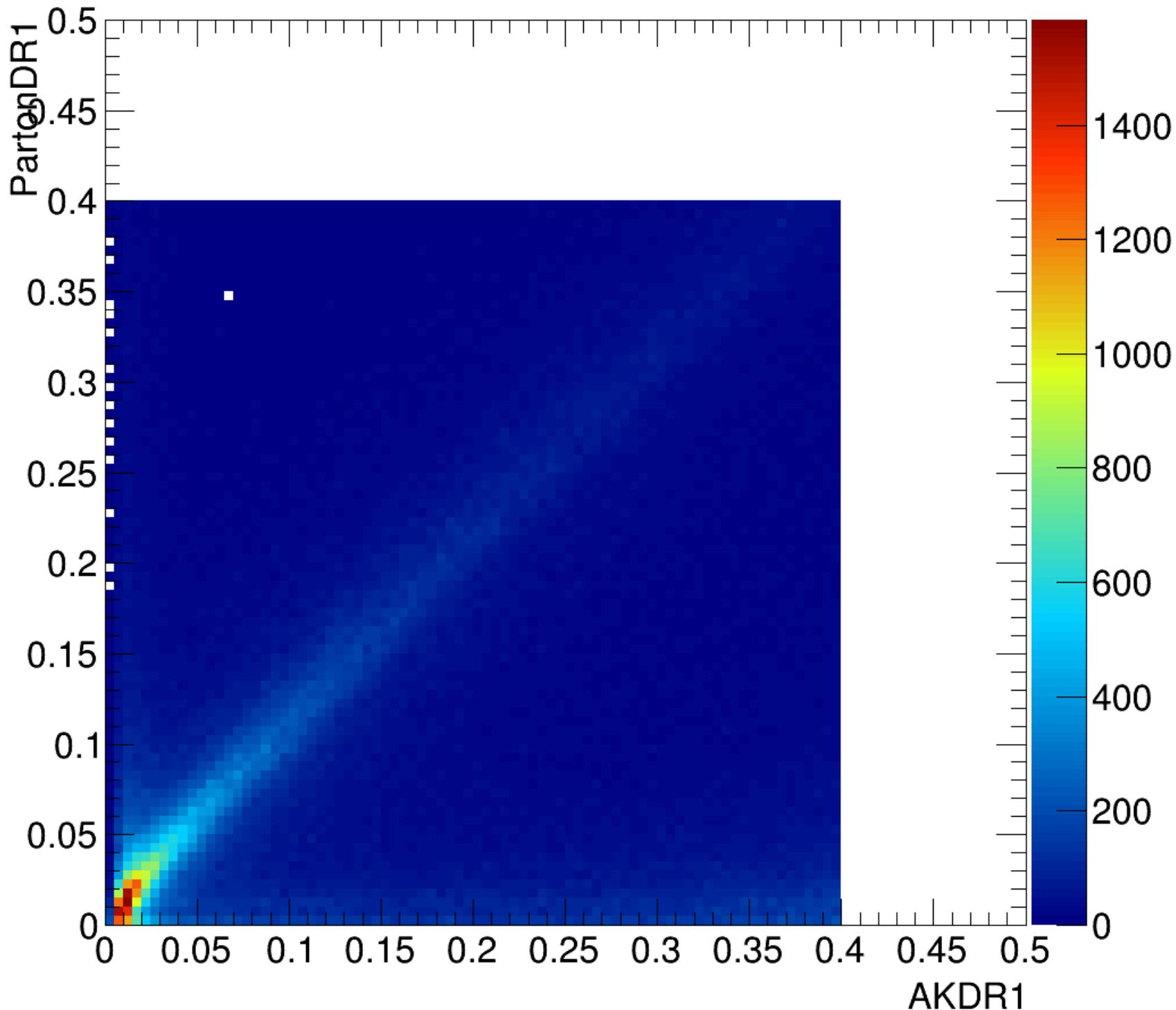
# PYTHIA8 Pthat300 Jet pT>350 GeVCA Declustering



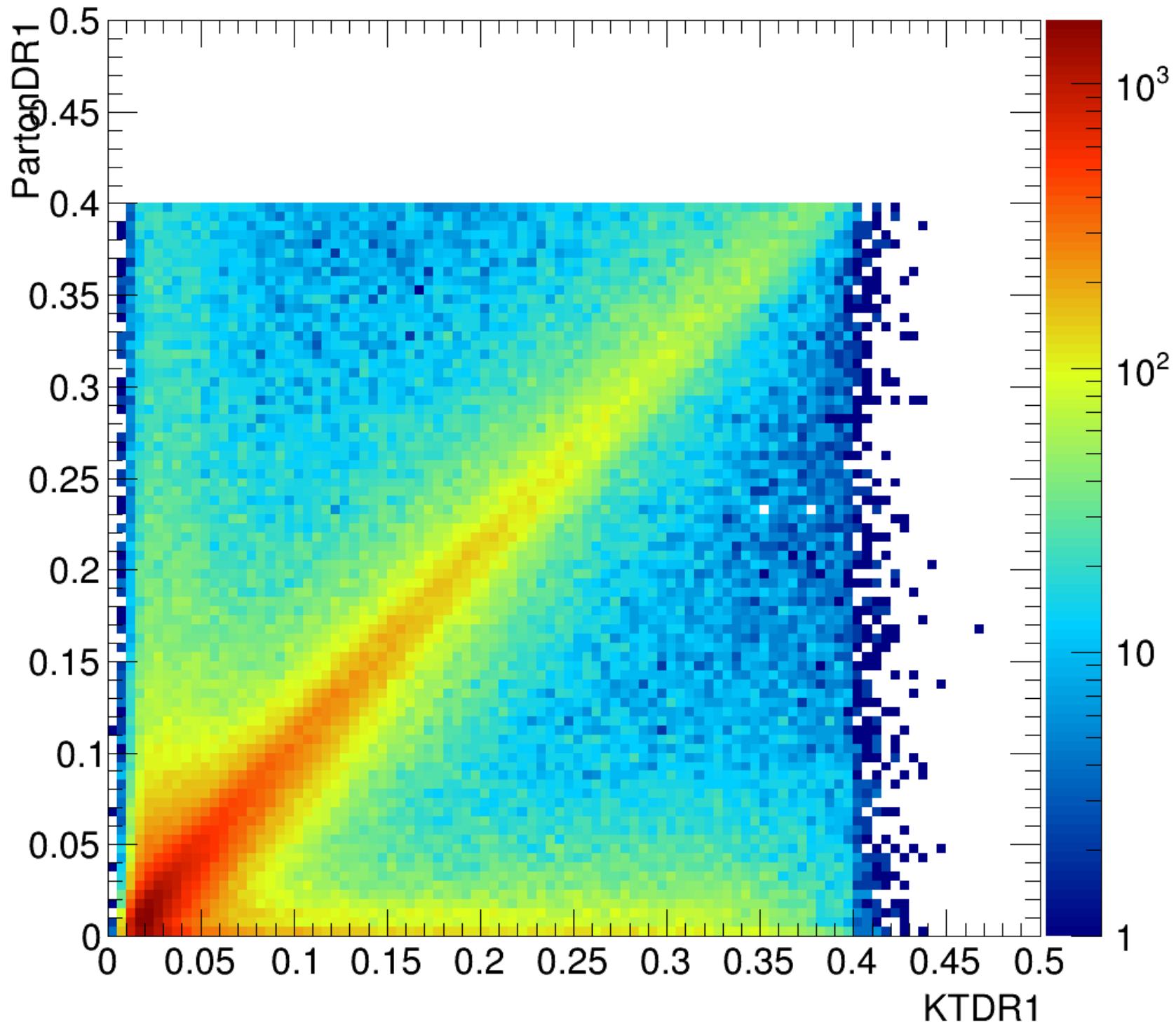
# PYTHIA8 Pthat300 Jet pT>350 GeVAK Declustering



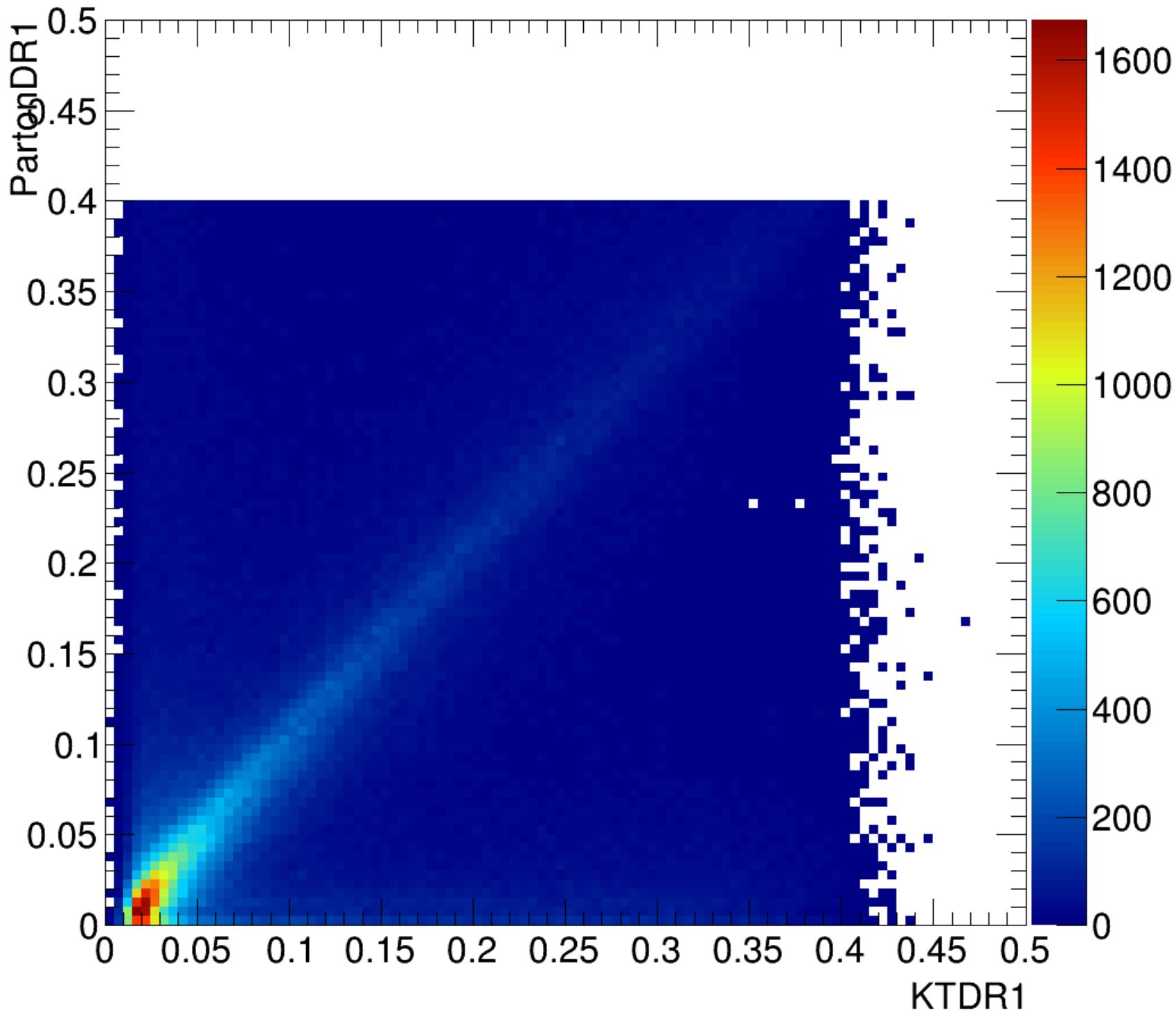
# PYTHIA8 Pthat300 Jet pT>350 GeVAK Declustering



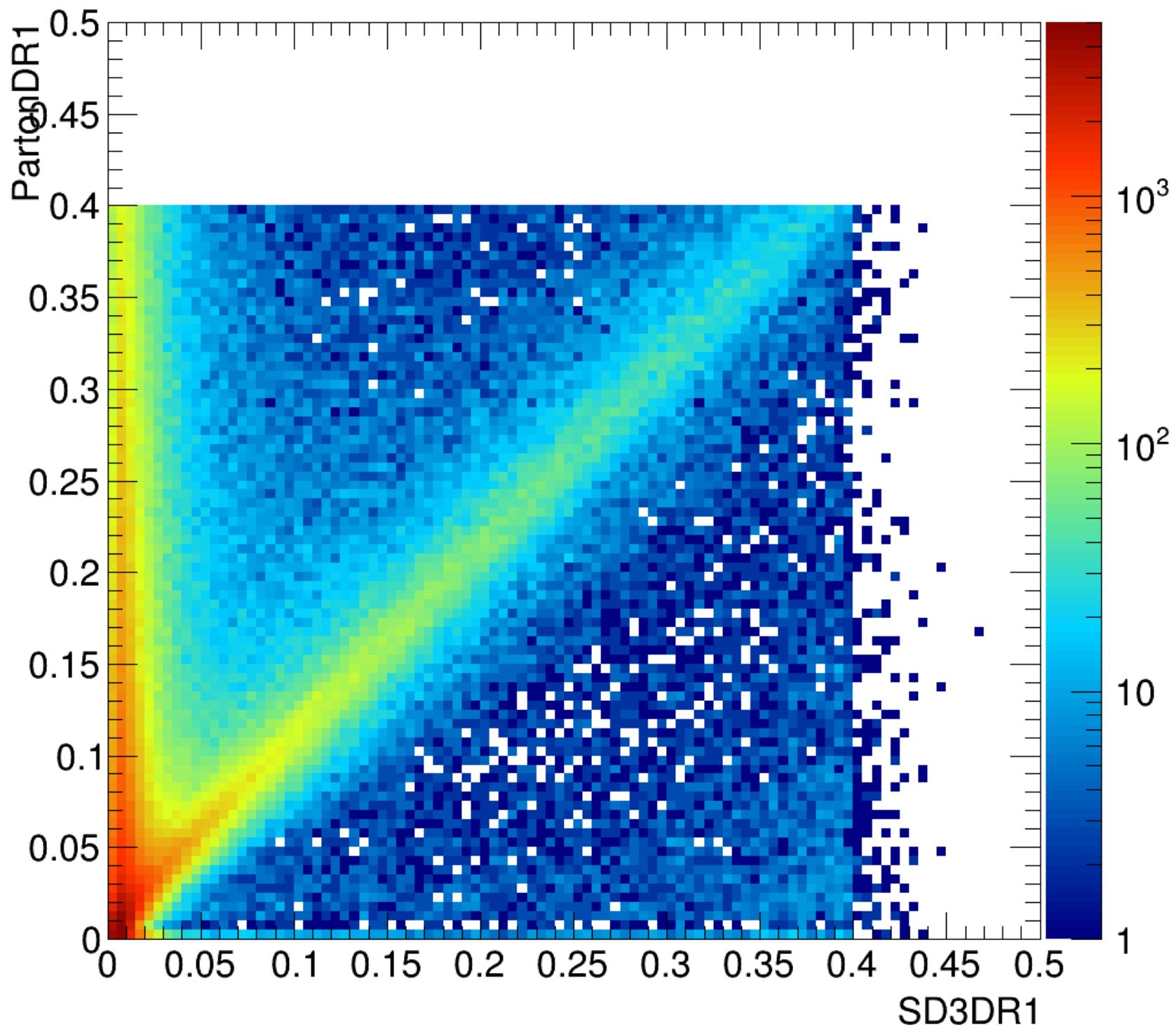
# PYTHIA8 Pthat300 Jet pT>350 GeVKT Declustering



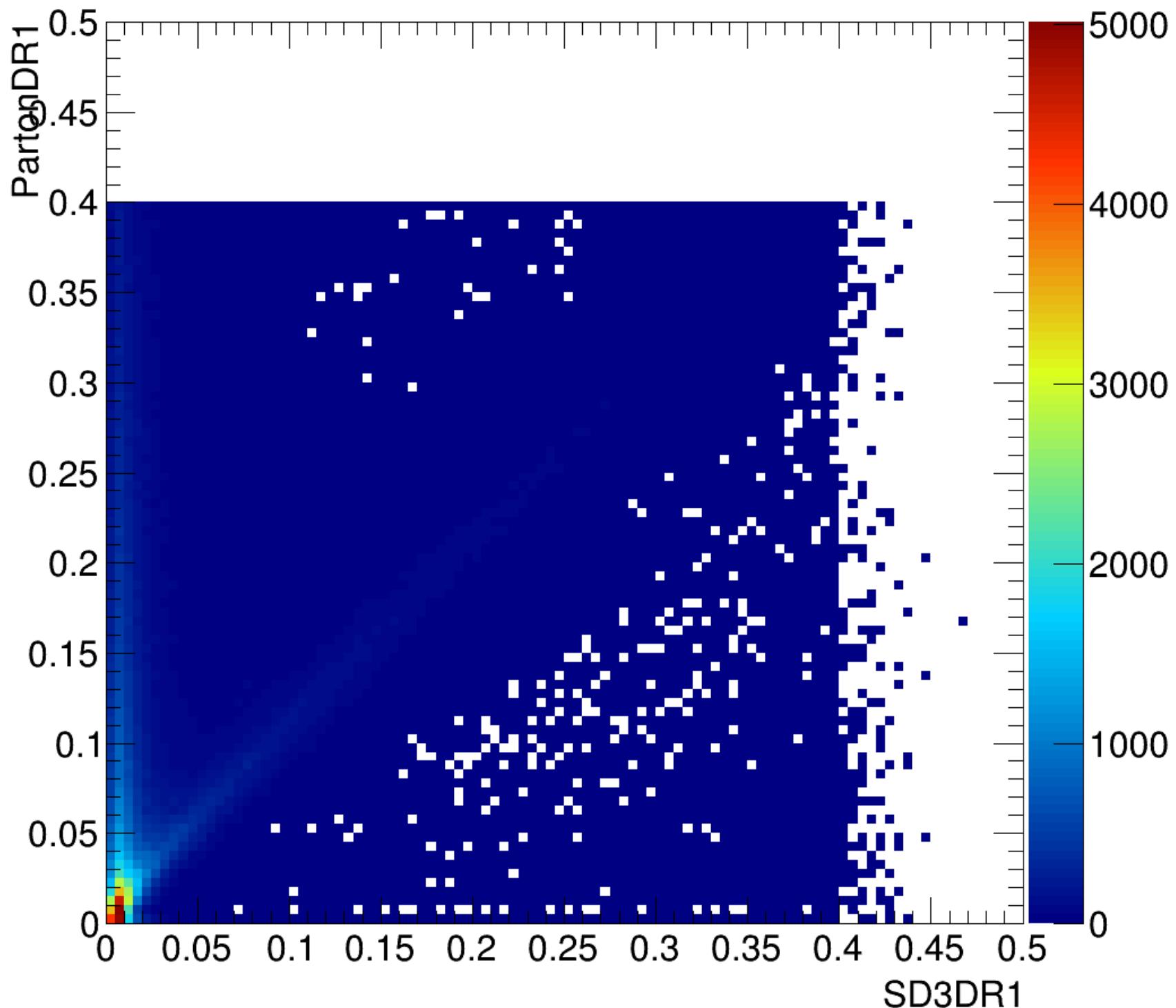
# PYTHIA8 Pthat300 Jet pT>350 GeVKT Declustering



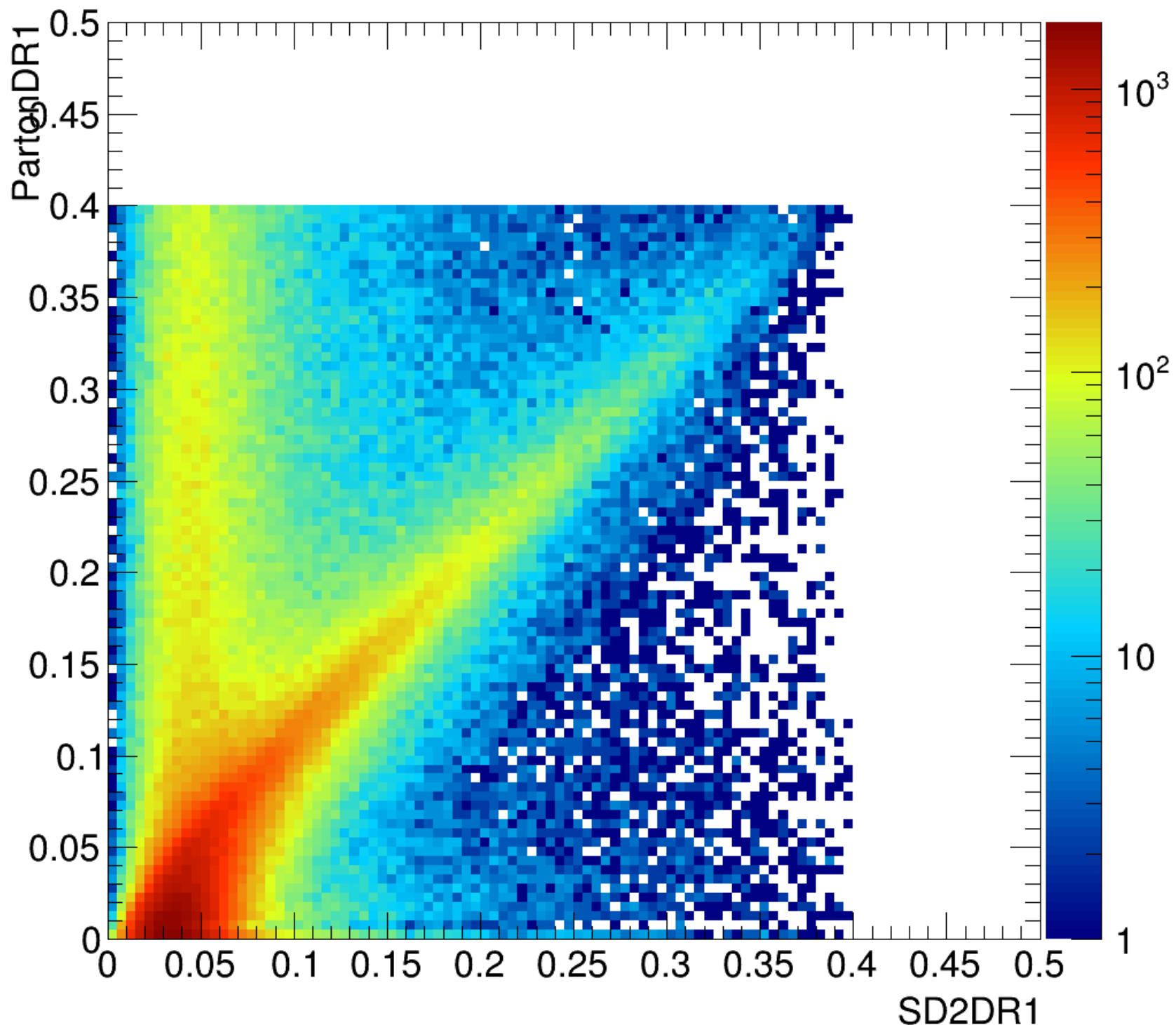
PYTHIA8 Pthat300 Jet pT>350 GeV( $Z_{cut}, \beta$ )=(0.25,0.0)



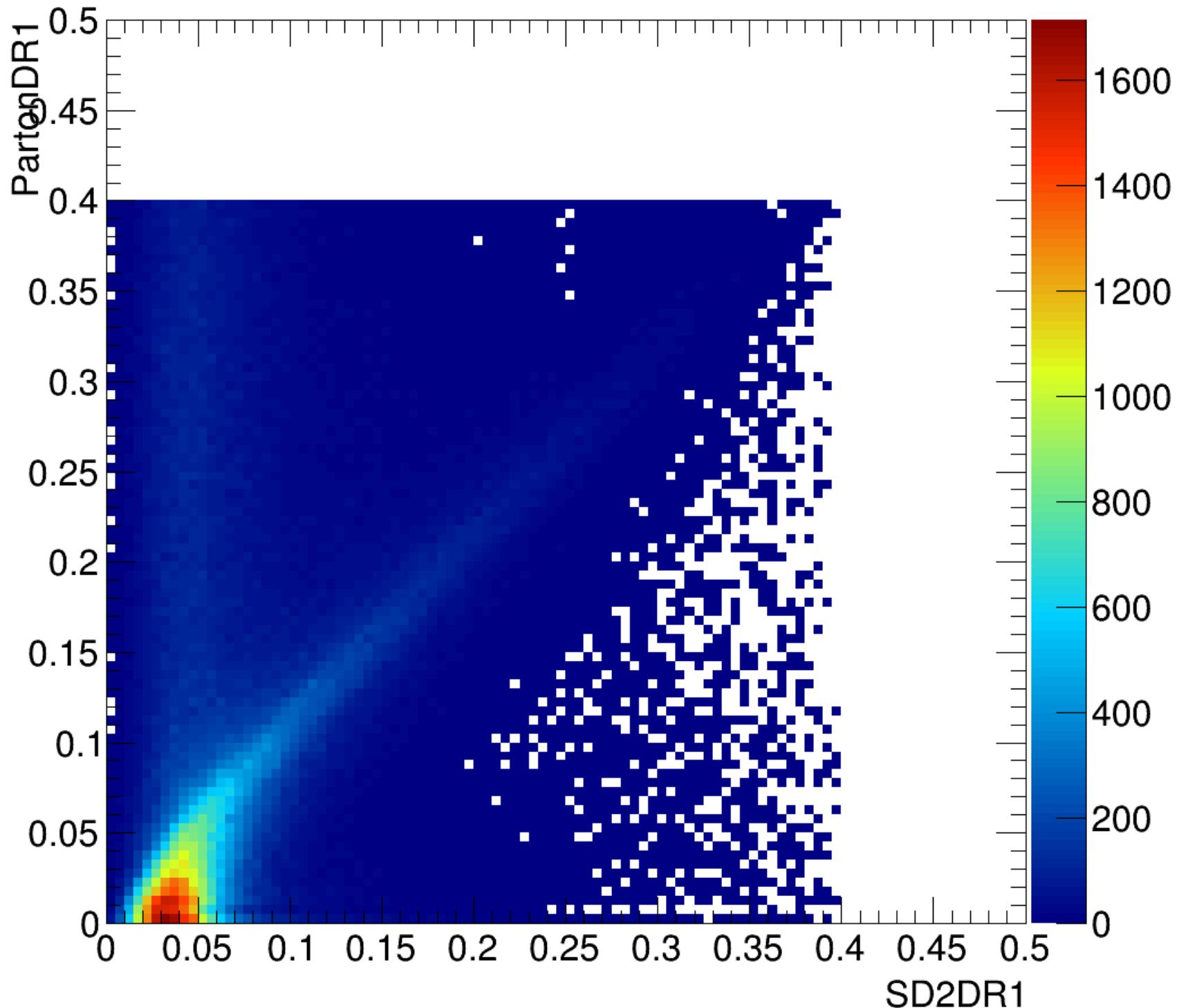
PYTHIA8 Pthat300 Jet pT>350 GeV( $Z_{cut}, \beta$ )=(0.25,0.0)



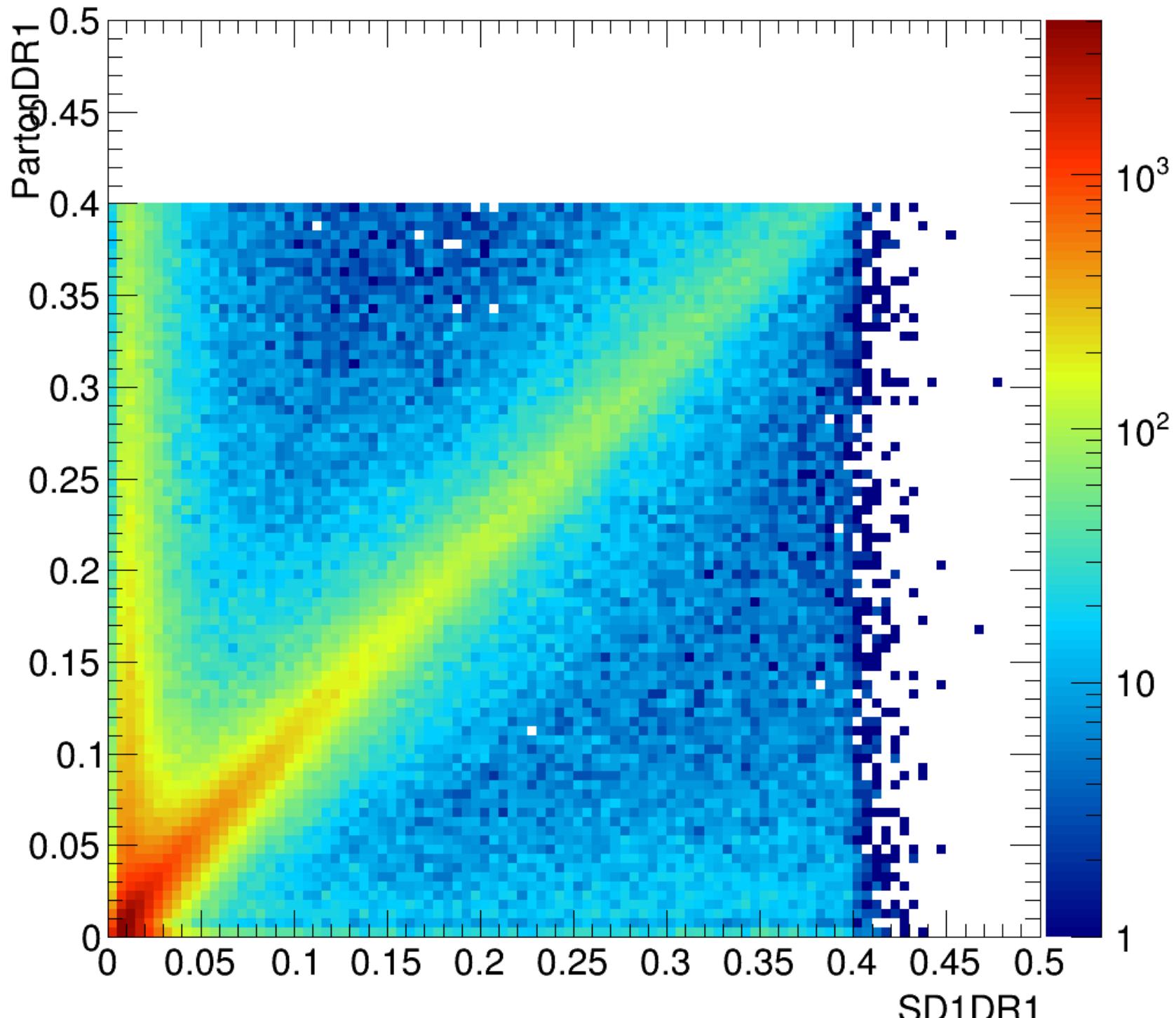
PYTHIA8 Pthat300 Jet pT>350 GeV( $Z_{cut}, \beta$ )=(0.5,1.5)



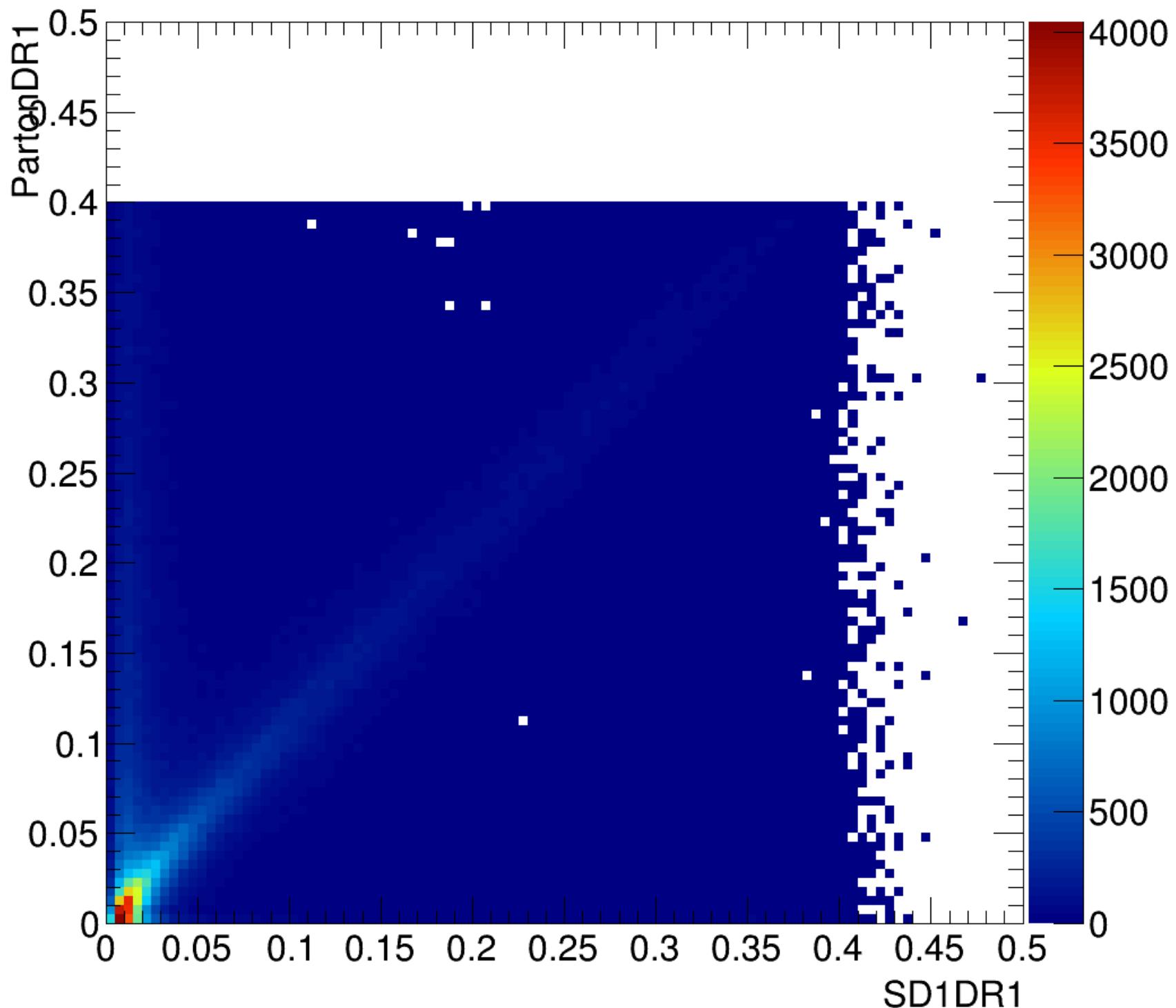
PYTHIA8 Pthat300 Jet pT>350 GeV( $Z_{cut}, \beta$ )=(0.5,1.5)



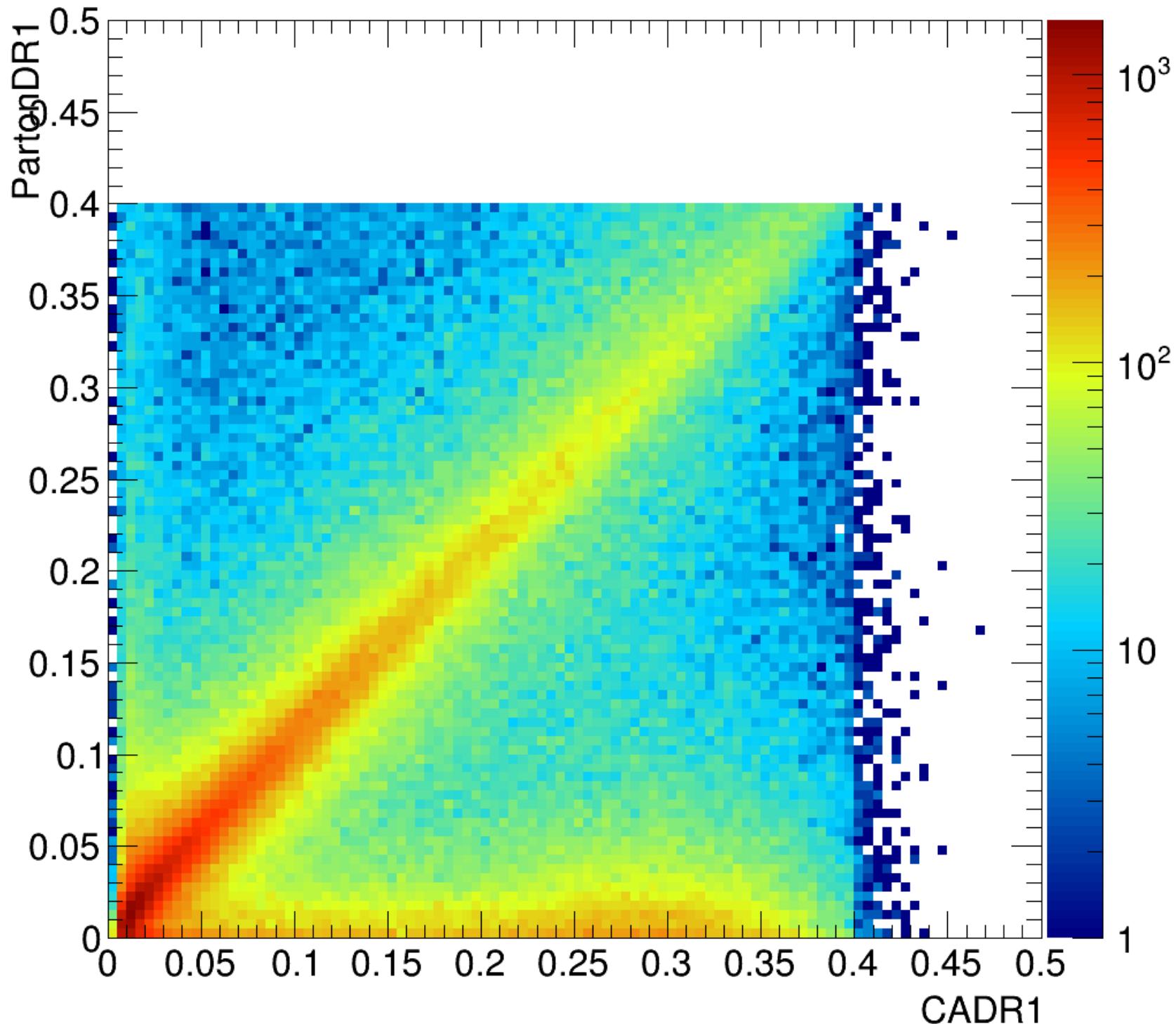
PYTHIA8 Pthat300 Jet pT>350 GeV( $Z_{cut}, \beta$ )=(0.1,0.0)



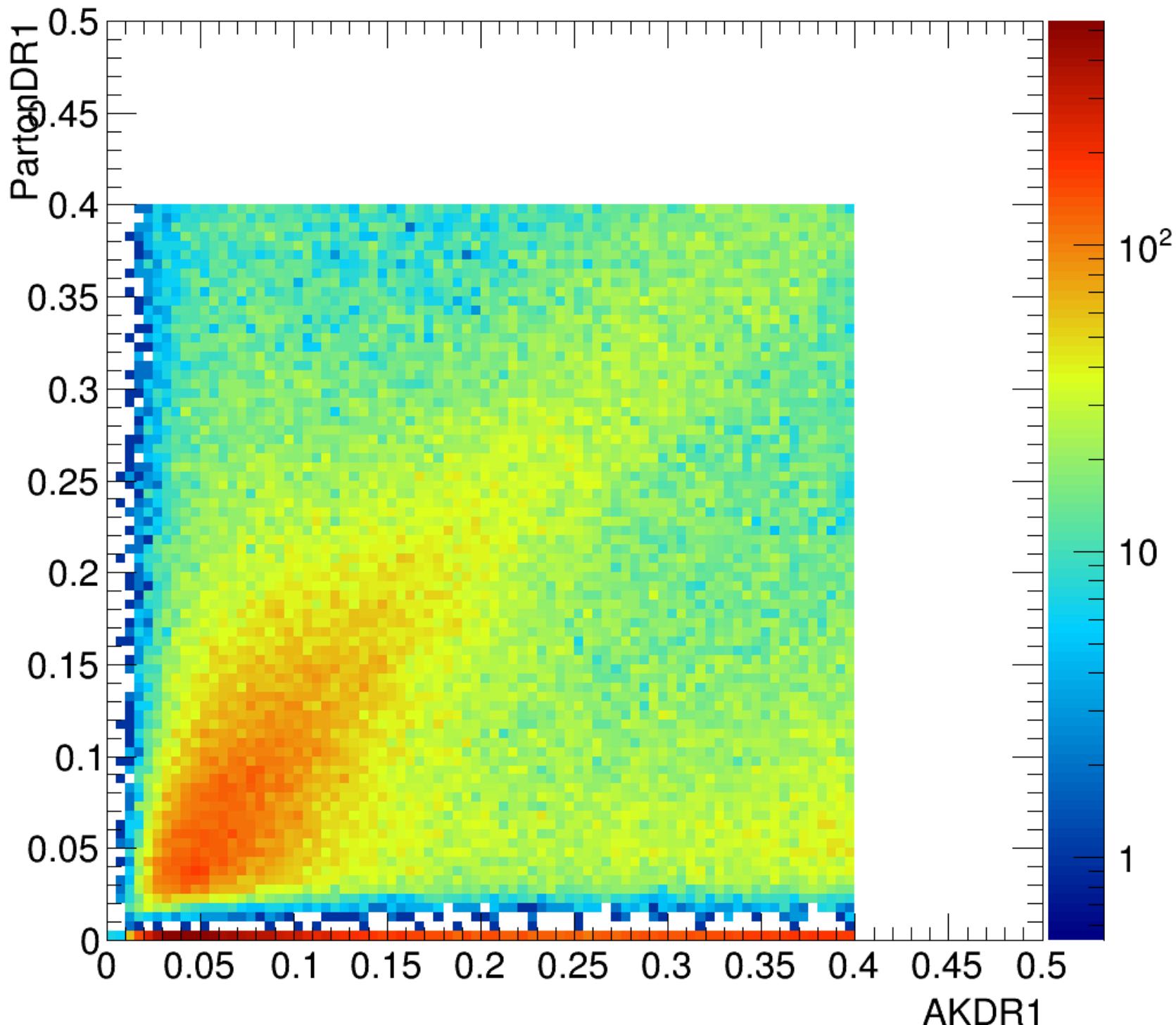
PYTHIA8 Pthat300 Jet pT>350 GeV( $Z_{cut}, \beta$ )=(0.1,0.0)



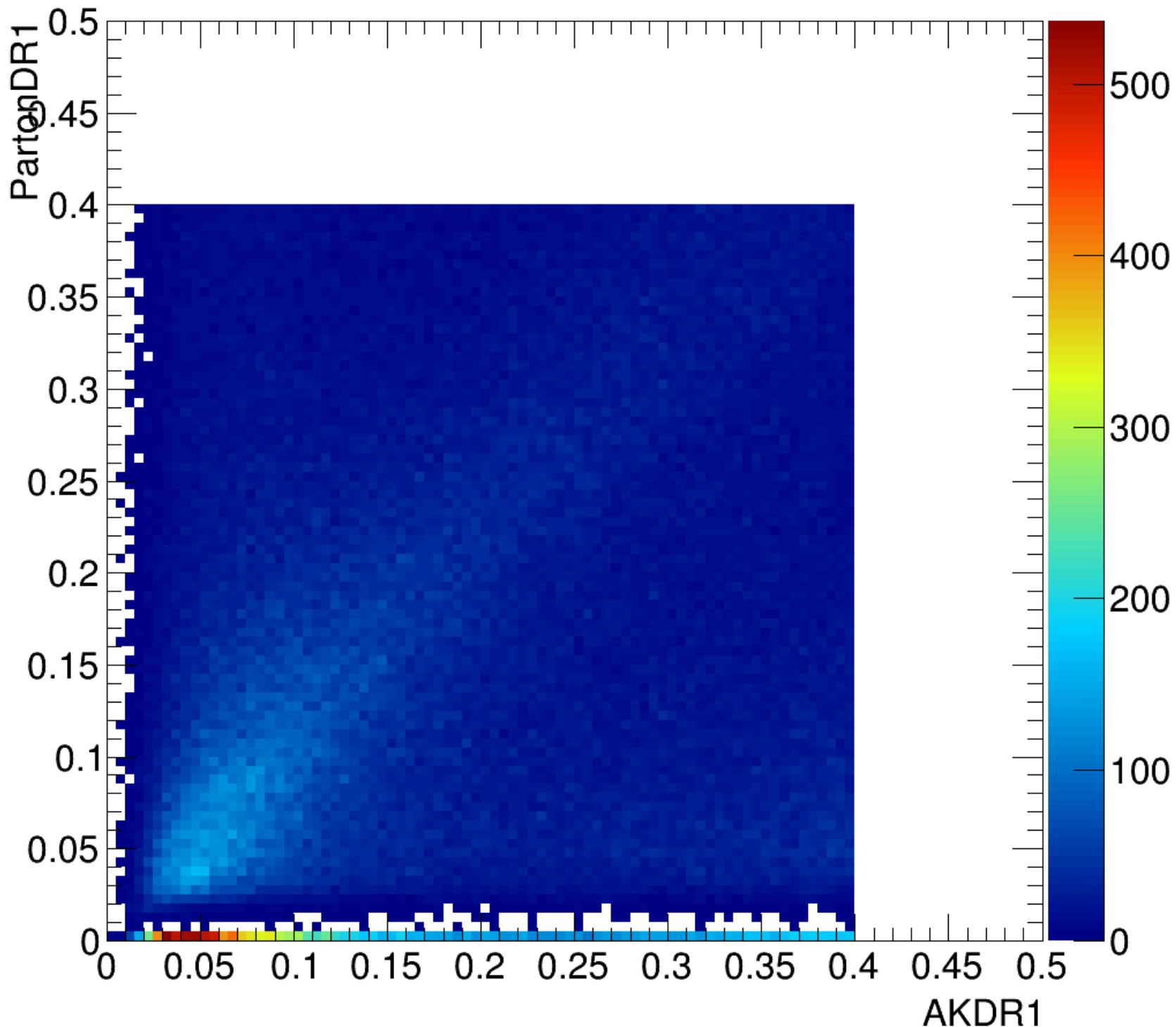
# PYTHIA8 Pthat300 Jet pT>350 GeVCA Declustering



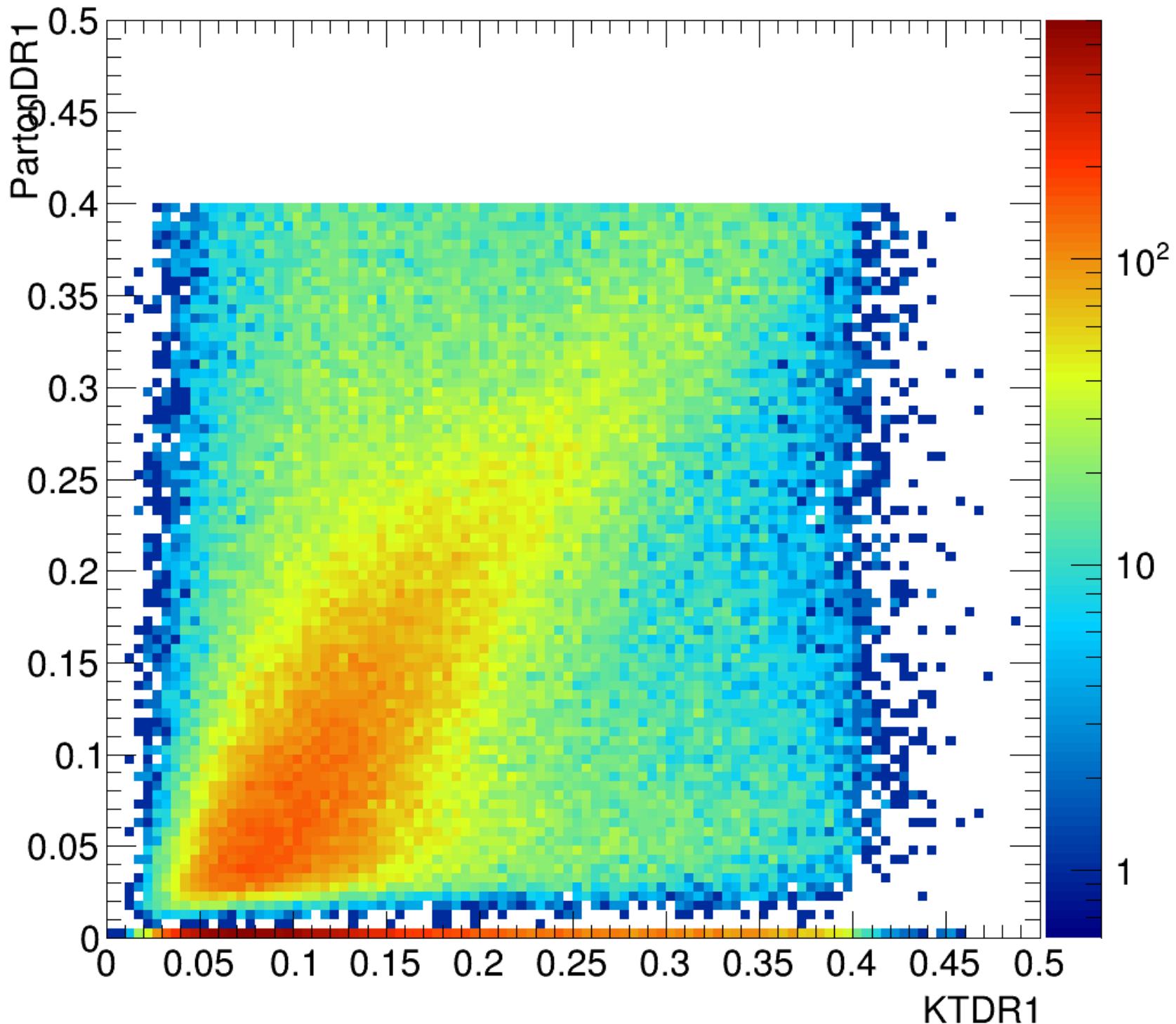
# PYTHIA8 Pthat50 Jet pT>70 GeVAK Declustering



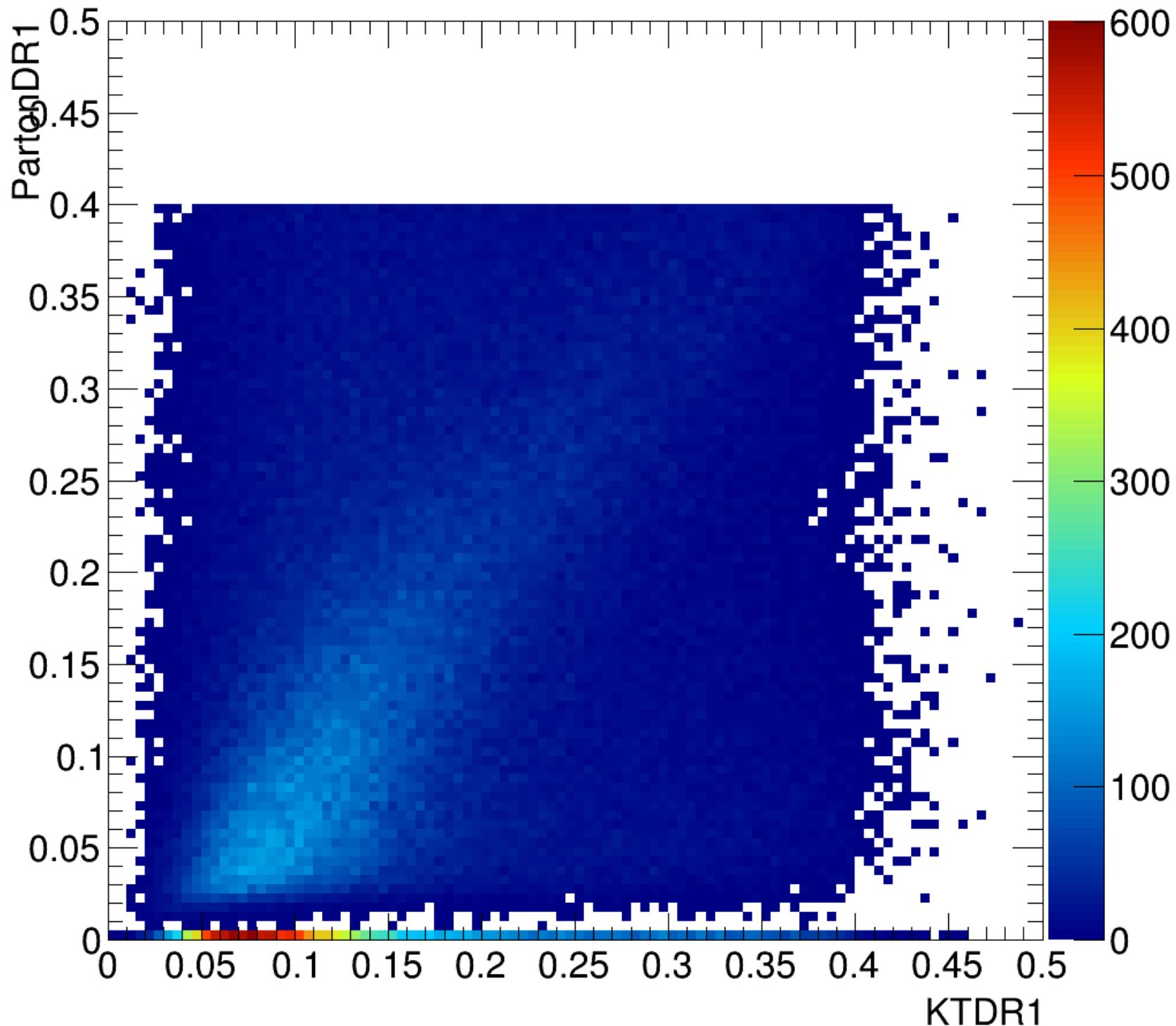
# PYTHIA8 Pthat50 Jet pT>70 GeVAK Declustering



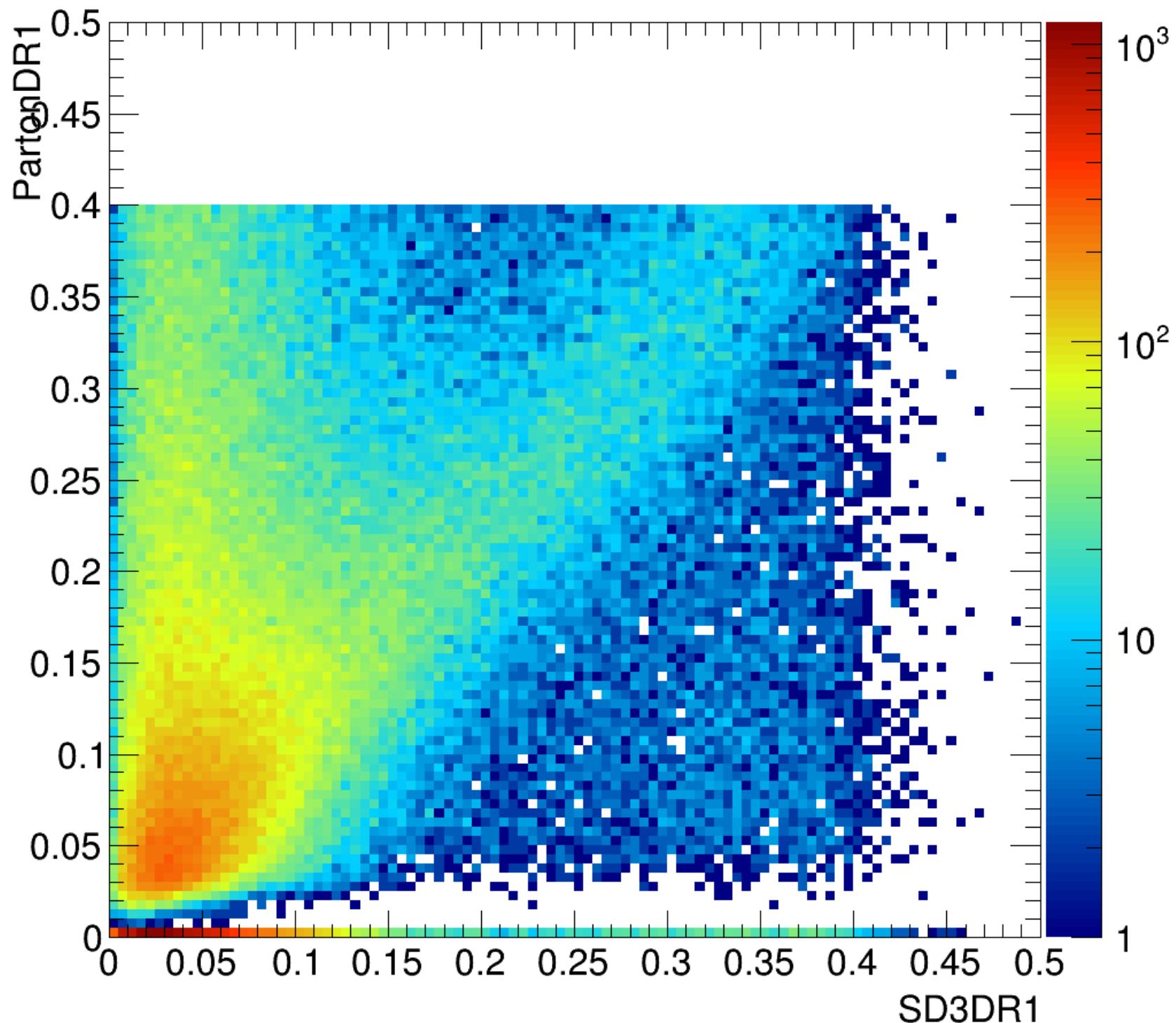
# PYTHIA8 Pthat50 Jet pT>70 GeVKT Declustering



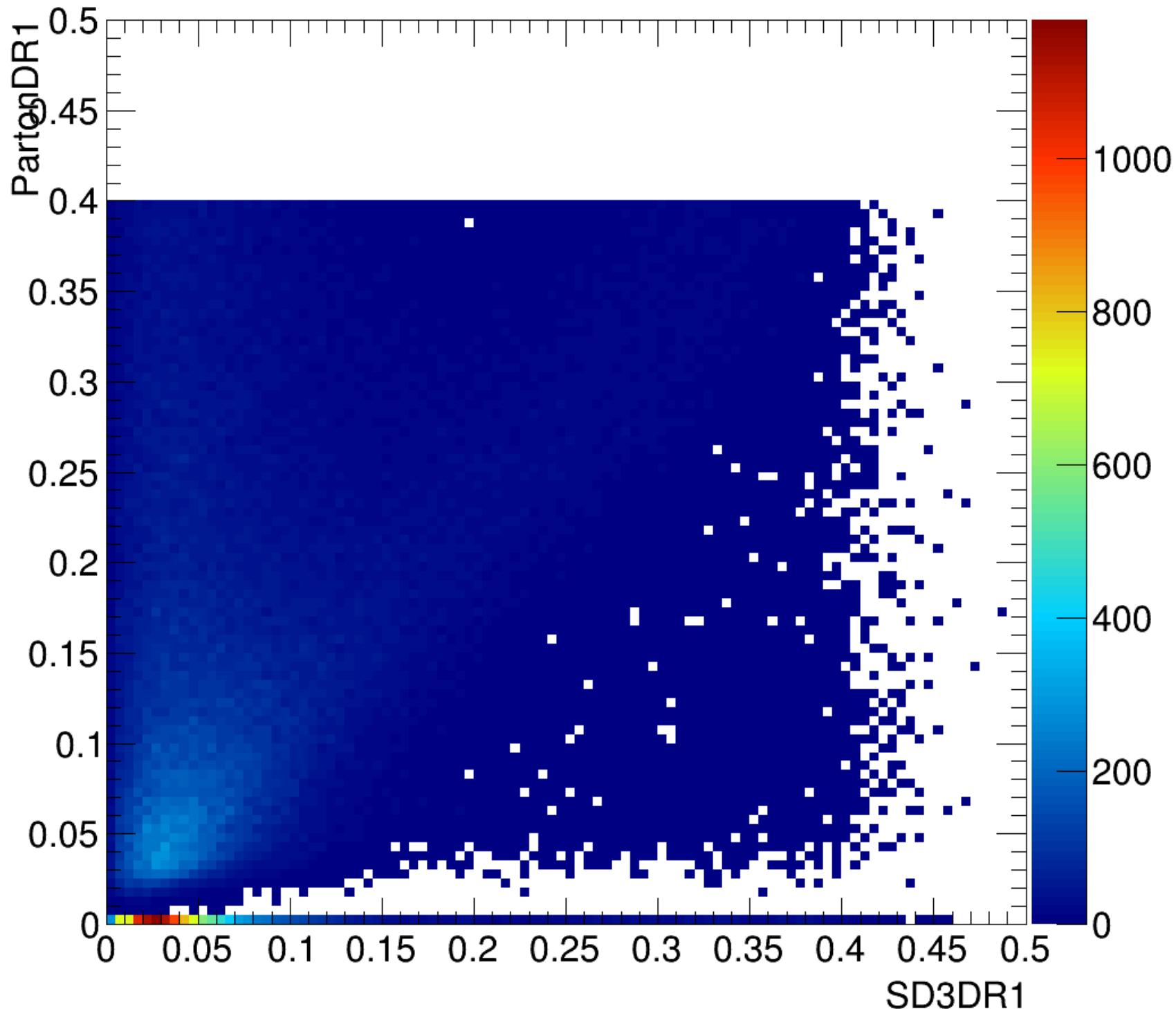
# PYTHIA8 Pthat50 Jet pT>70 GeVKT Declustering



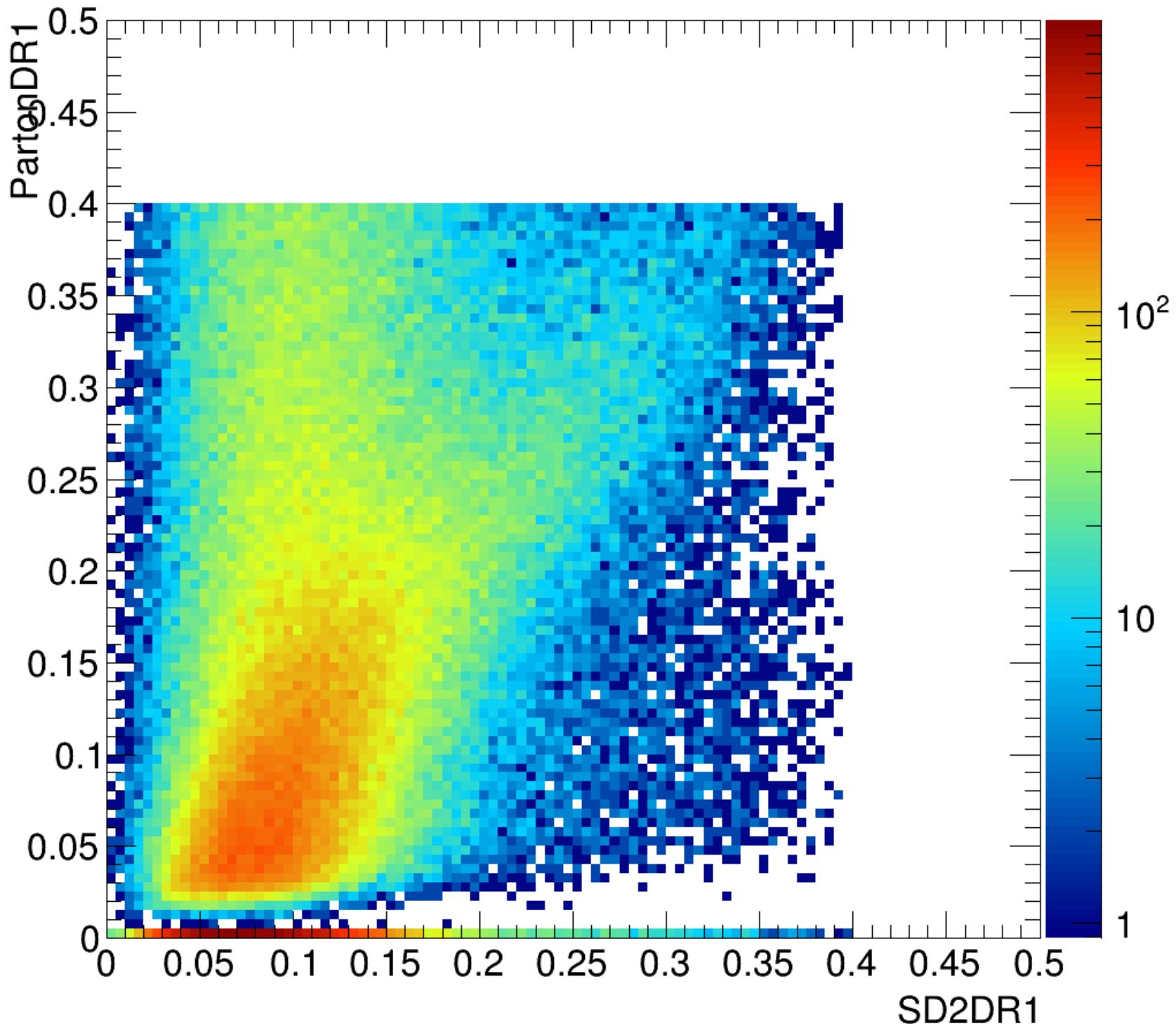
PYTHIA8 Pthat50 Jet pT>70 GeV( $Z_{\text{cut}}, \beta$ )=(0.25,0.0)



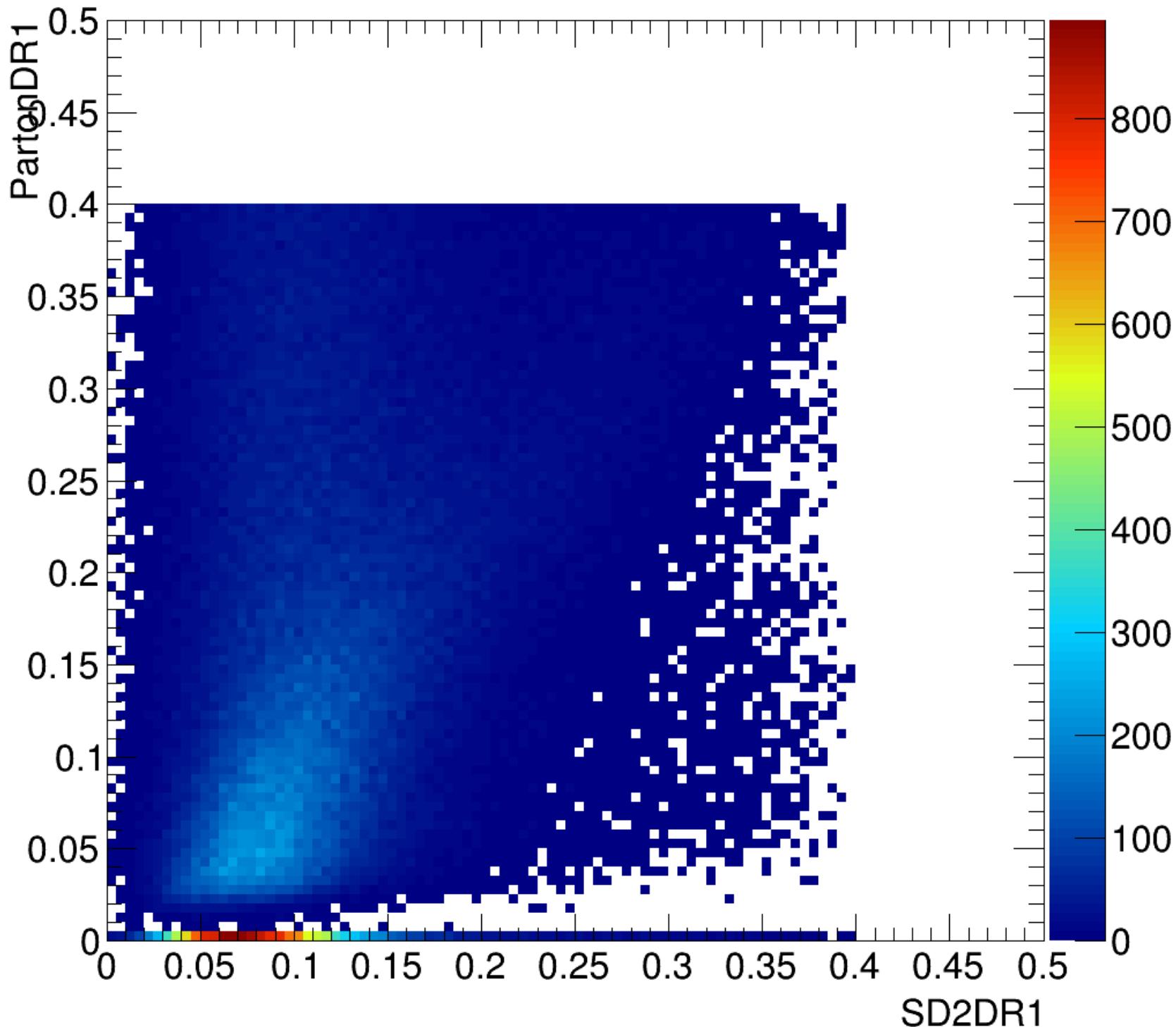
PYTHIA8 Pthat50 Jet pT>70 GeV( $Z_{cut}, \beta$ )=(0.25,0.0)



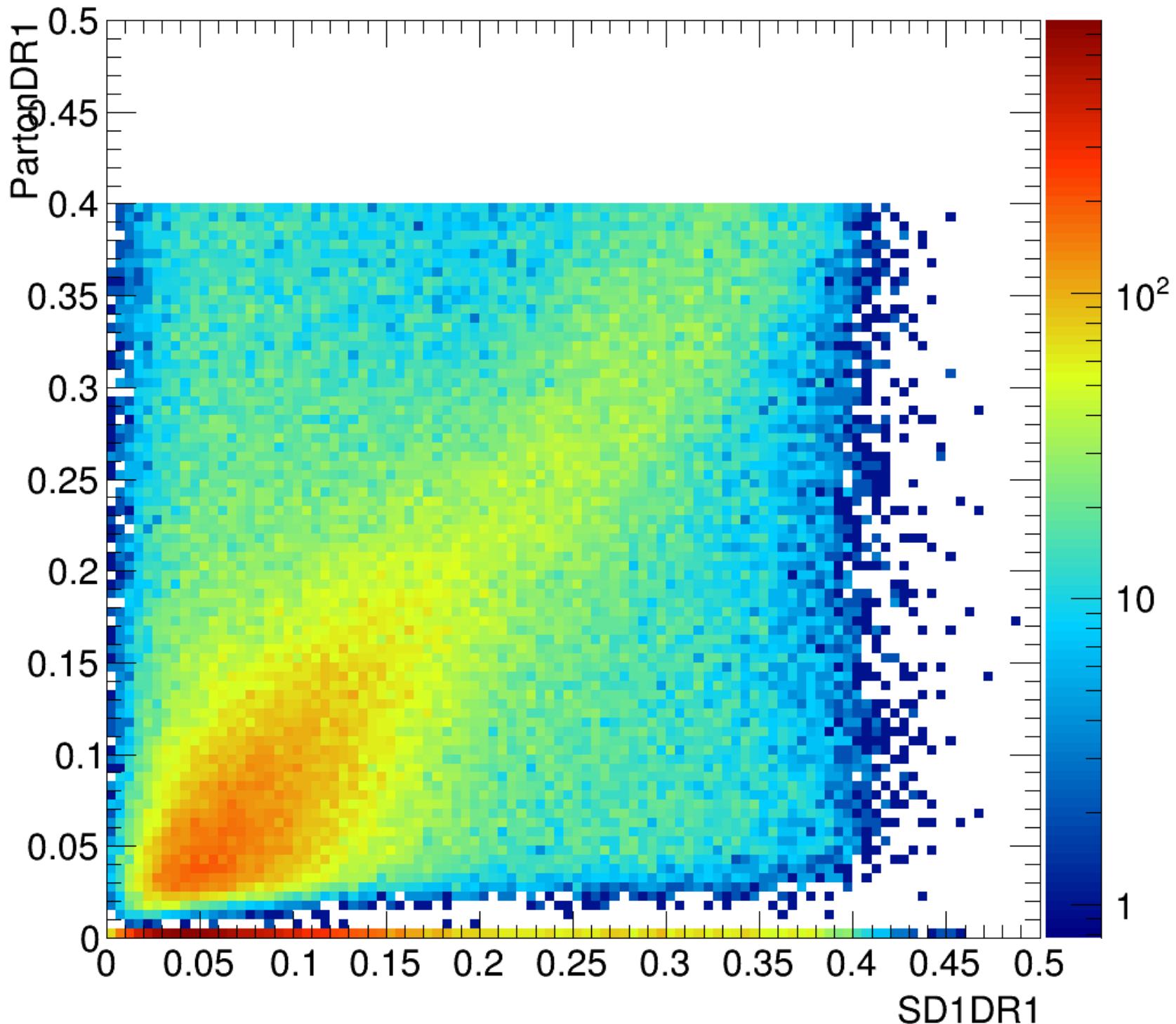
# PYTHIA8 Pthat50 Jet pT>70 GeV( $Z_{\text{cut}}, \beta$ )=(0.5,1.5)



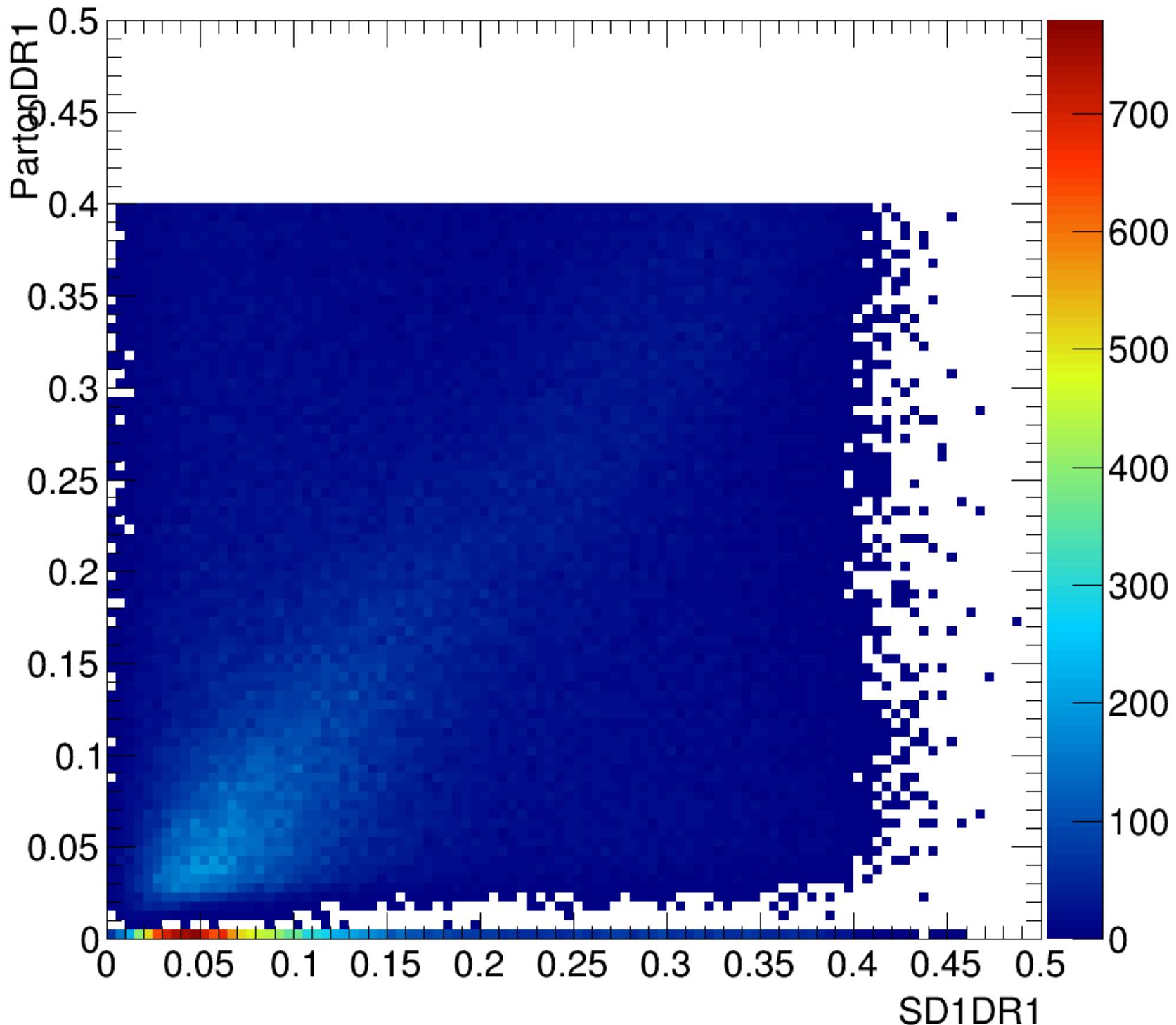
# PYTHIA8 Pthat50 Jet pT>70 GeV( $Z_{\text{cut}}, \beta$ )=(0.5,1.5)



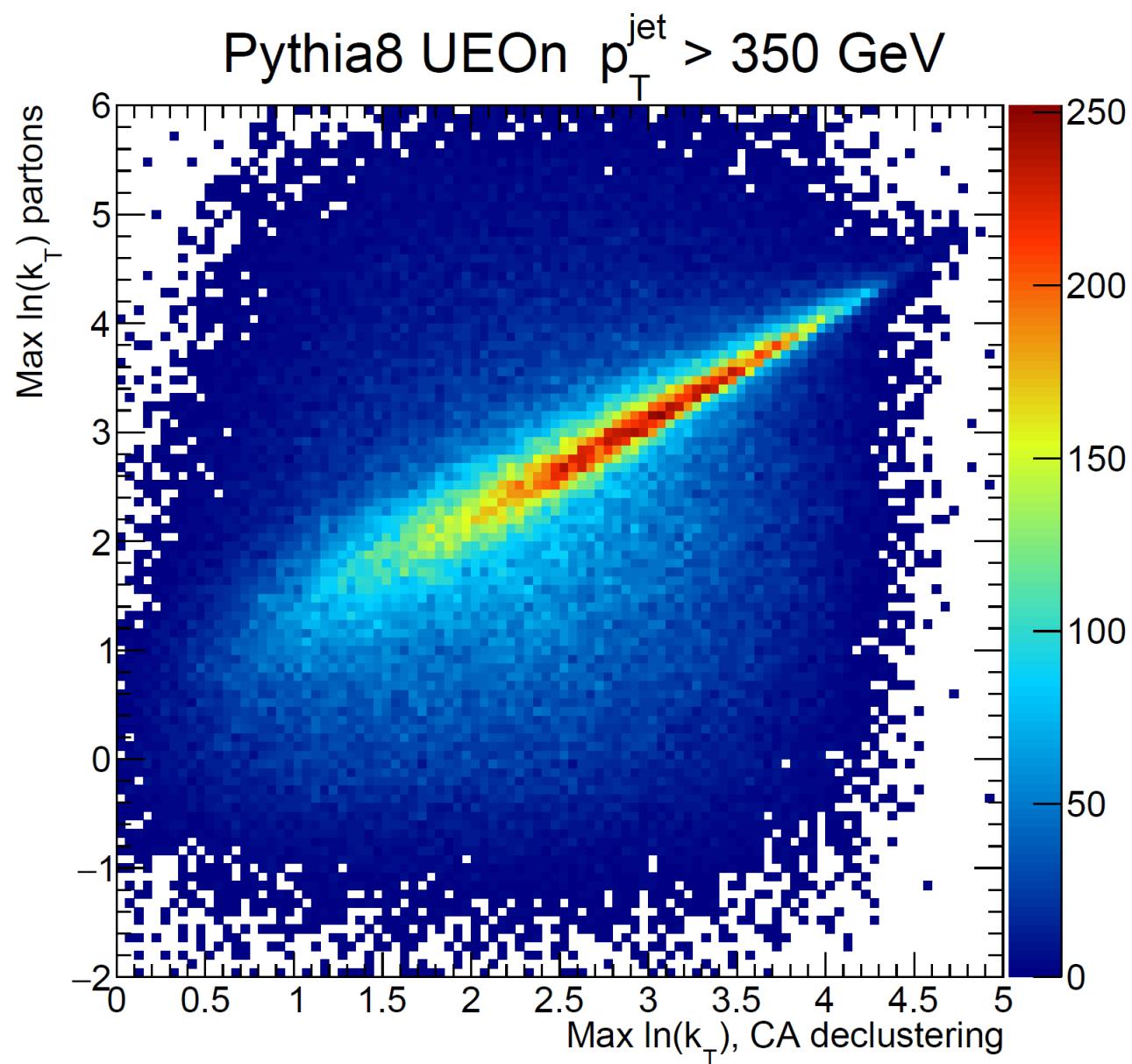
# PYTHIA8 Pthat50 Jet pT>70 GeV( $Z_{\text{cut}}, \beta$ )=(0.1,0.0)



# PYTHIA8 Pthat50 Jet pT>70 GeV( $Z_{\text{cut}}, \beta$ )=(0.1,0.0)

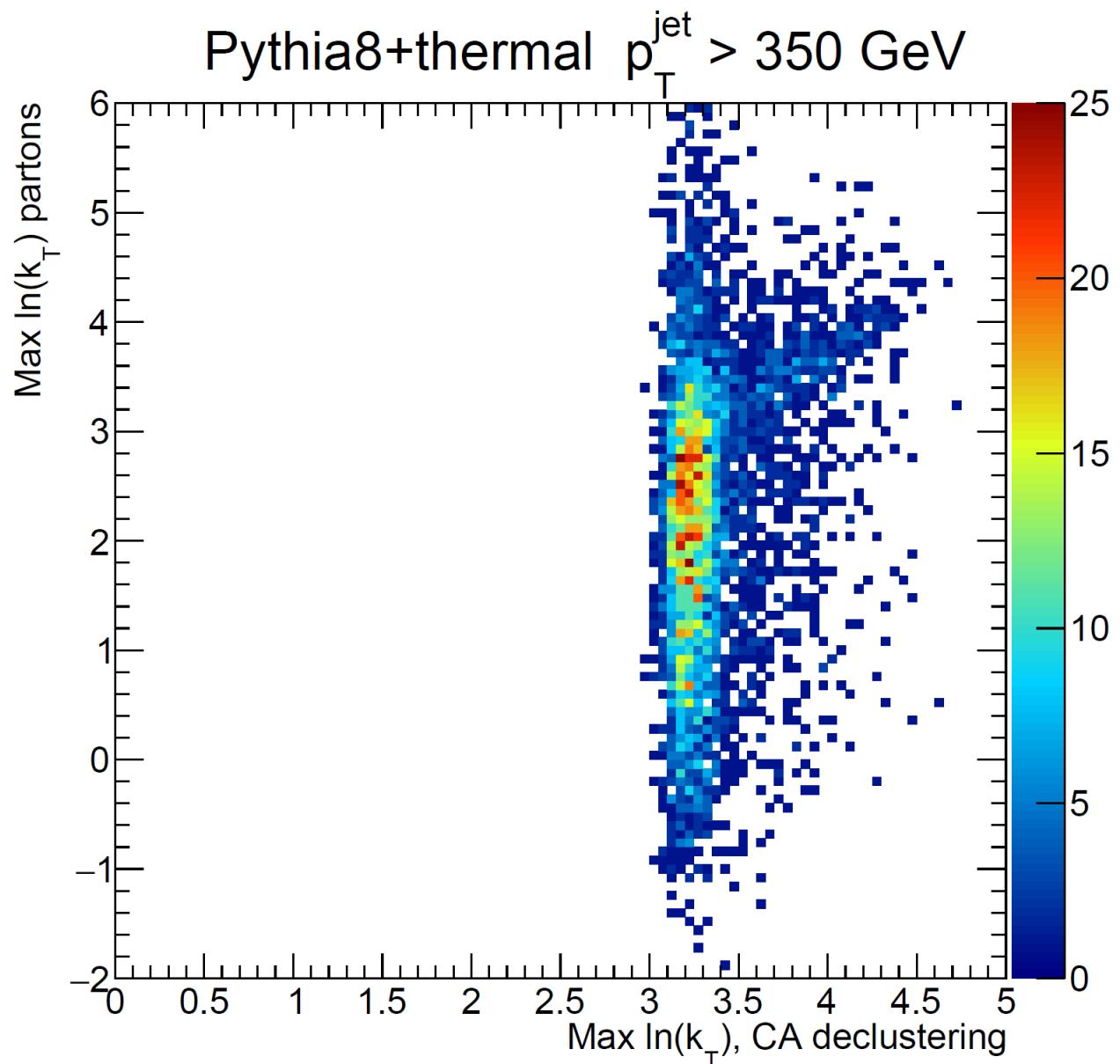


# Jet (CA) PYTHIA8 pThat300



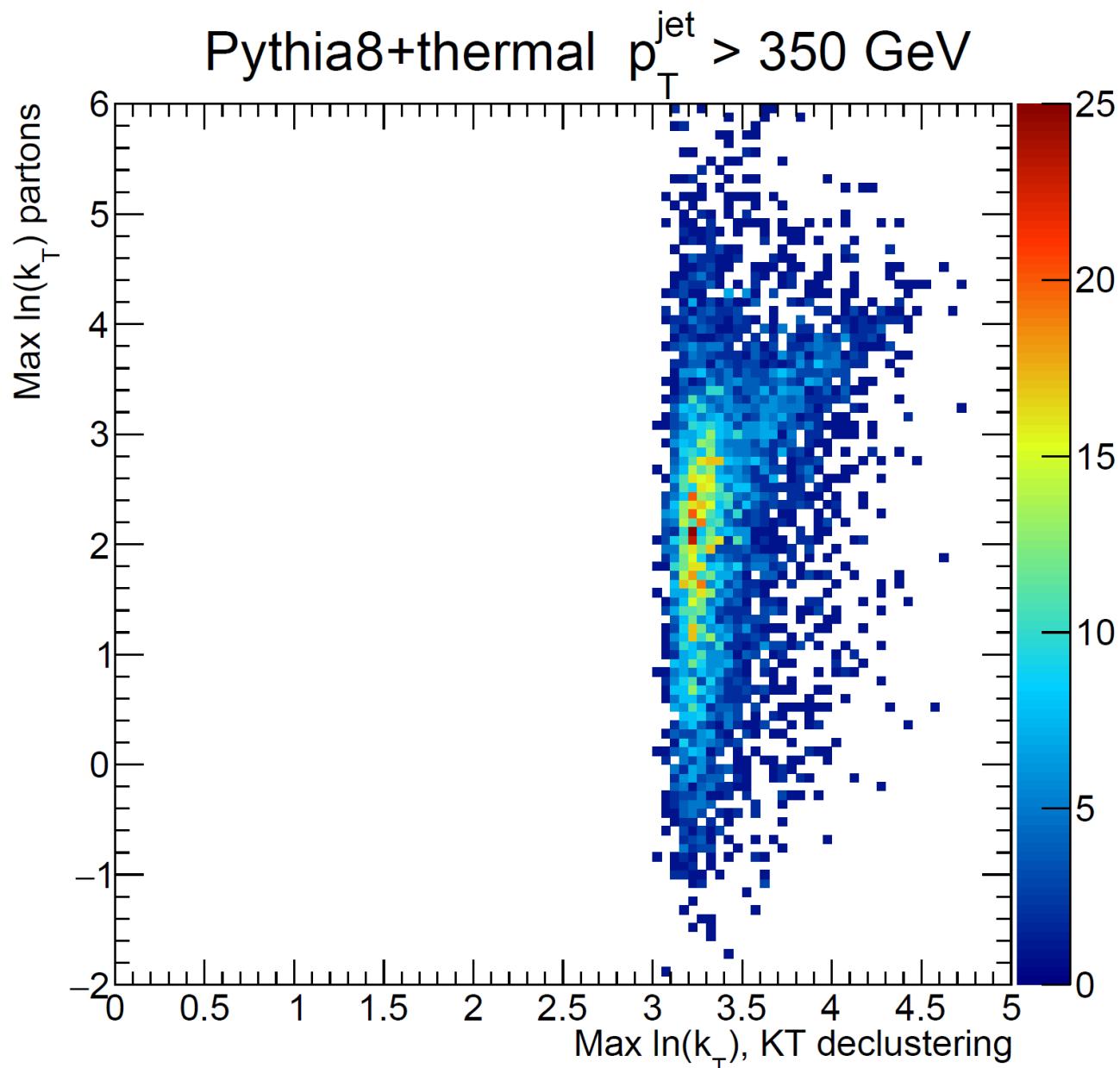
# Jet (CA) PYTHIA+TermaL Background (PbPb 5 TeV 0-10%)

Without background sub



# Jet (KT) PYTHIA+TermaL Background (PbPb 5 TeV 0-10%)

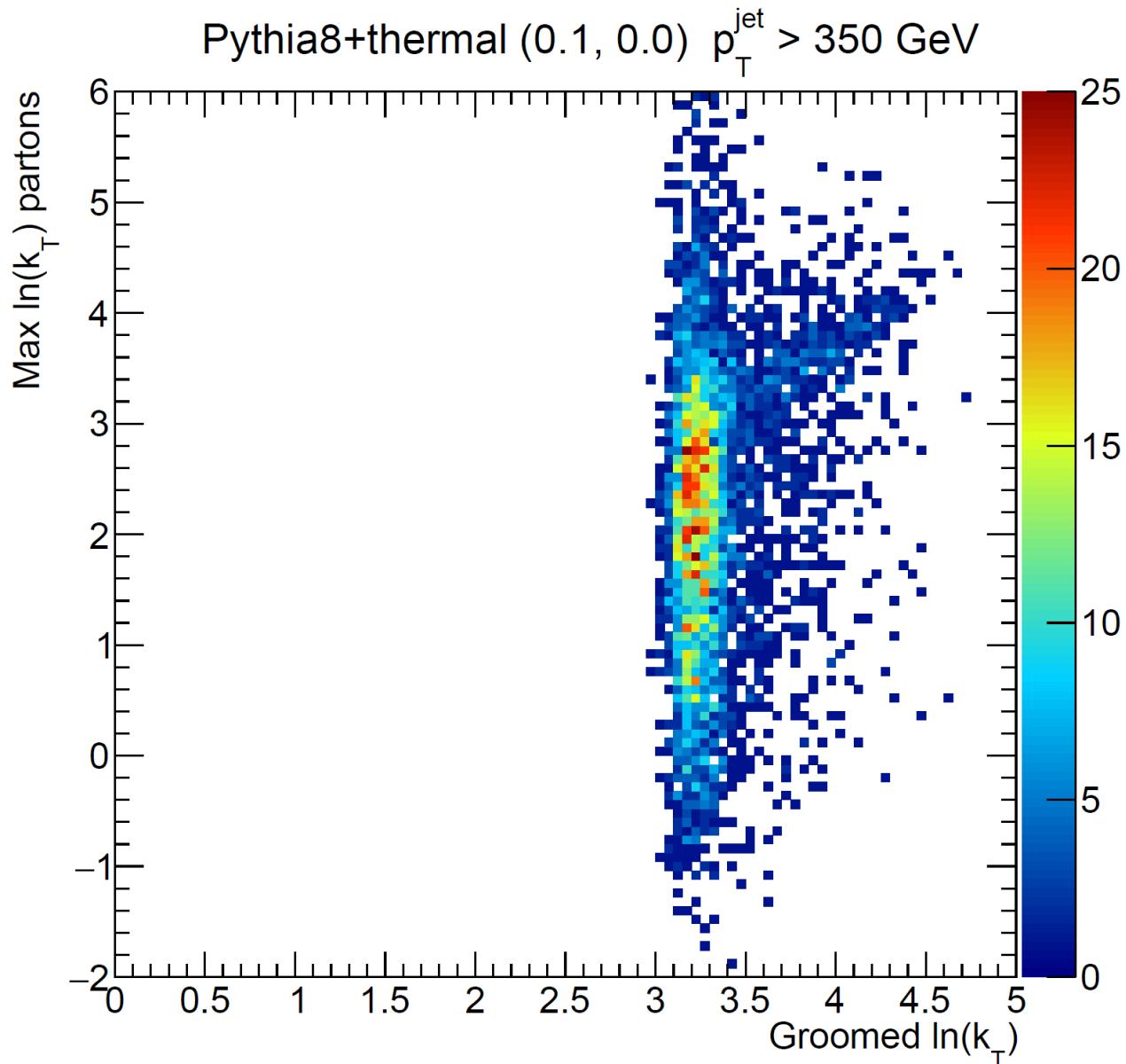
Without background sub



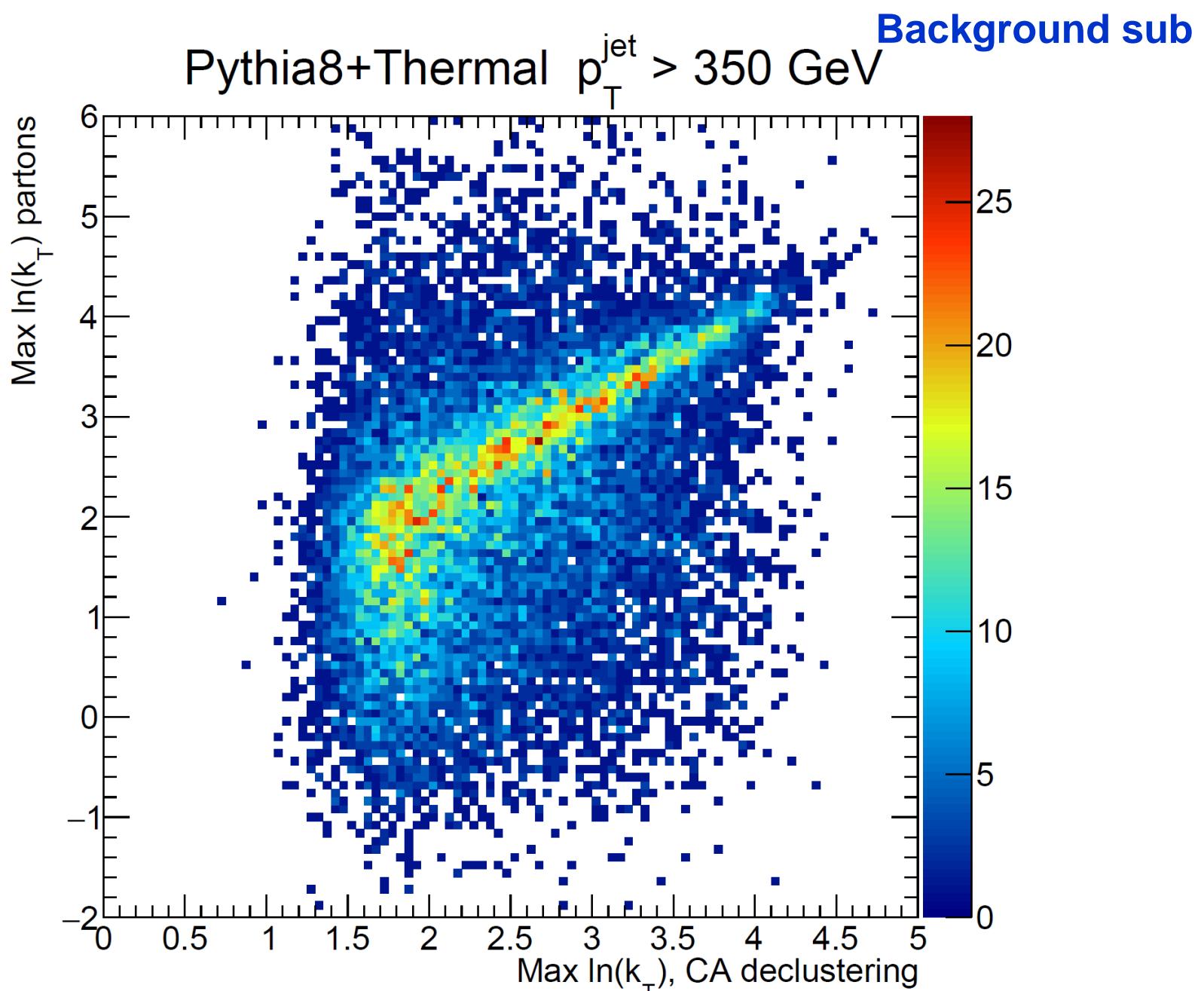
# Groomed Jet (CA) PYTHIA+Termal Background (PbPb 5 TeV 0-10%)

Zcut (0.1,0)

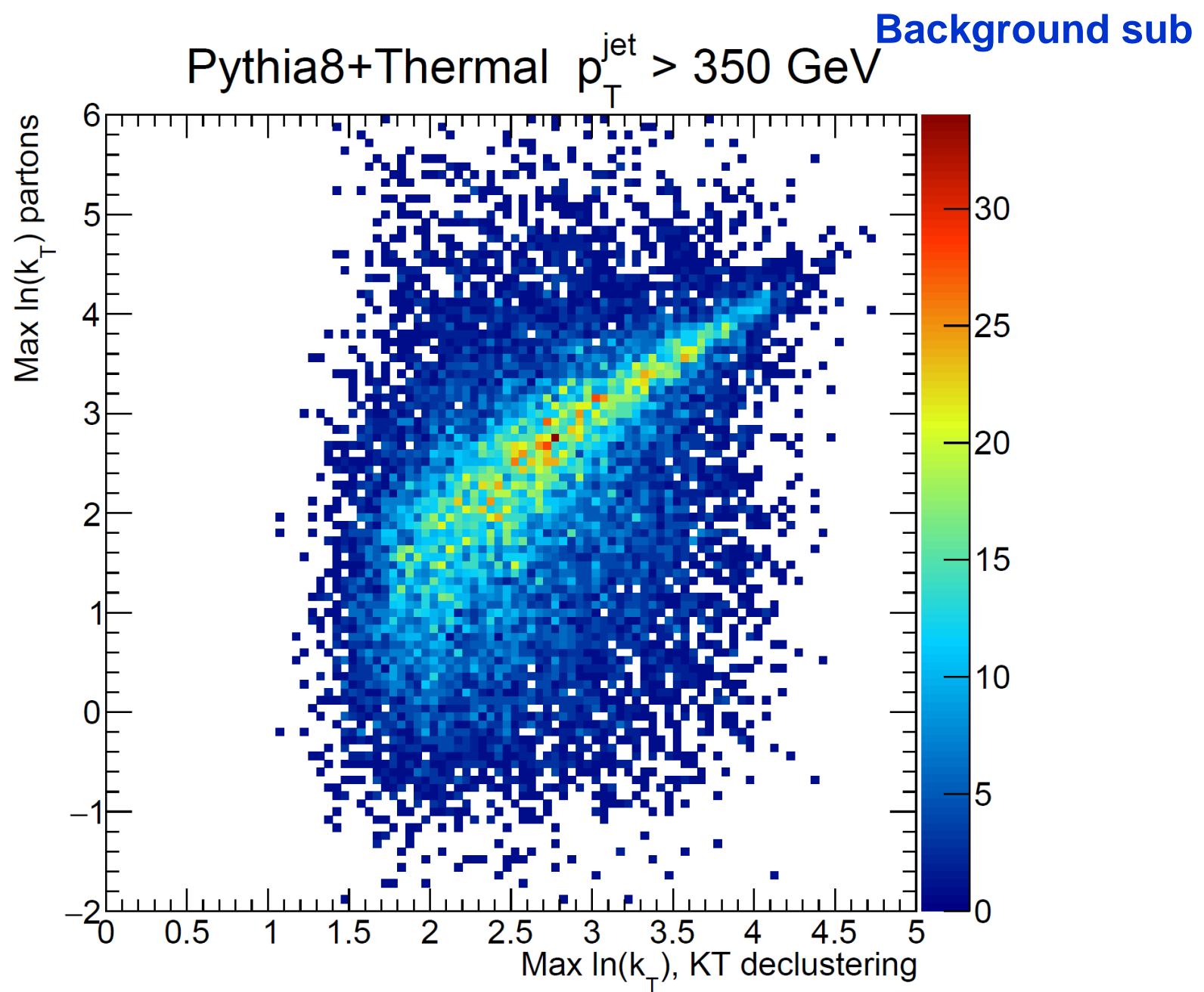
Without background sub



# Jet (CA) PYTHIA+TermaL Background (PbPb 5 TeV 0-10%)



# Jet (KT) PYTHIA+TermaL Background (PbPb 5 TeV 0-10%)

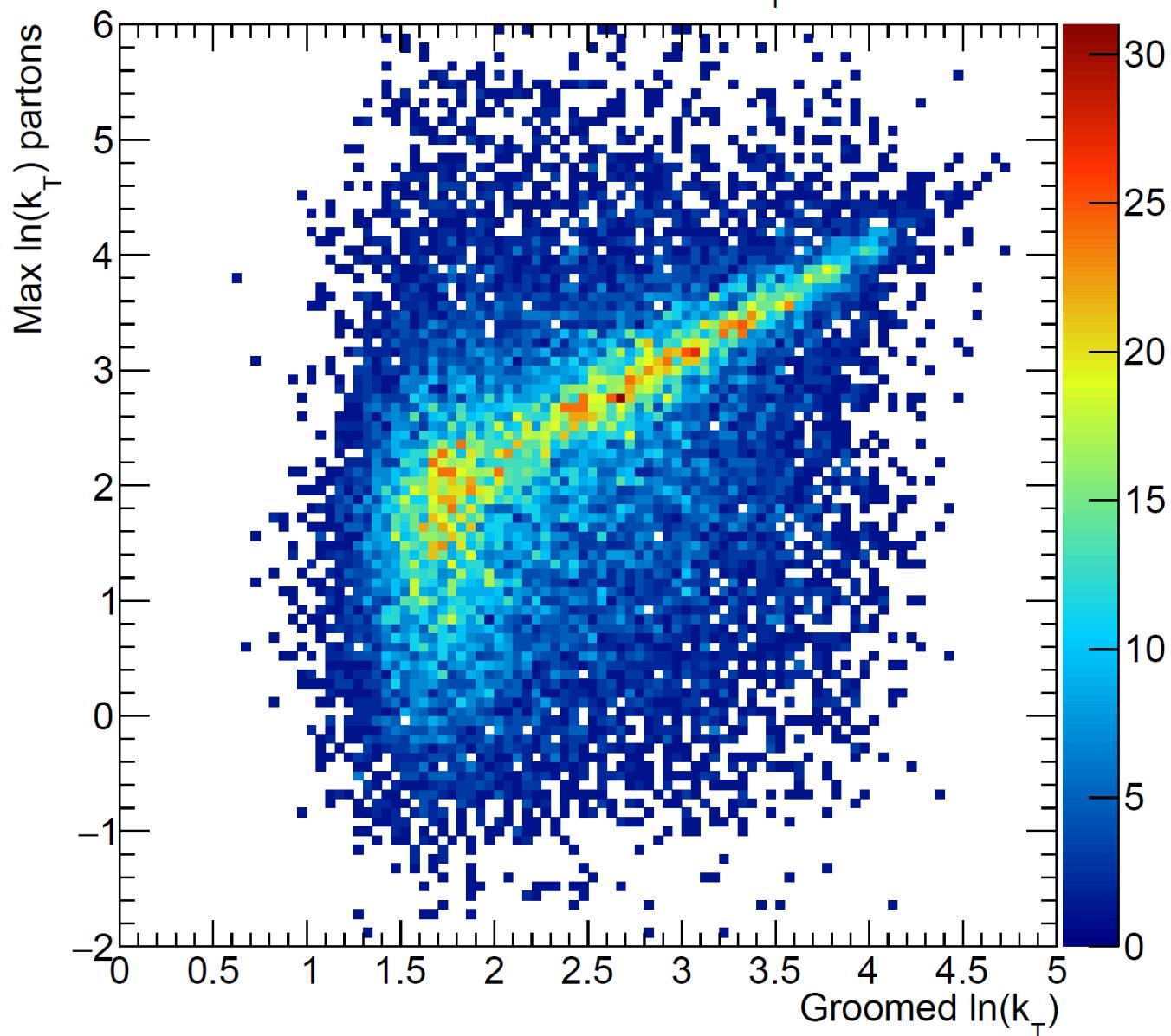


# Groomed Jet (CA) PYTHIA+Termal Background (PbPb 5 TeV 0-10%)

Zcut (0.1,0)

Pythia8+Thermal (0.1, 0.0)  $p_T^{\text{jet}} > 350 \text{ GeV}$

Background sub

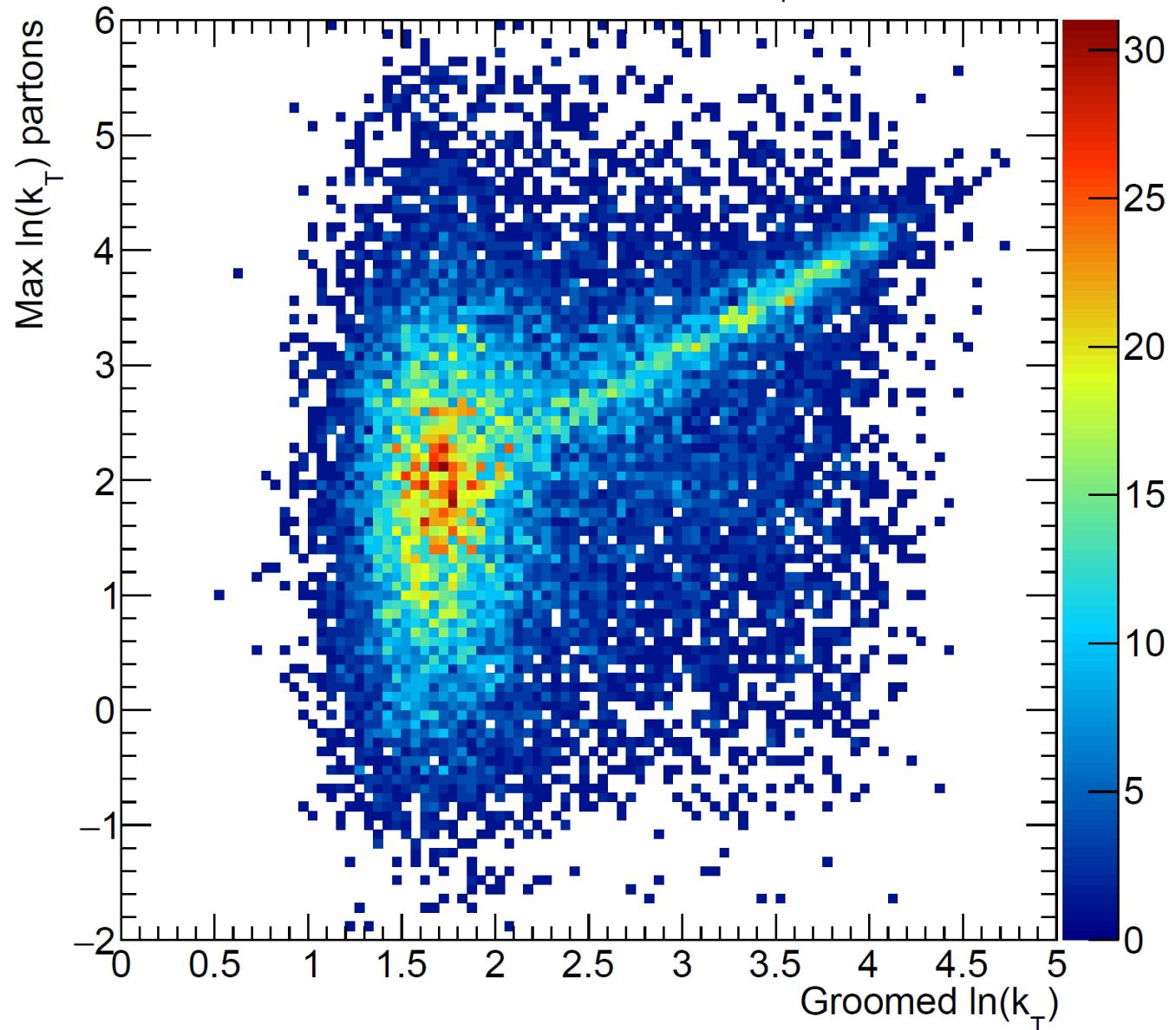


# Groomed Jet (CA) PYTHIA+Termal Background (PbPb 5 TeV 0-10%)

Zcut (0.25,0.0)

Pythia8+Thermal (0.25, 0.0)  $p_T^{\text{jet}} > 350 \text{ GeV}$

Background sub

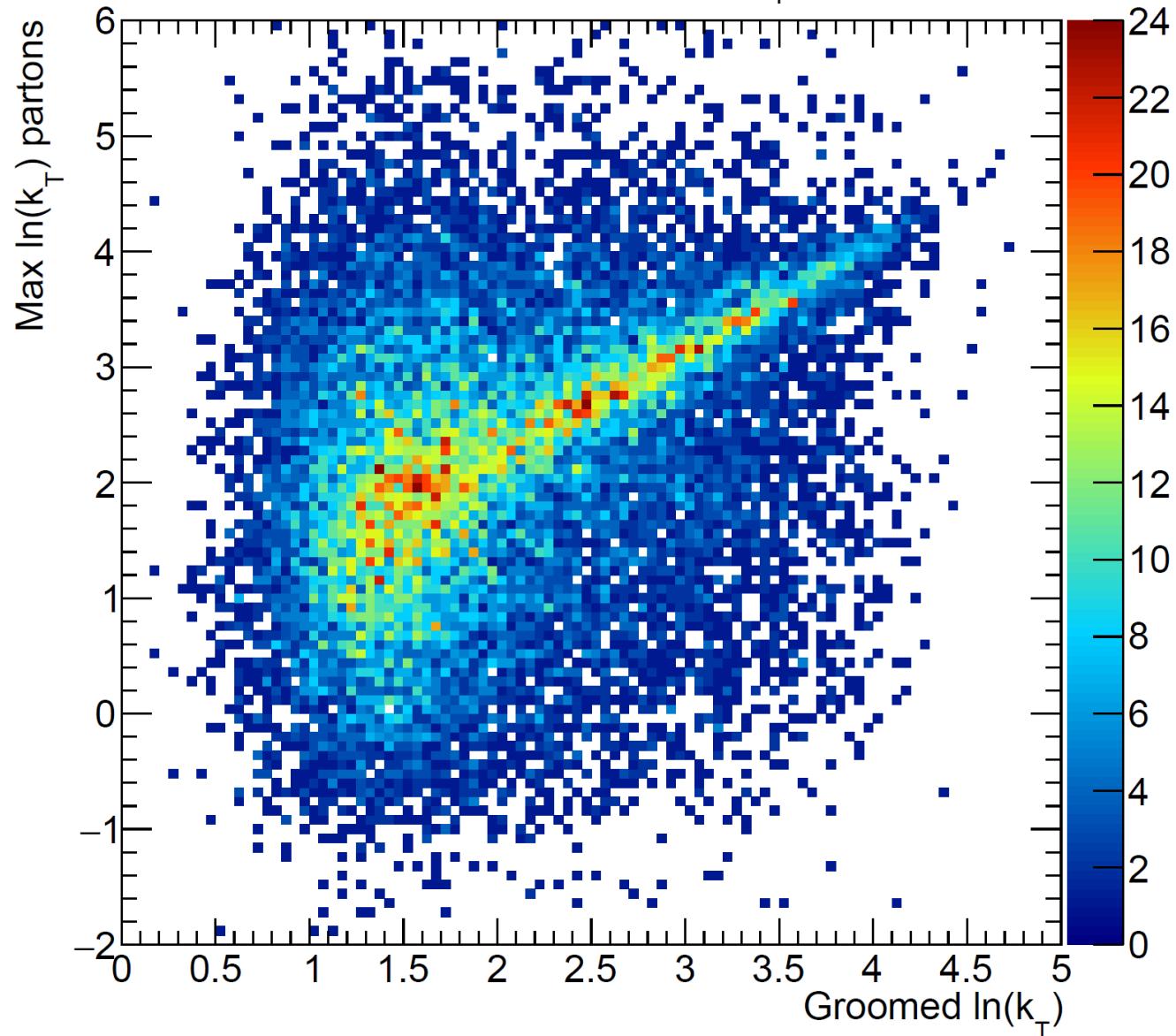


# Groomed Jet (CA) PYTHIA+Termal Background (PbPb 5 TeV 0-10%)

Zcut (0.5,1.5)

Pythia8+Thermal (0.5, 1.5)  $p_T^{\text{jet}} > 350 \text{ GeV}$

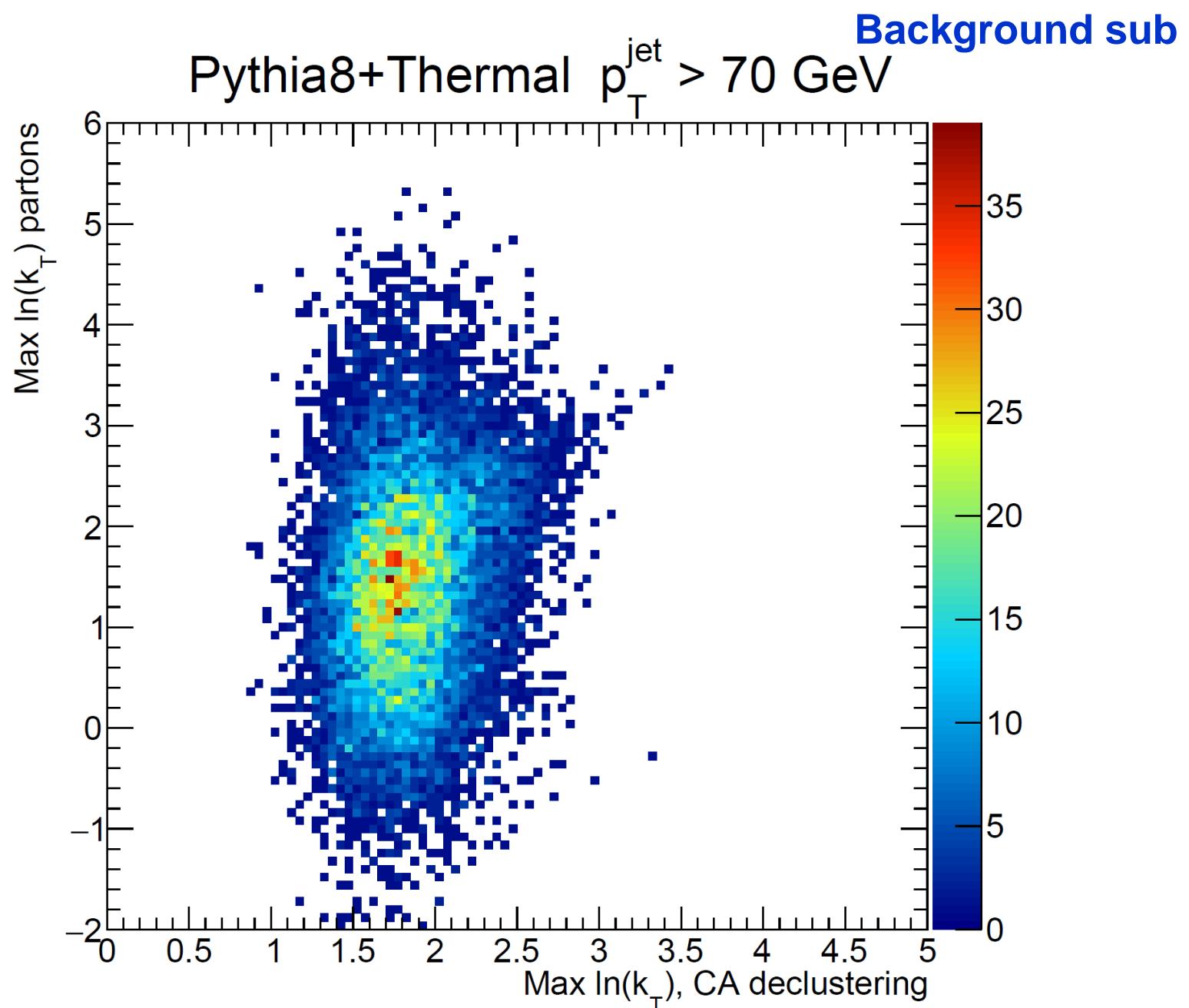
Background sub



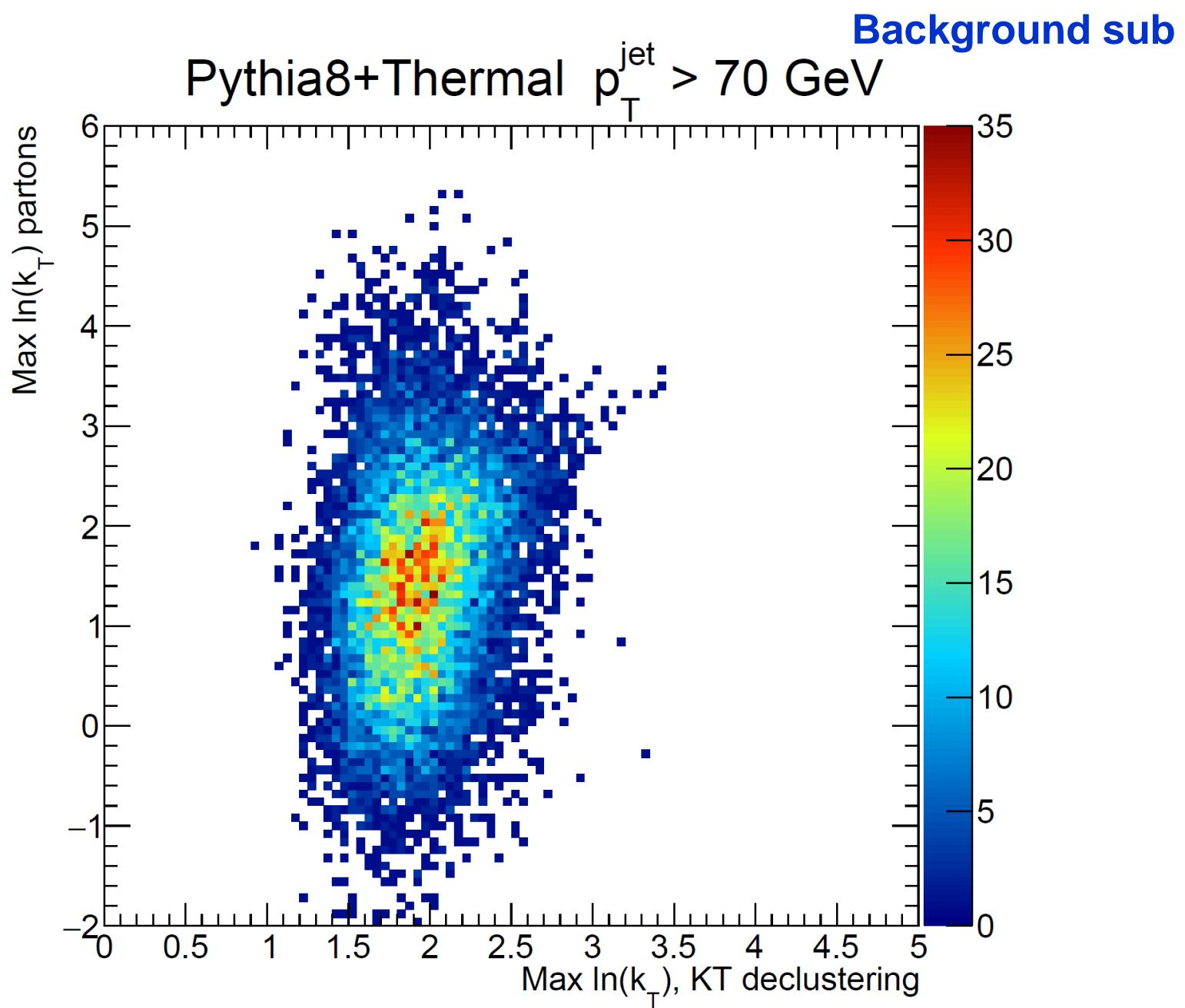
# Low pT Jet in thermal background



# Jet (CA) PYTHIA+TermaL Background (PbPb 5 TeV 0-10%) Low pT jet

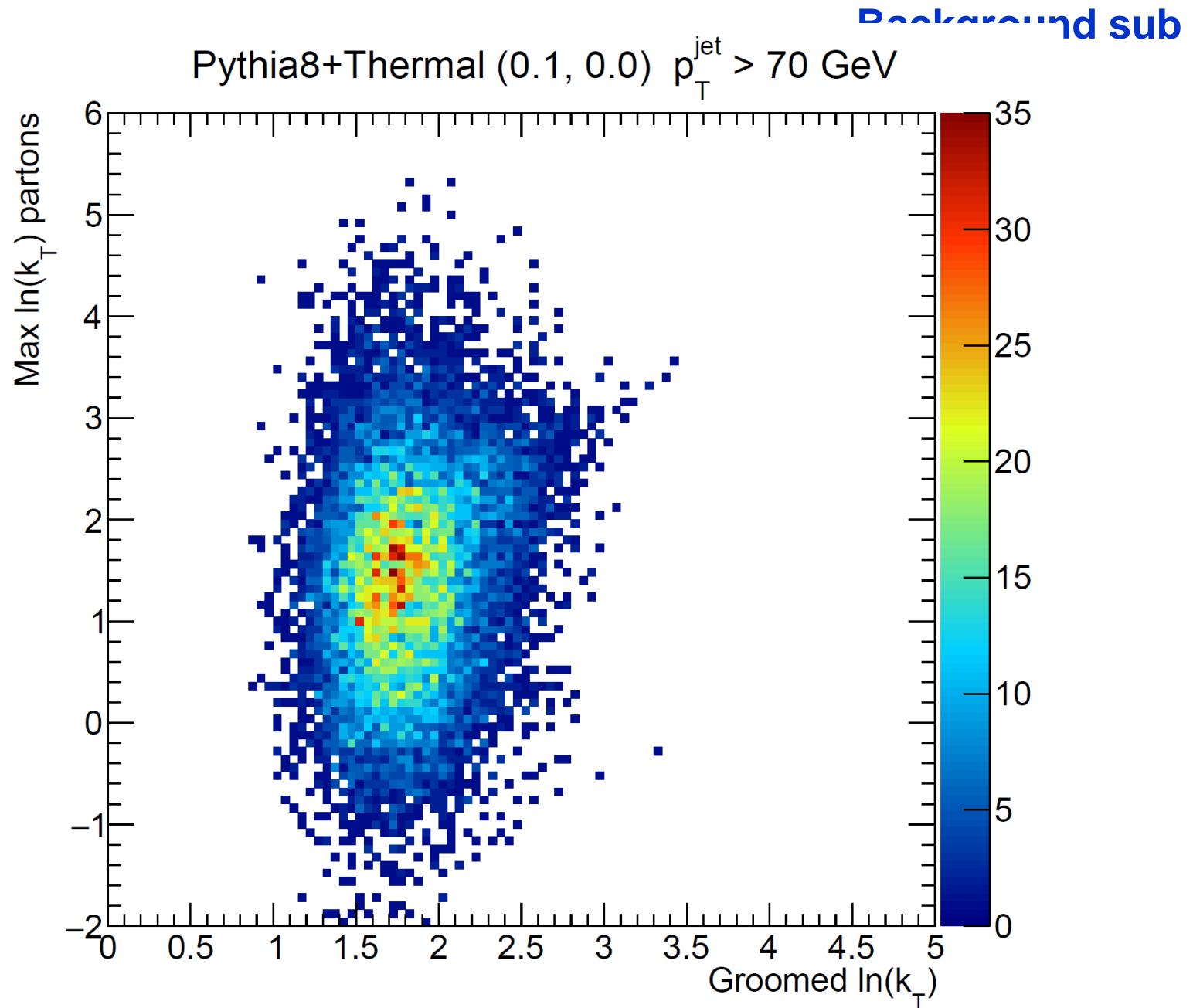


# Jet (KT) PYTHIA+TermaL Background (PbPb 5 TeV 0-10%) Low pT Jet



# Groomed Jet (CA) PYTHIA+Termal Background (PbPb 5 TeV 0-10%)

Zcut (0.1,0)

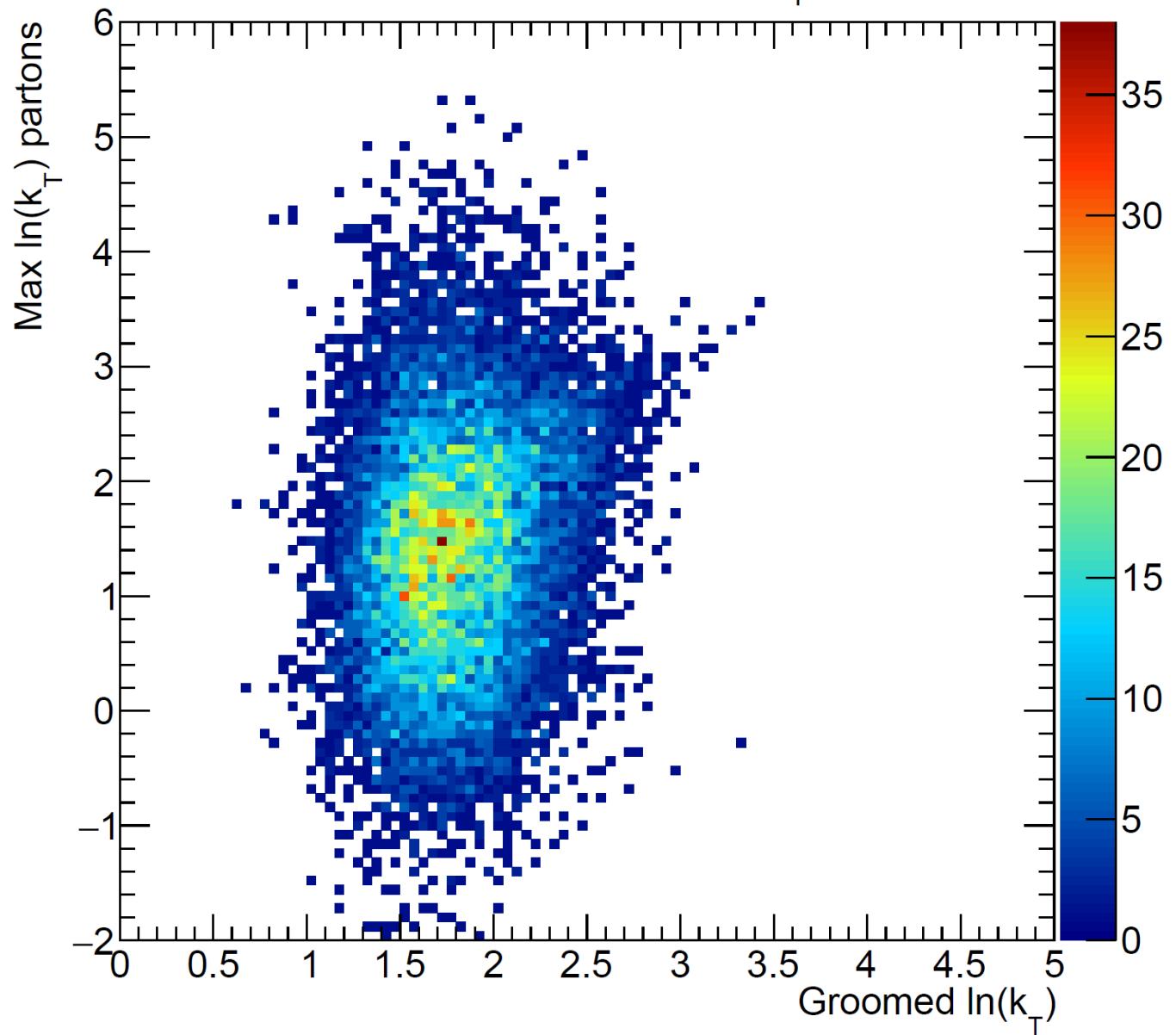


# Groomed Jet (CA) PYTHIA+TermaL Background (PbPb 5 TeV 0-10%) Low pT Jet

Zcut (0.25, 0.0)

Pythia8+Thermal (0.25, 0.0)  $p_T^{\text{jet}} > 70 \text{ GeV}$

Background sub

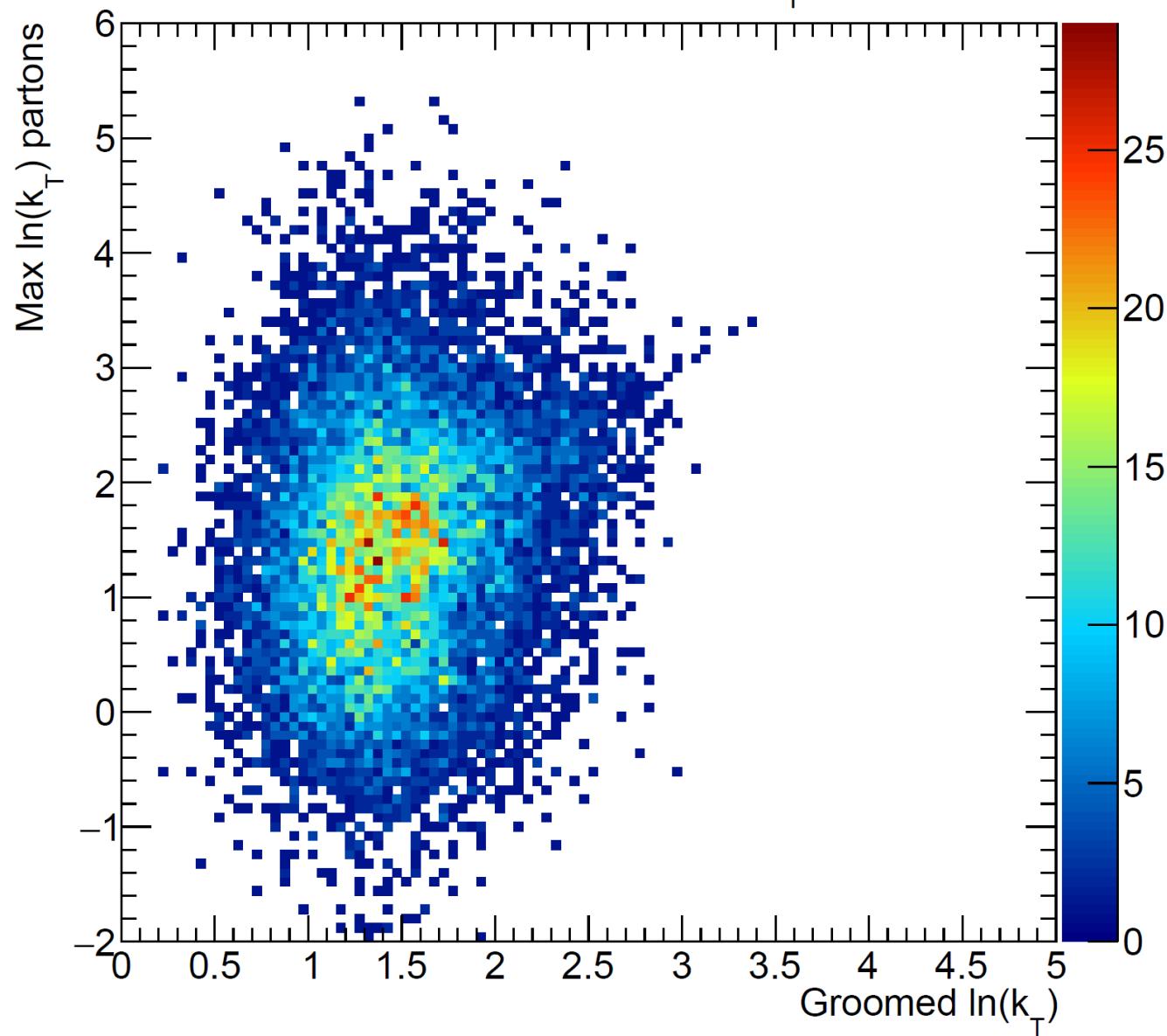


# Groomed Jet (CA) PYTHIA+Termal Background (PbPb 5 TeV 0-10%)

Zcut (0.5, 1.5)

Pythia8+Thermal (0.5, 1.5)  $p_T^{\text{jet}} > 70 \text{ GeV}$

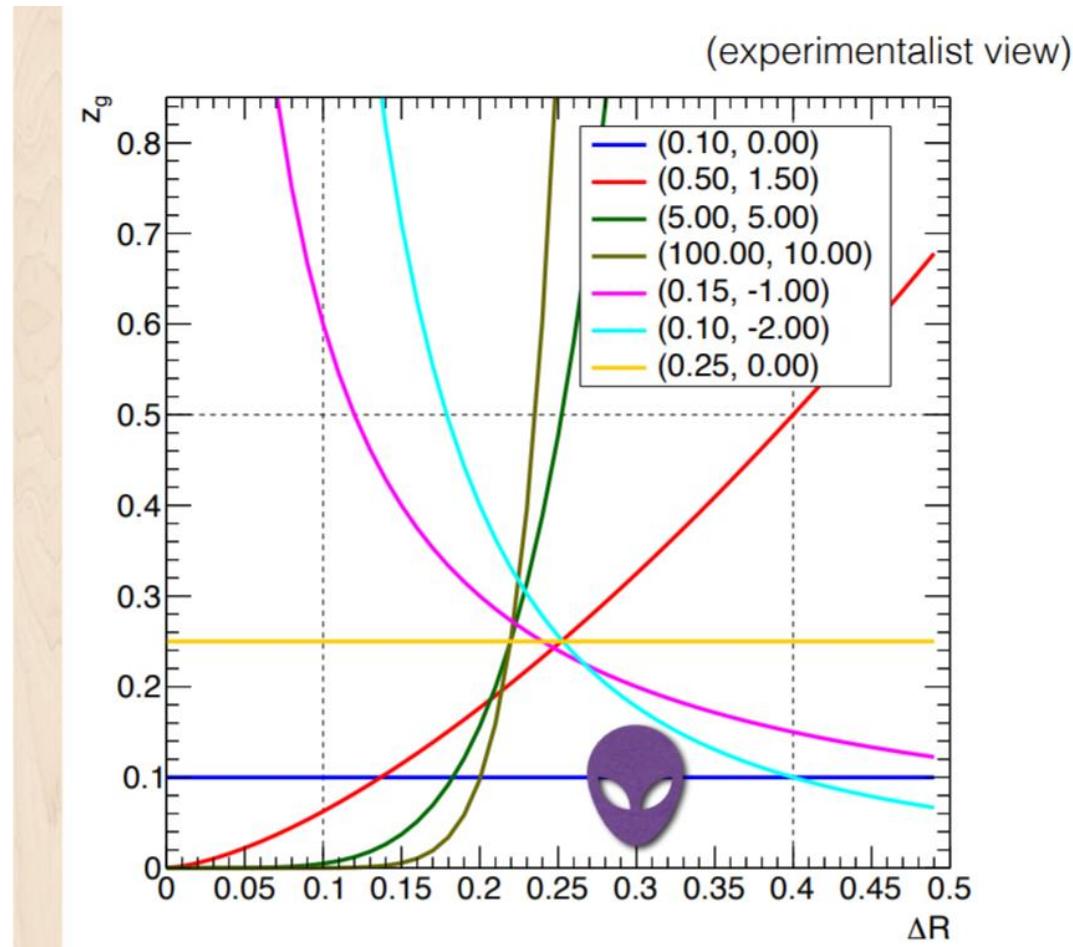
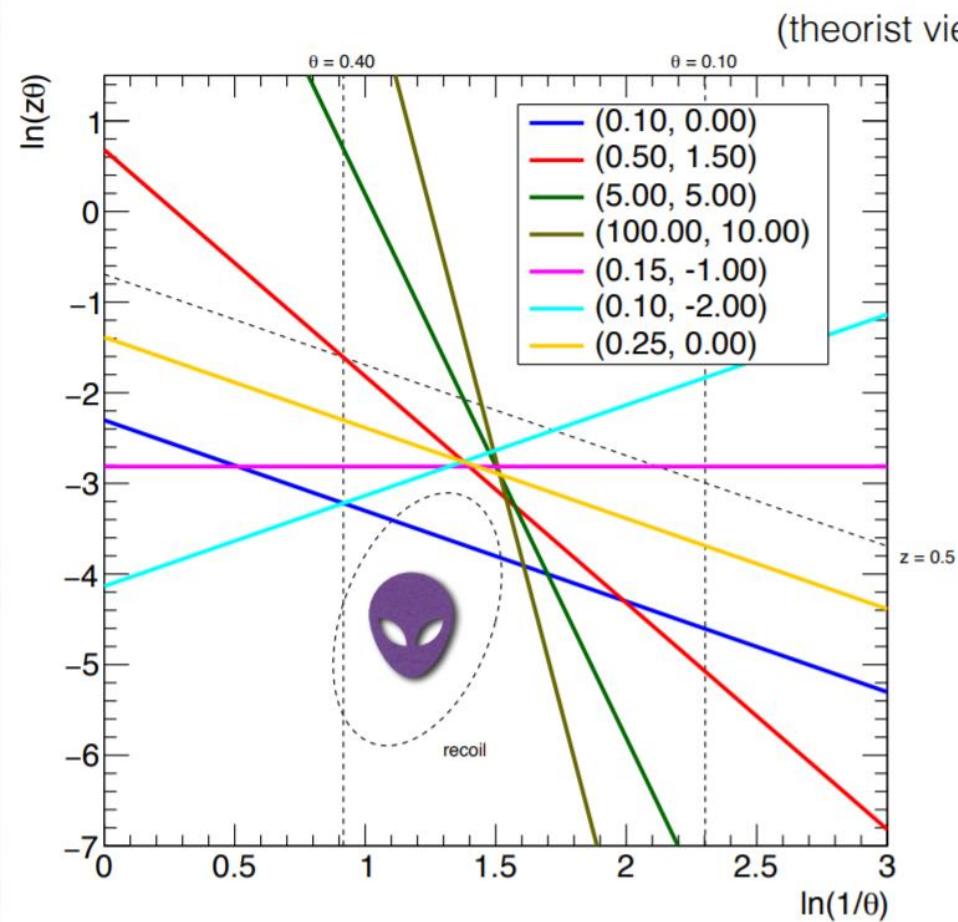
Background sub



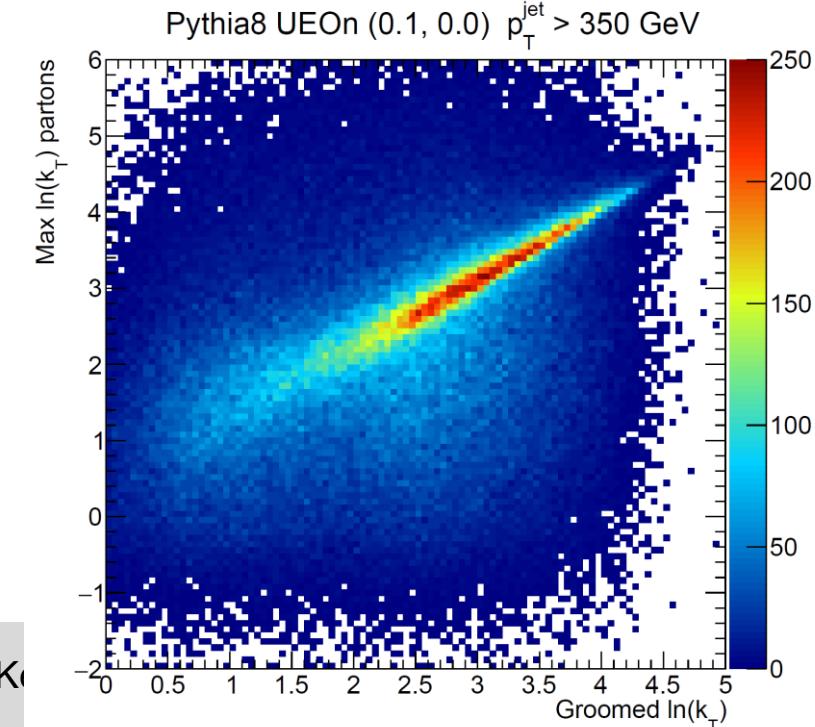
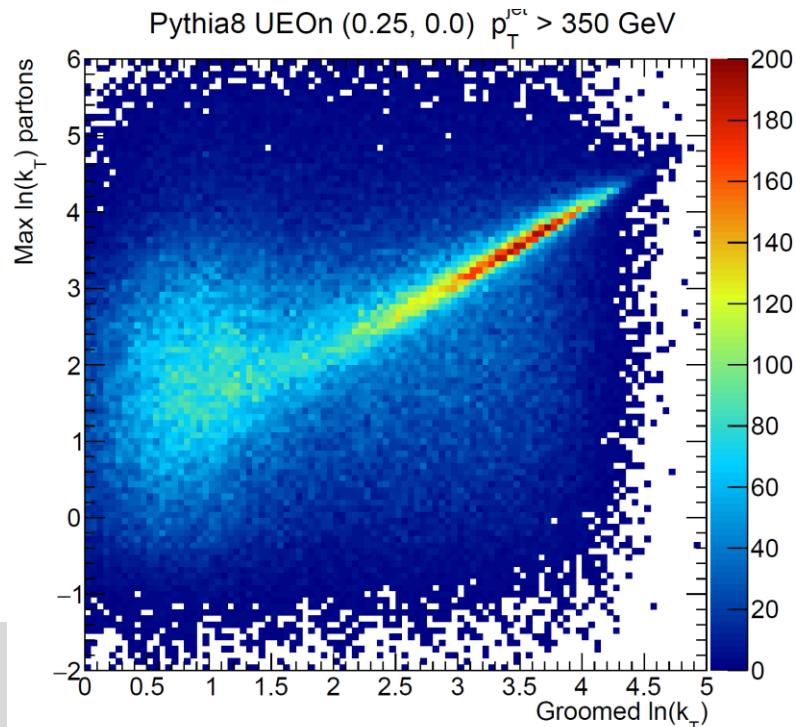
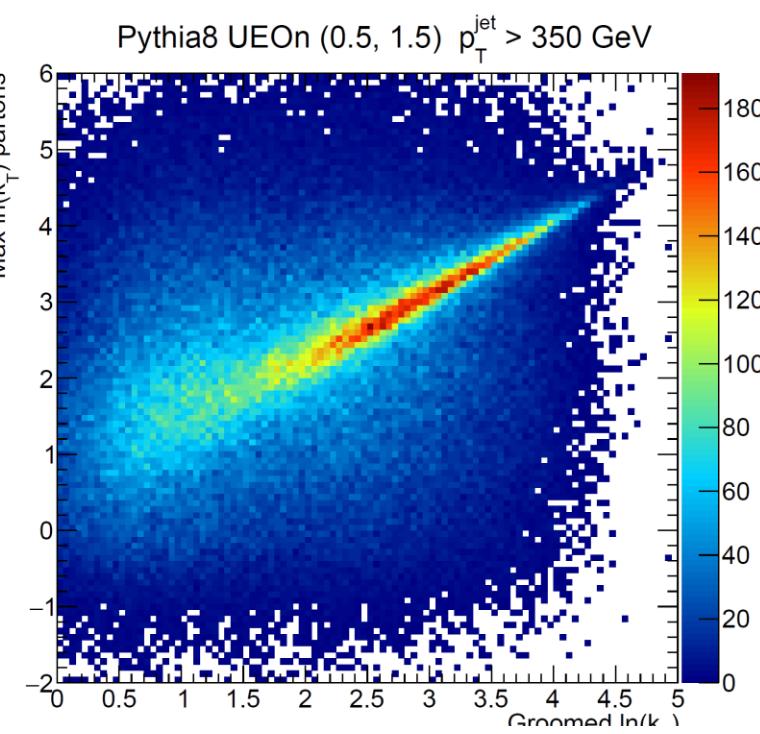
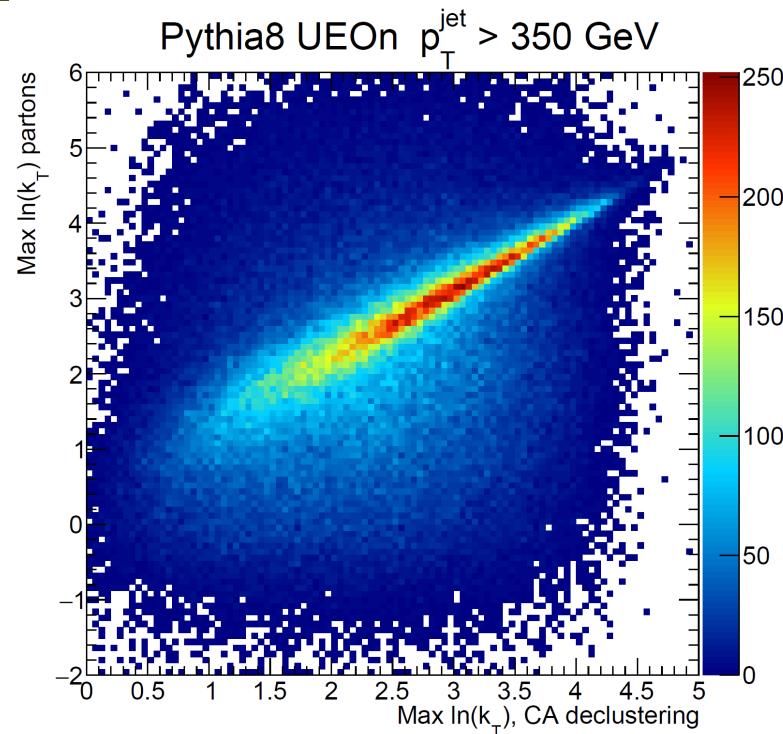
# Previous Report



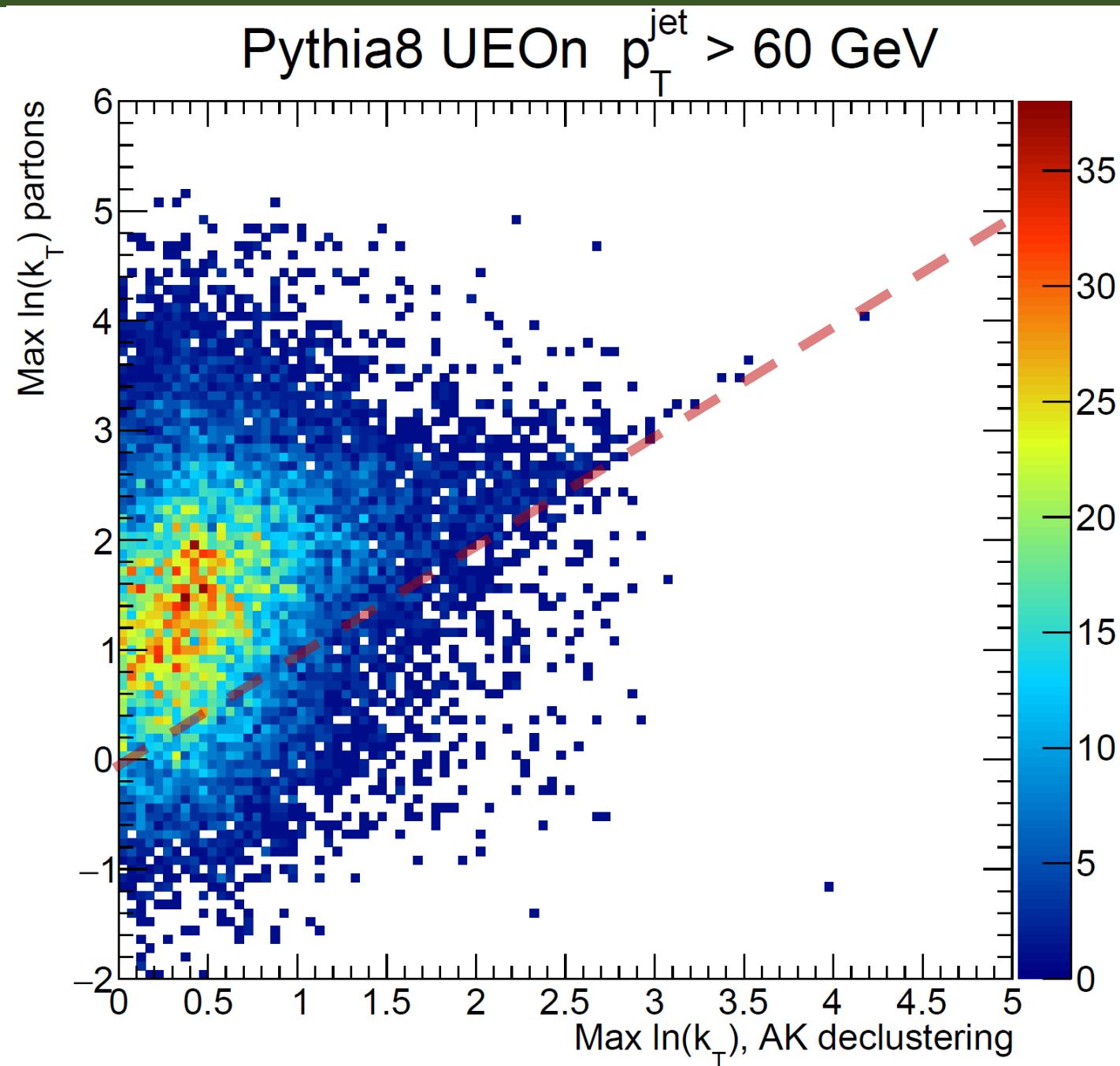
# Softdrop



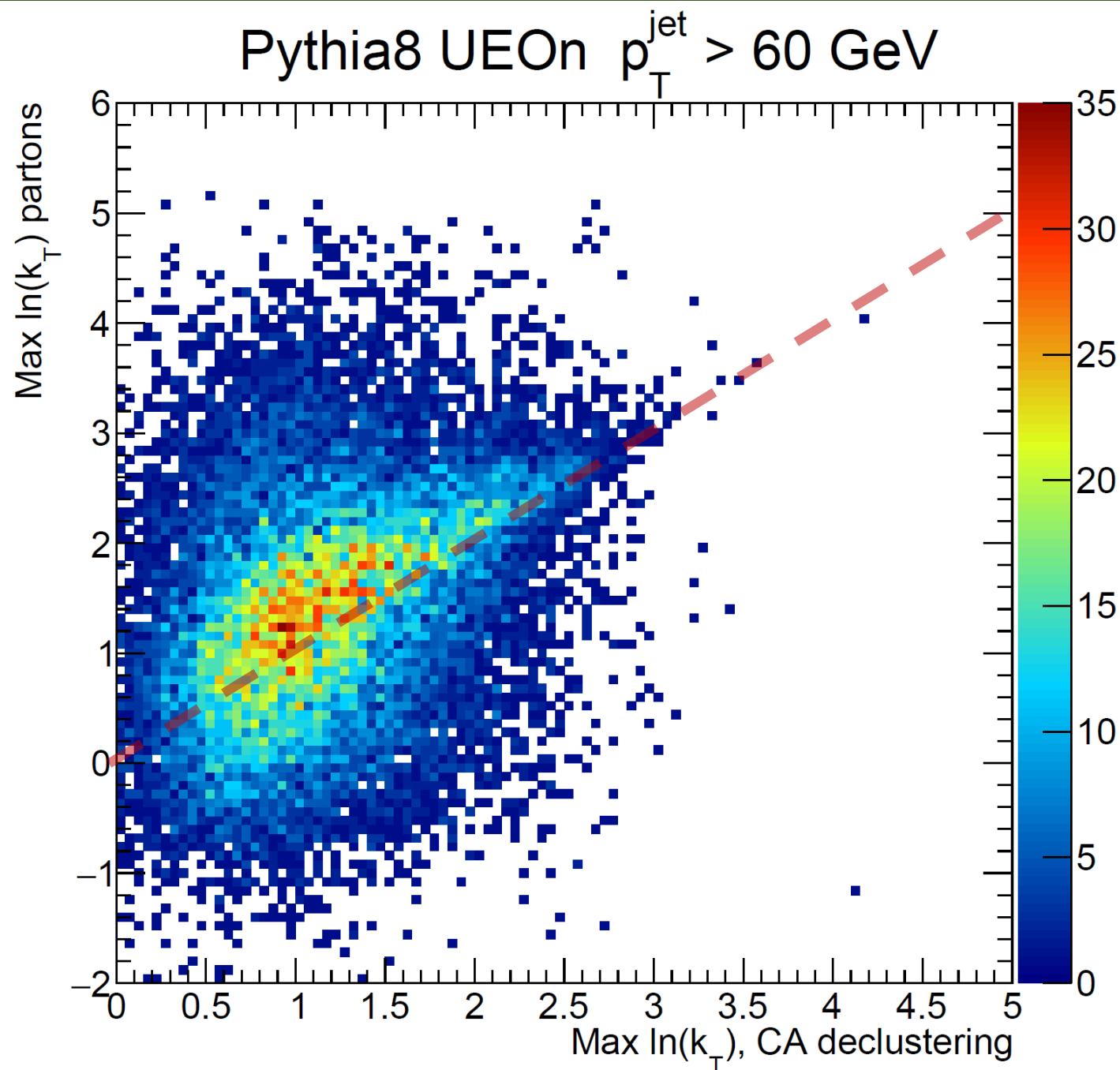
# Performance with $\hat{p}_T > 300$ GeV



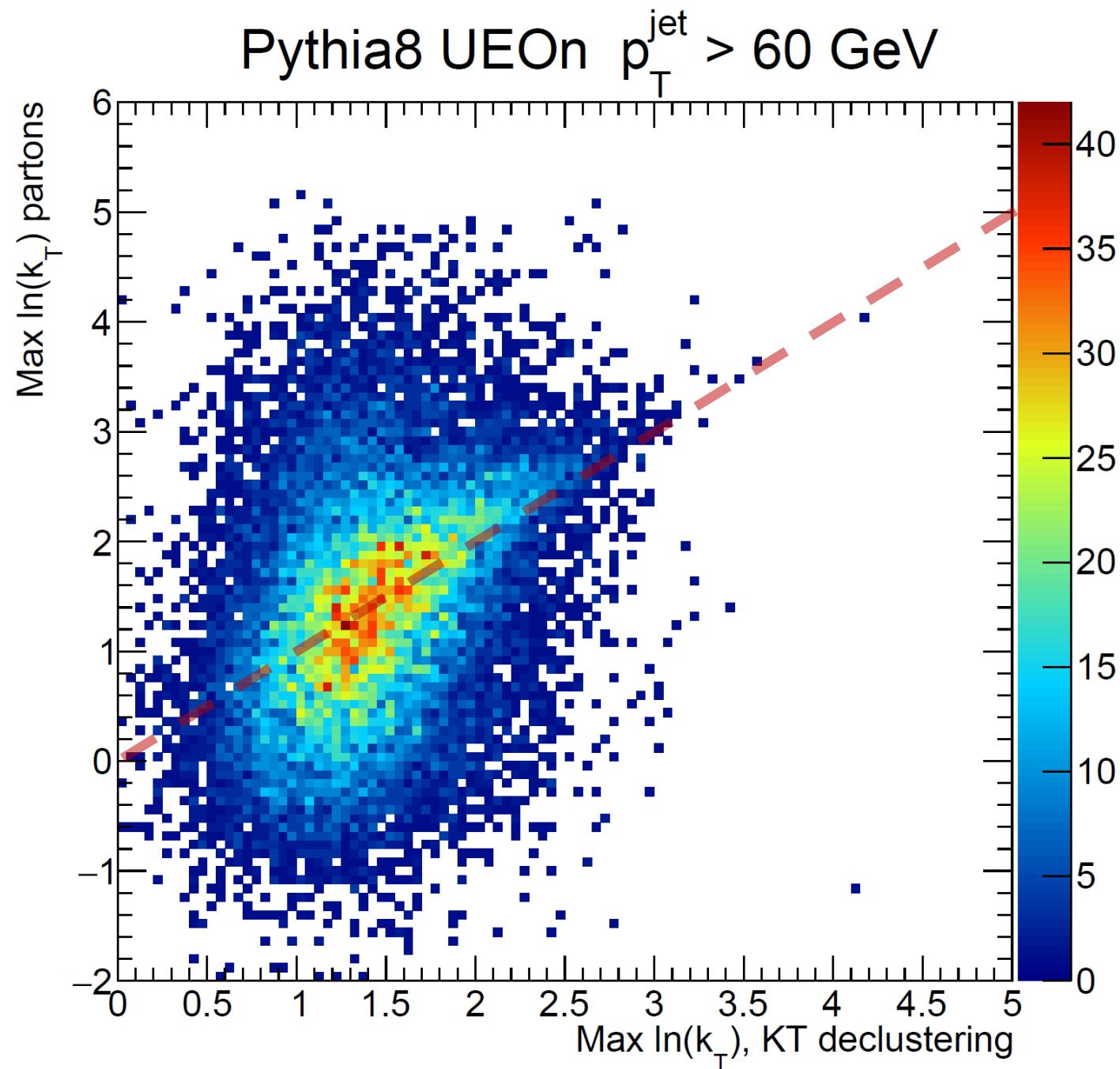
# Performance with $\hat{p}_T > 50$ GeV, Anti-KT



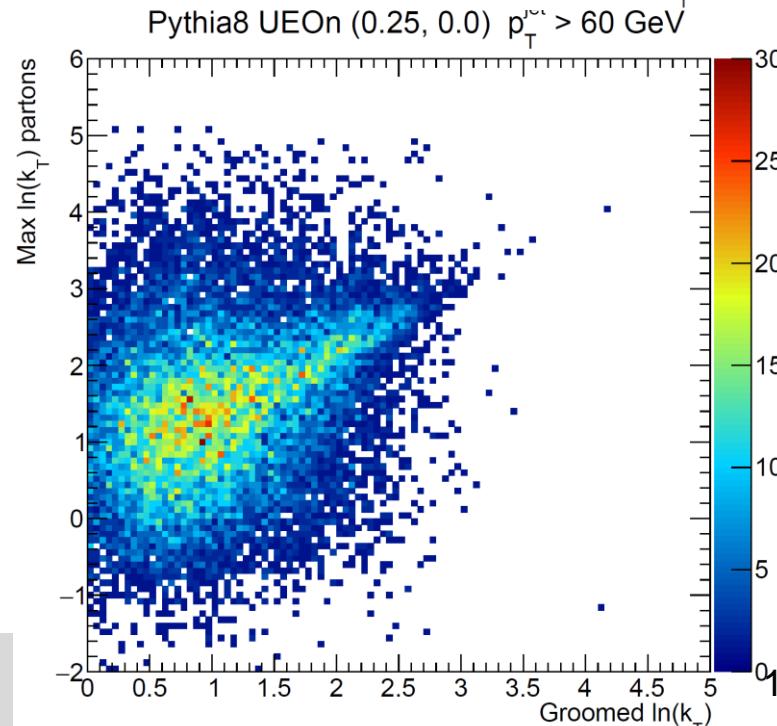
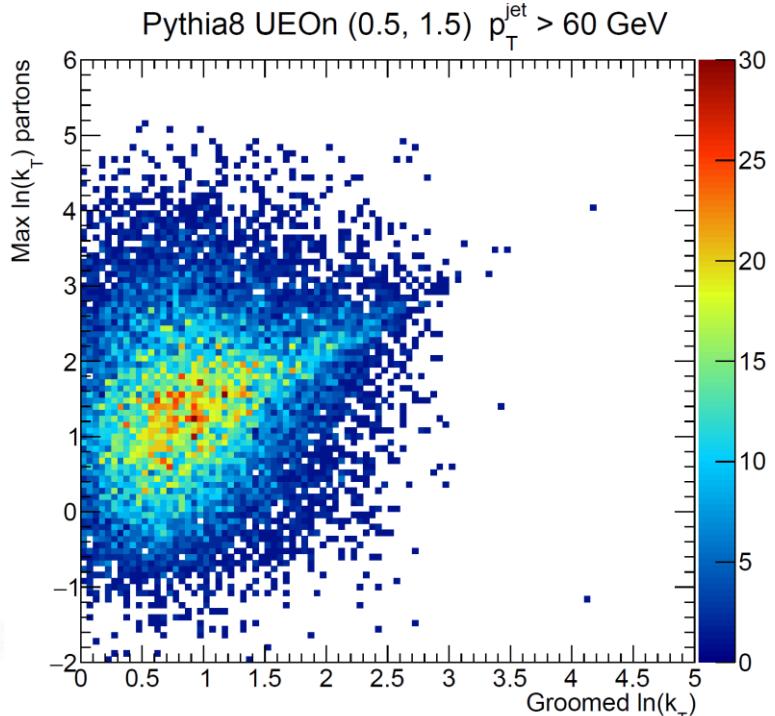
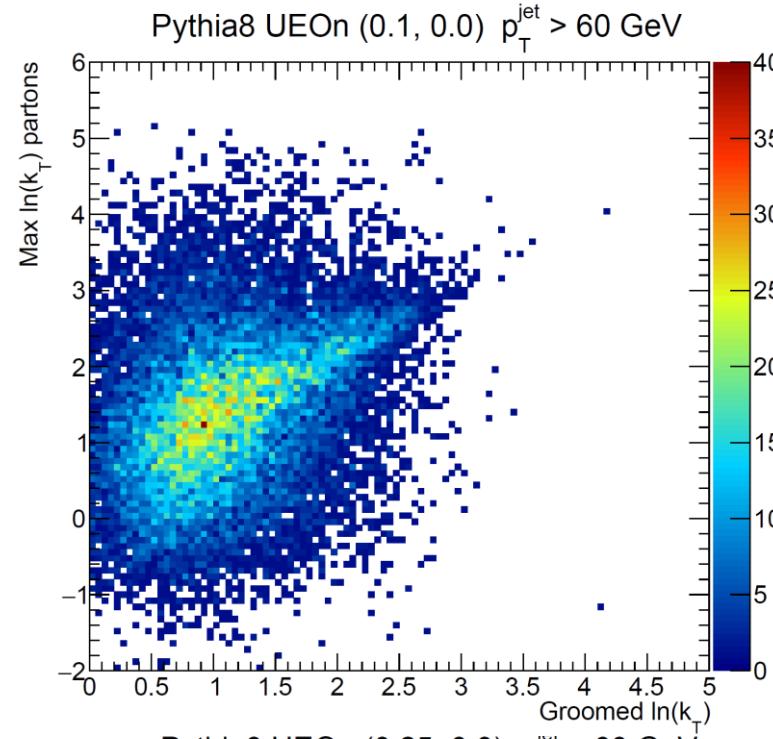
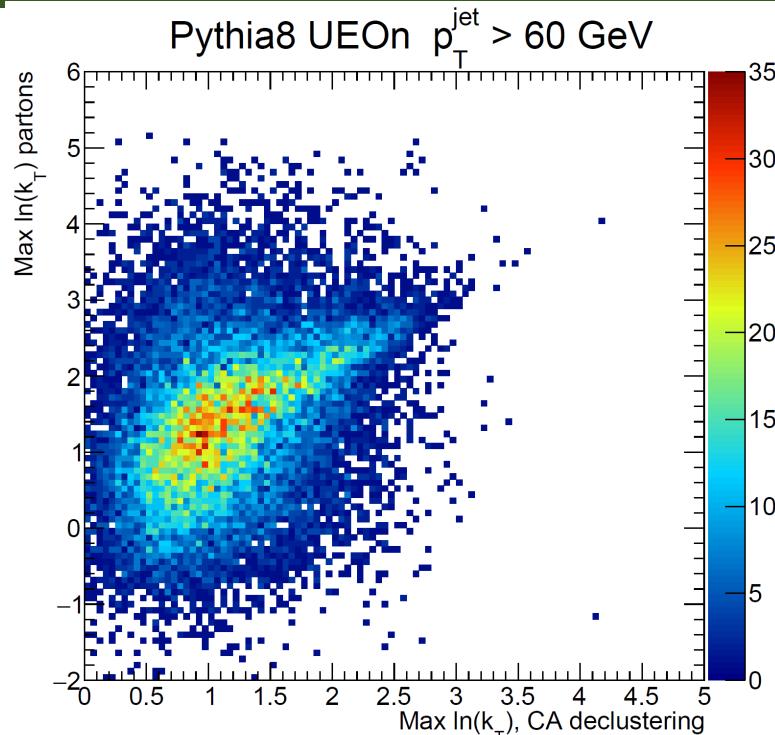
# Performance with $\hat{p}_T > 50$ GeV, CA



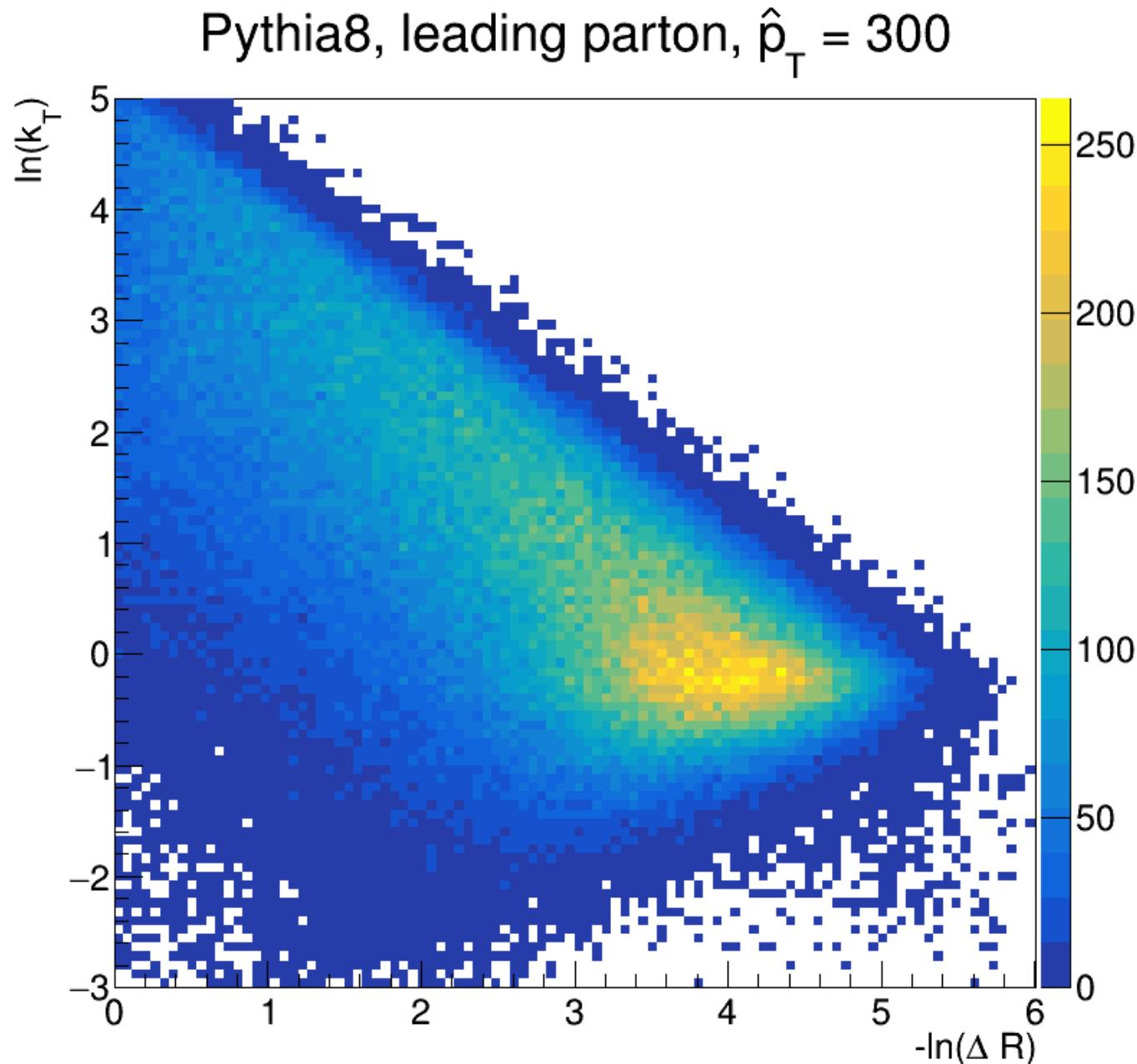
# Performance with $\hat{p}_T > 50$ GeV, KT



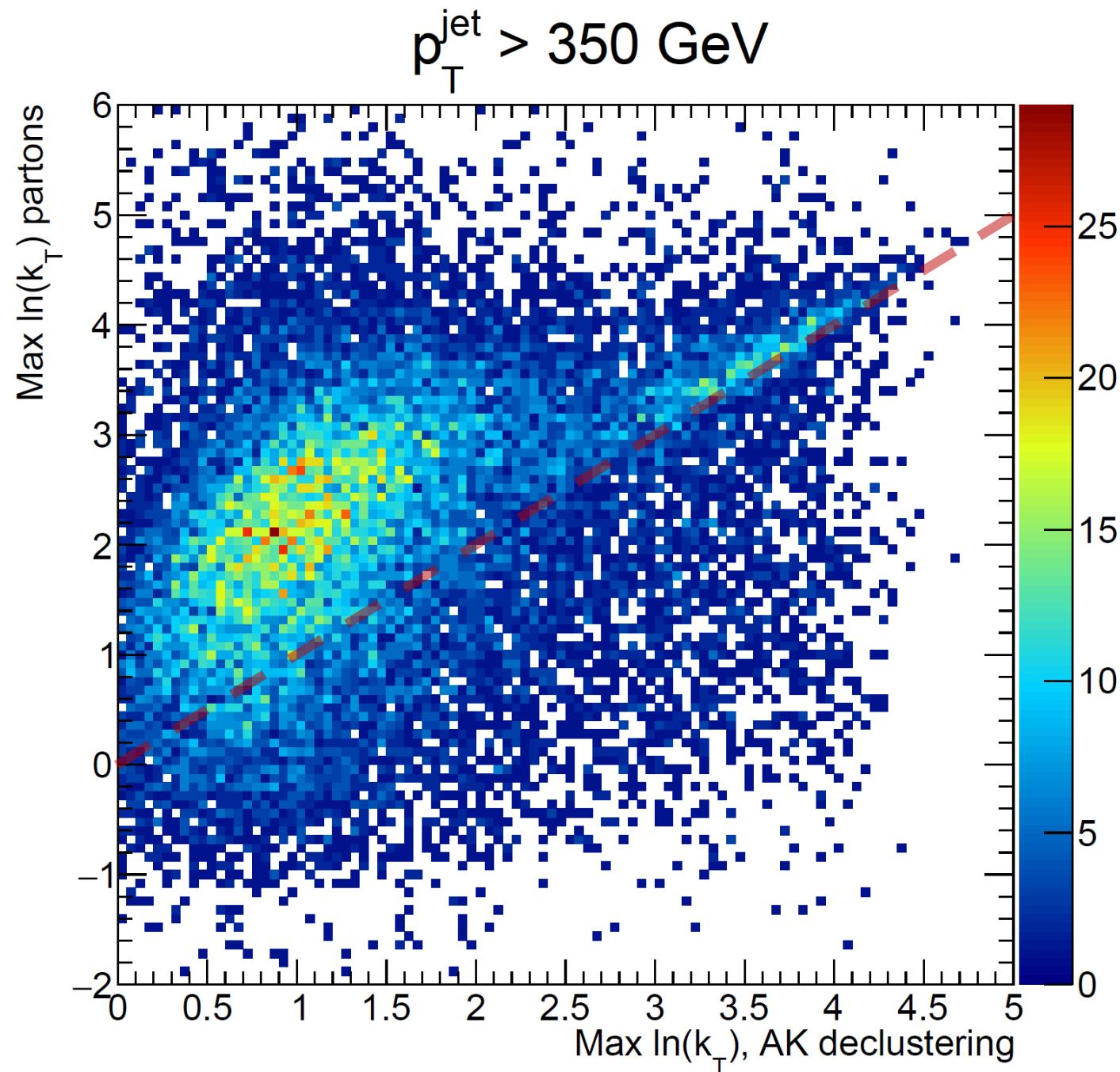
# Performance with $\hat{p}_T > 50$ GeV, CA



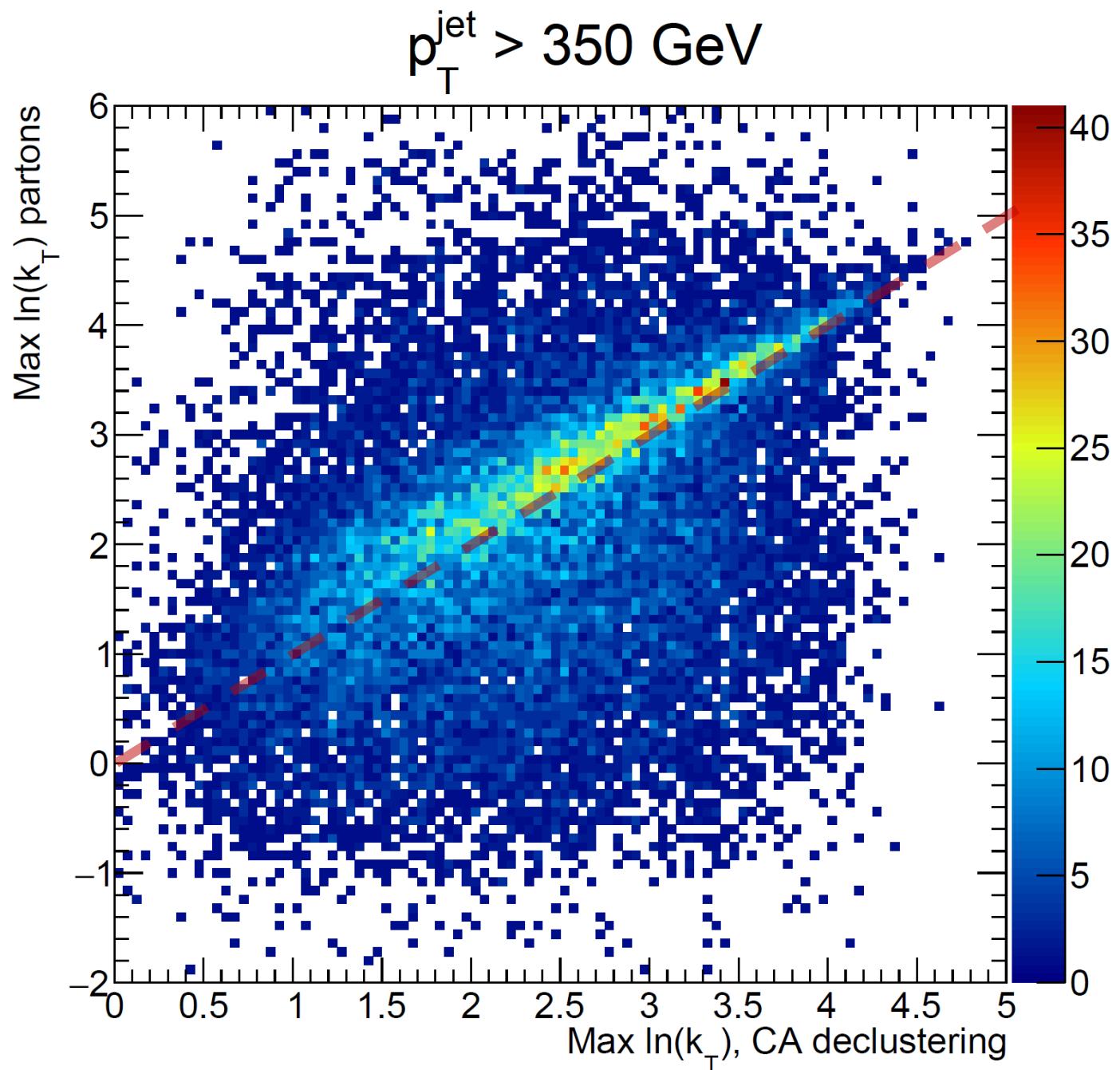
# Lund Diagram from Parton Shower



# PYTHIA $\hat{p}_T > 300$ GeV, Anti-KT

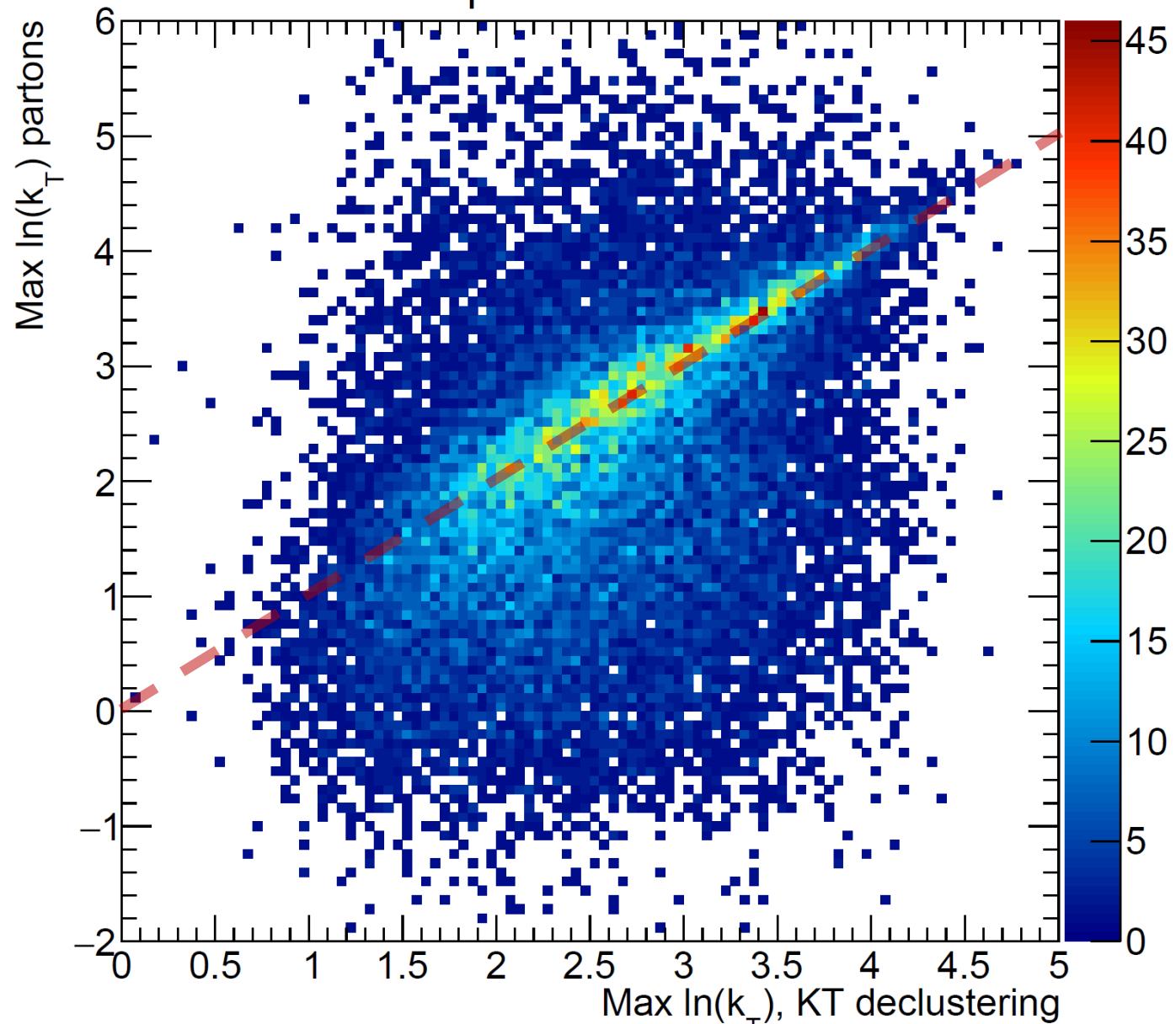


# PYTHIA $\hat{p}_T > 300$ GeV, CA



# PYTHIA $\hat{p}_T > 300 \text{ GeV}$ , KT

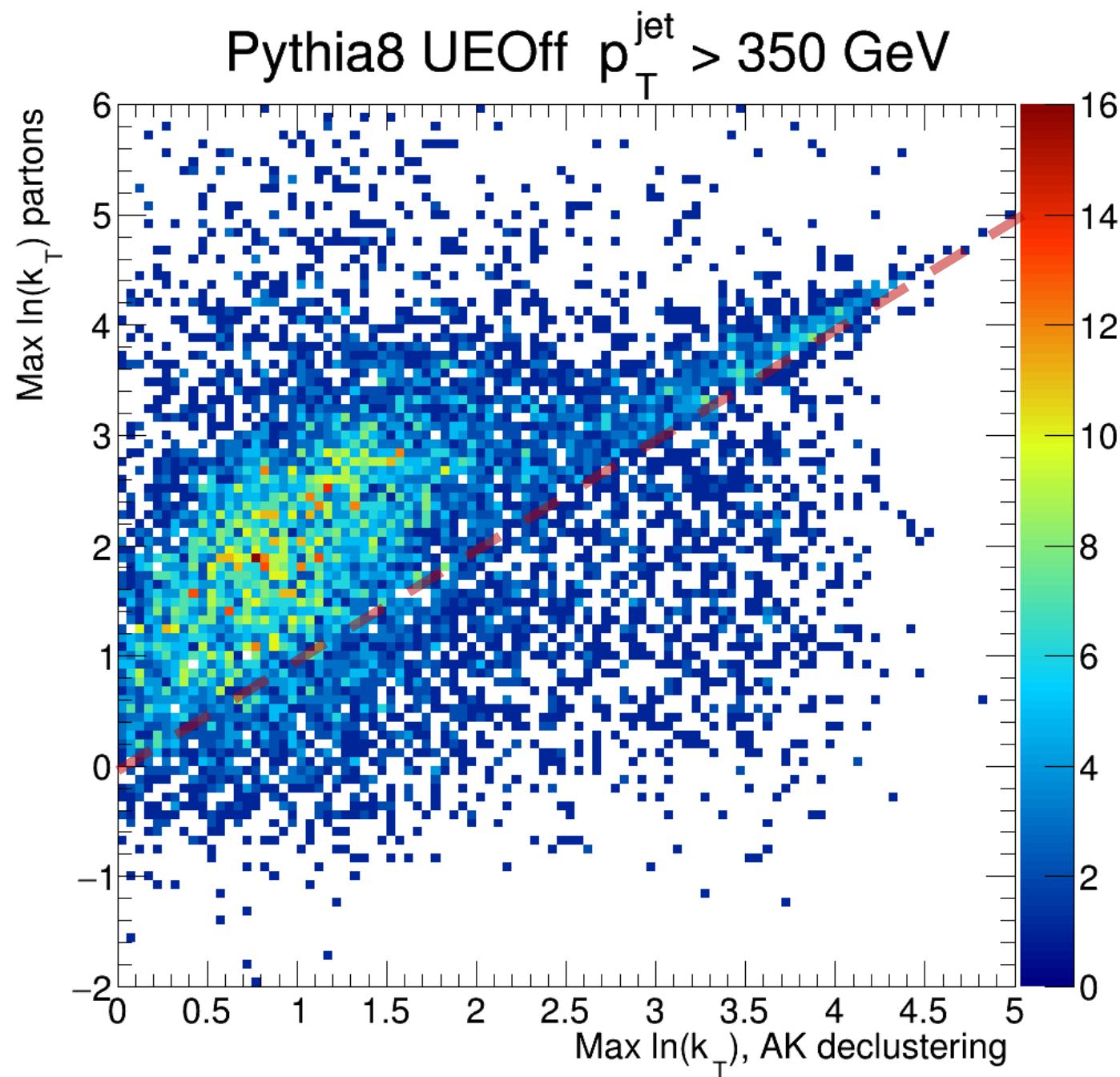
$p_T^{\text{jet}} > 350 \text{ GeV}$



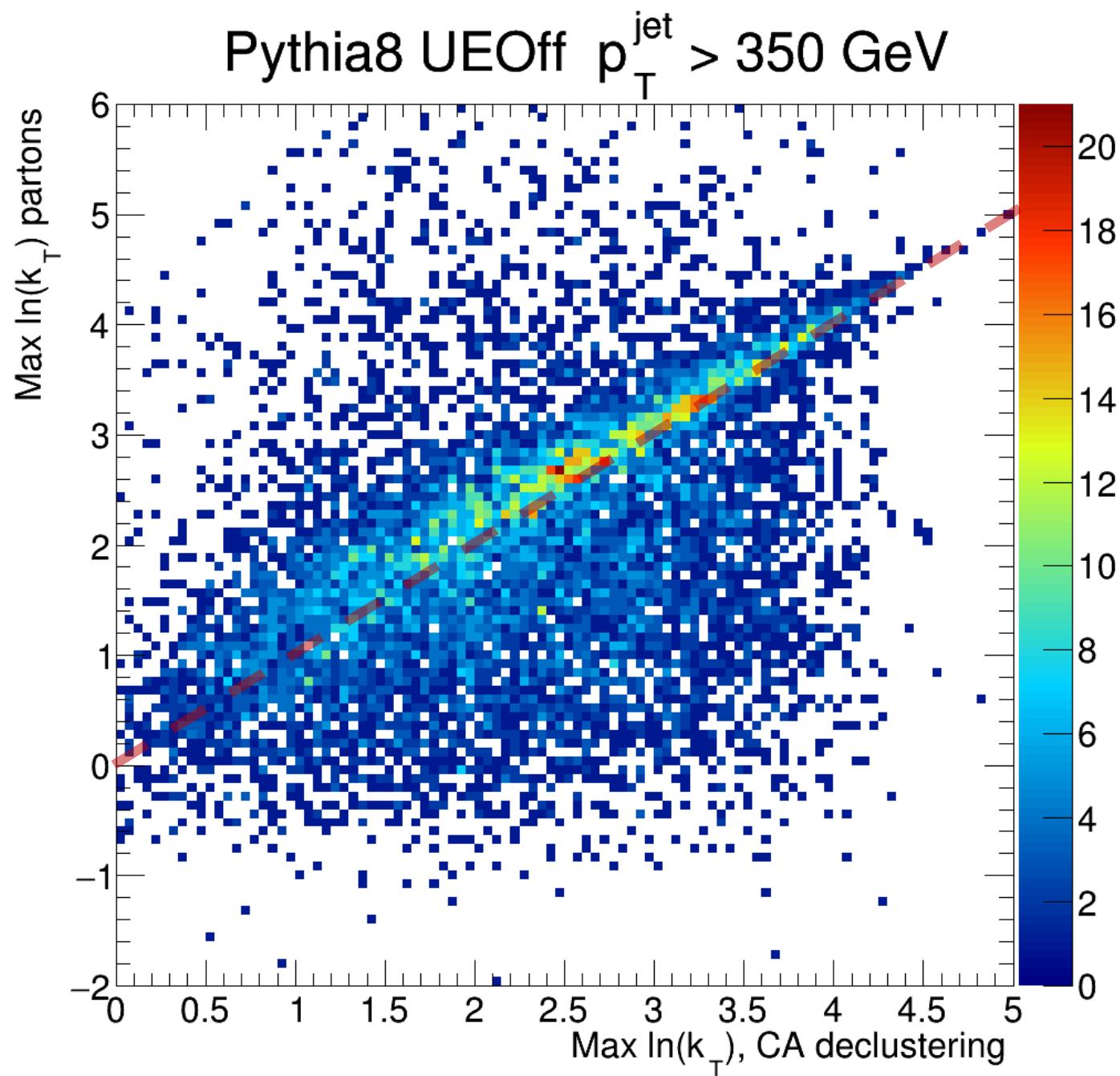
# UE Off



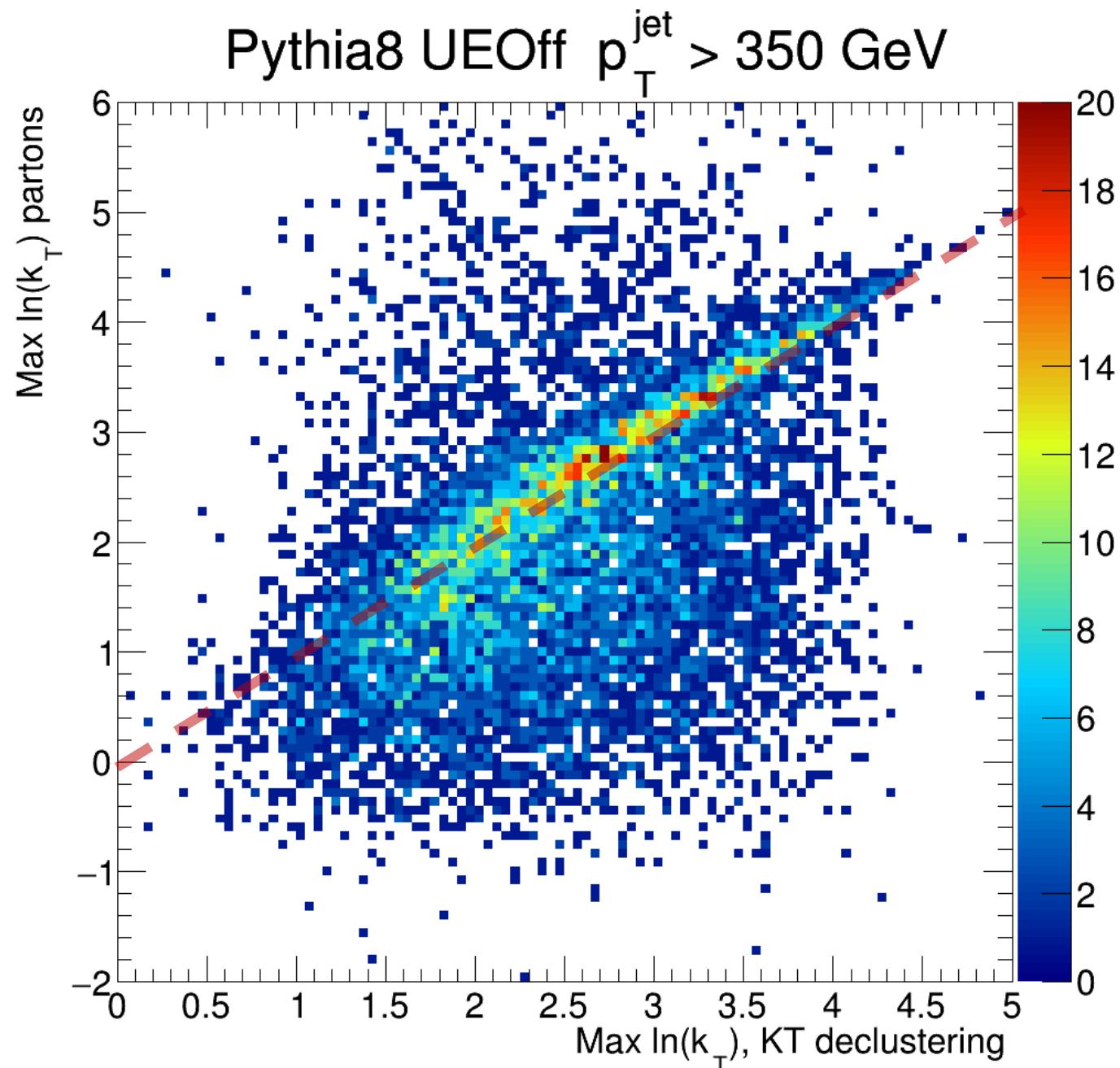
# PYTHIA $\hat{p}_T > 300$ GeV, Anti-KT



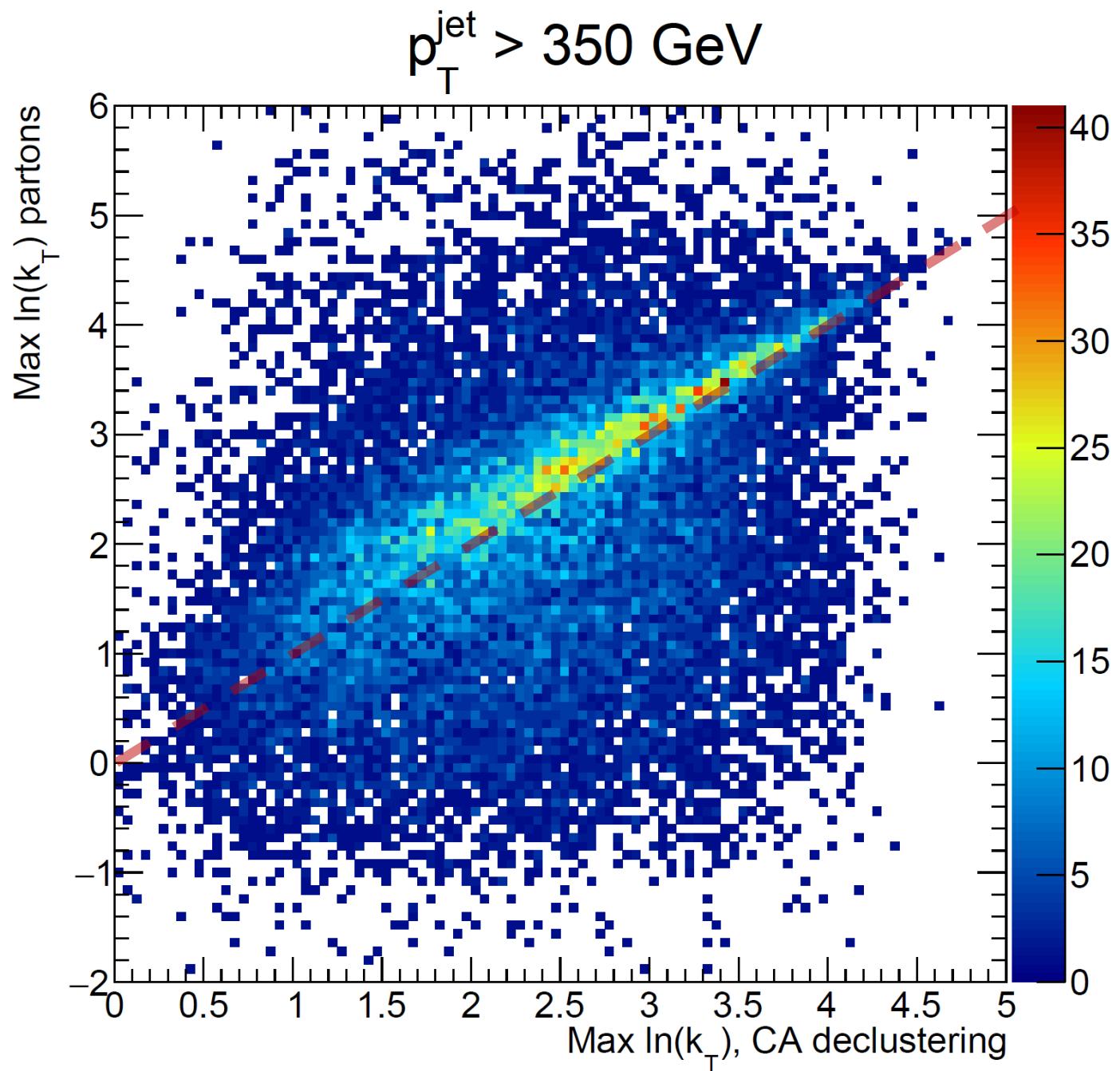
# PYTHIA $\hat{p}_T > 300$ GeV, CA



# PYTHIA $\hat{p}_T > 300 \text{ GeV}$ , KT

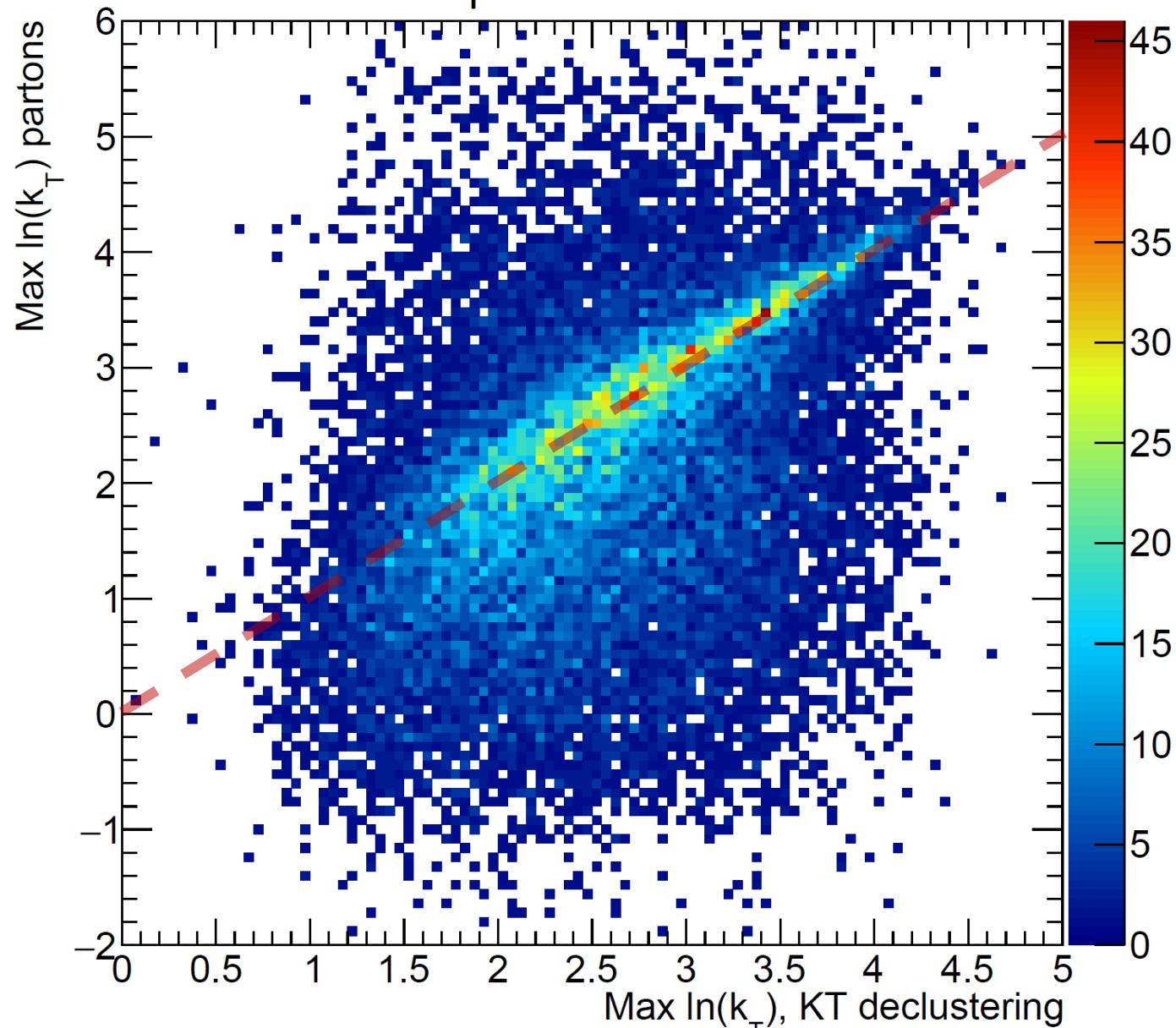


# PYTHIA $\hat{p}_T > 300 \text{ GeV}$ , CA



# PYTHIA $\hat{p}_T > 300 \text{ GeV}$ , KT

$p_T^{\text{jet}} > 350 \text{ GeV}$

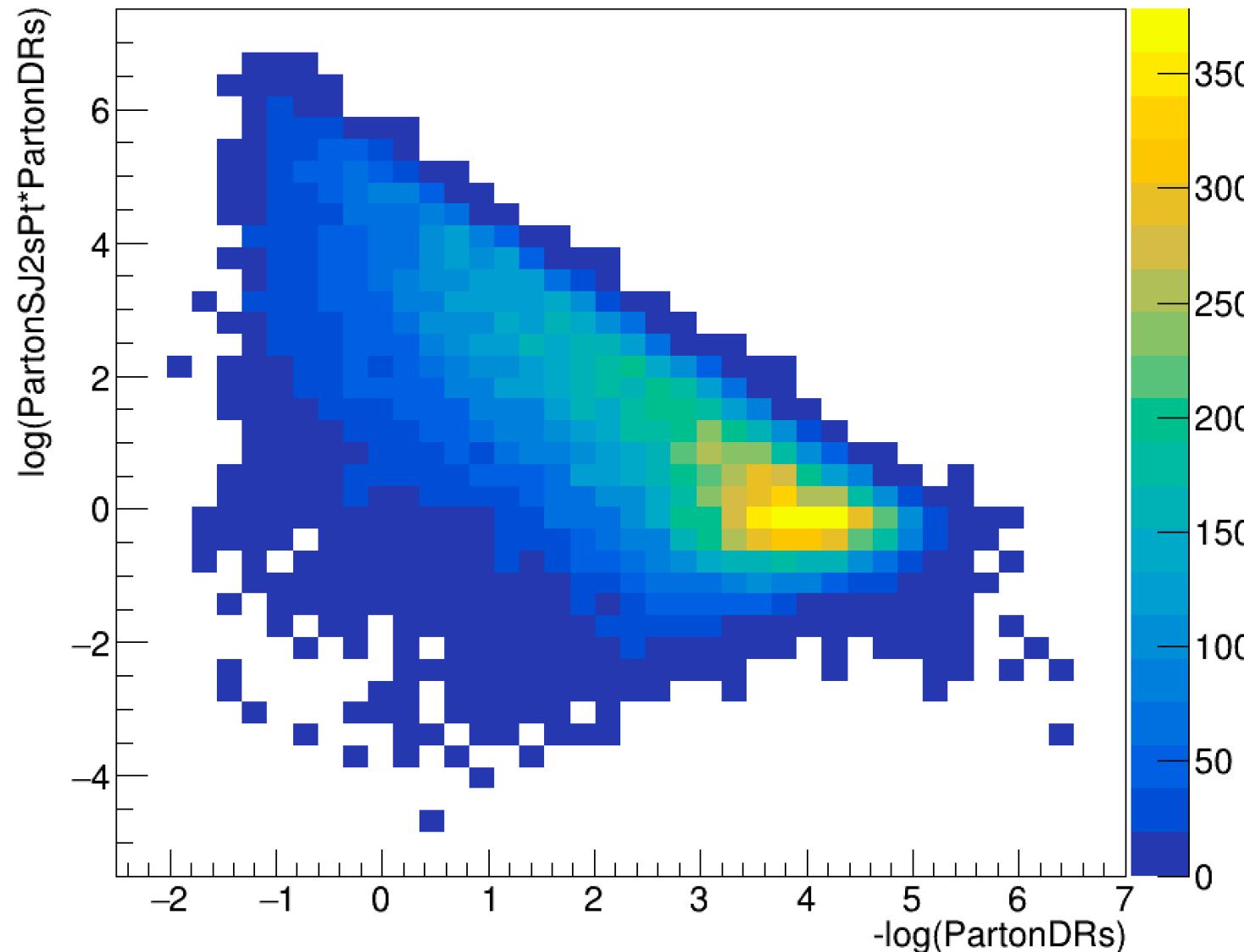


# Backup slides

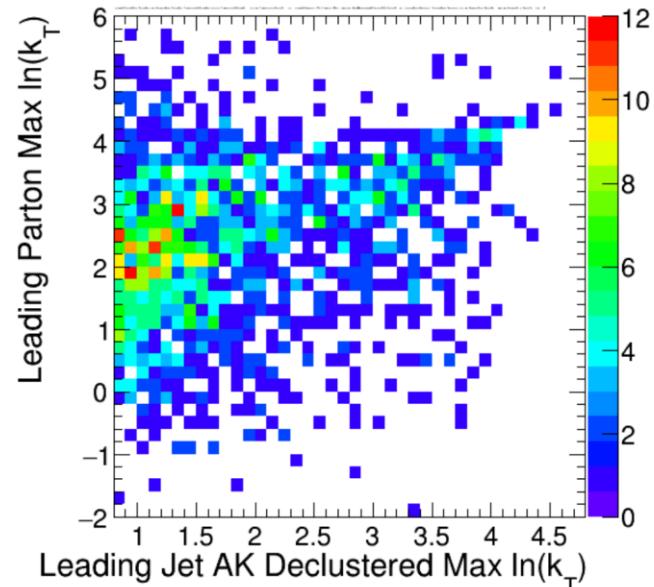
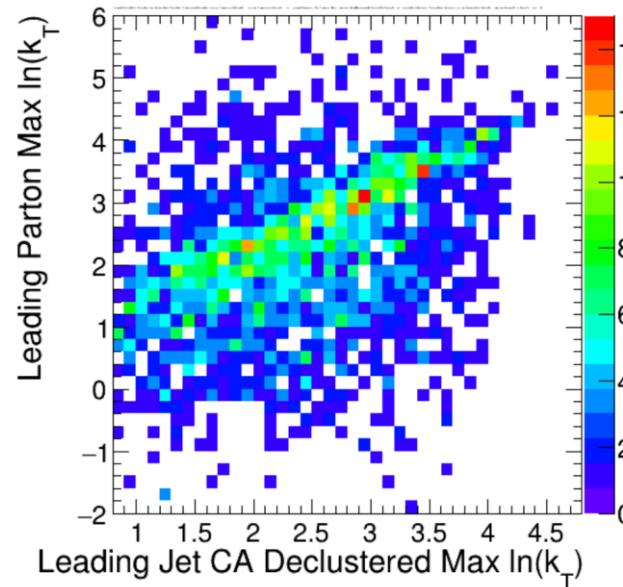
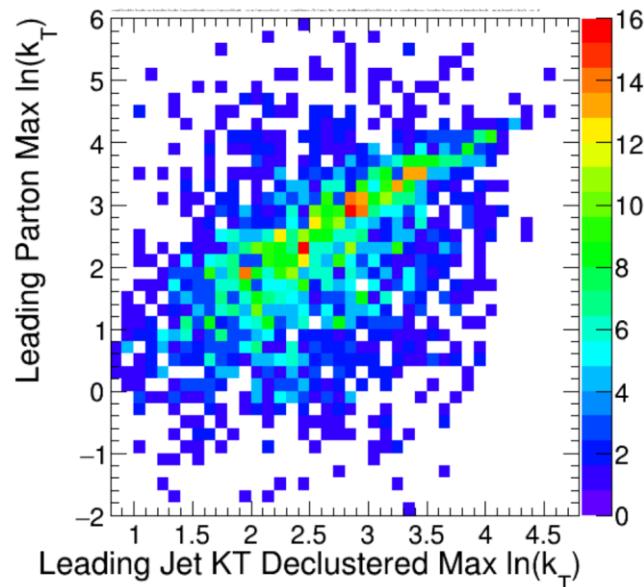
## Unbeautified plots

# Unbeautified Parton Level Lund Diagram

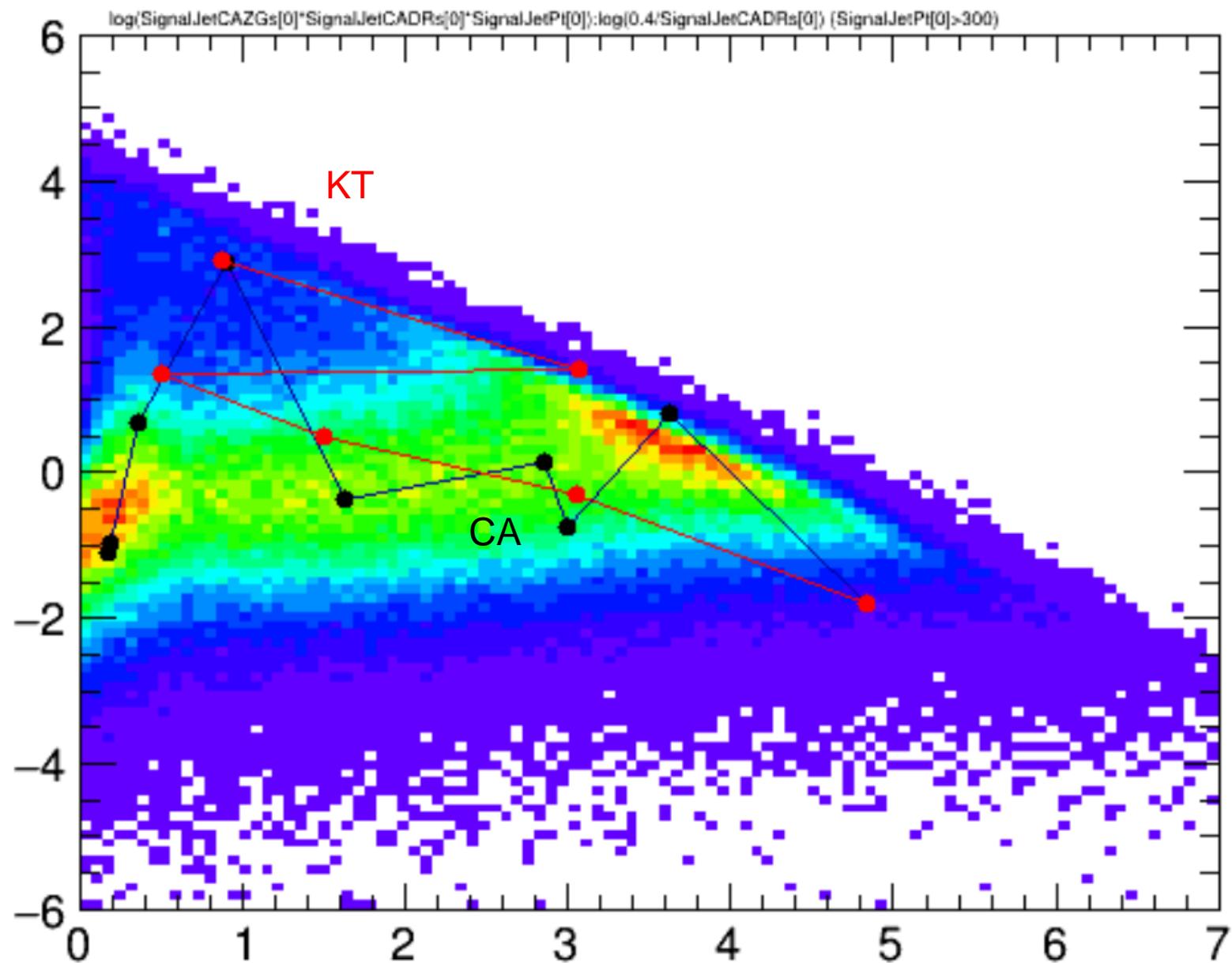
$\log(\text{PartonSJ2sPt} * \text{PartonDRs}) : -\log(\text{PartonDRs})$



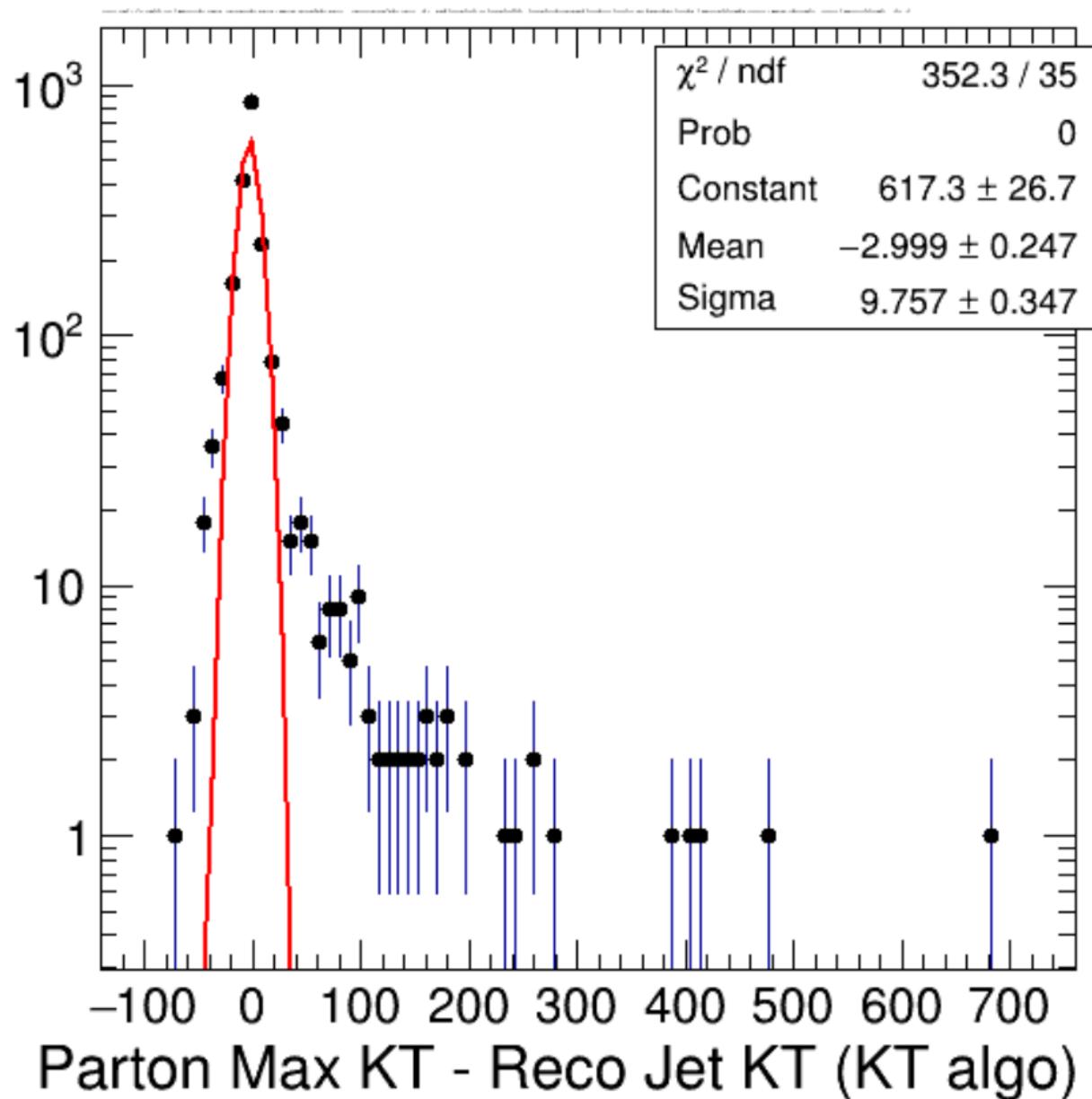
# With lower statistics in cross-check macro



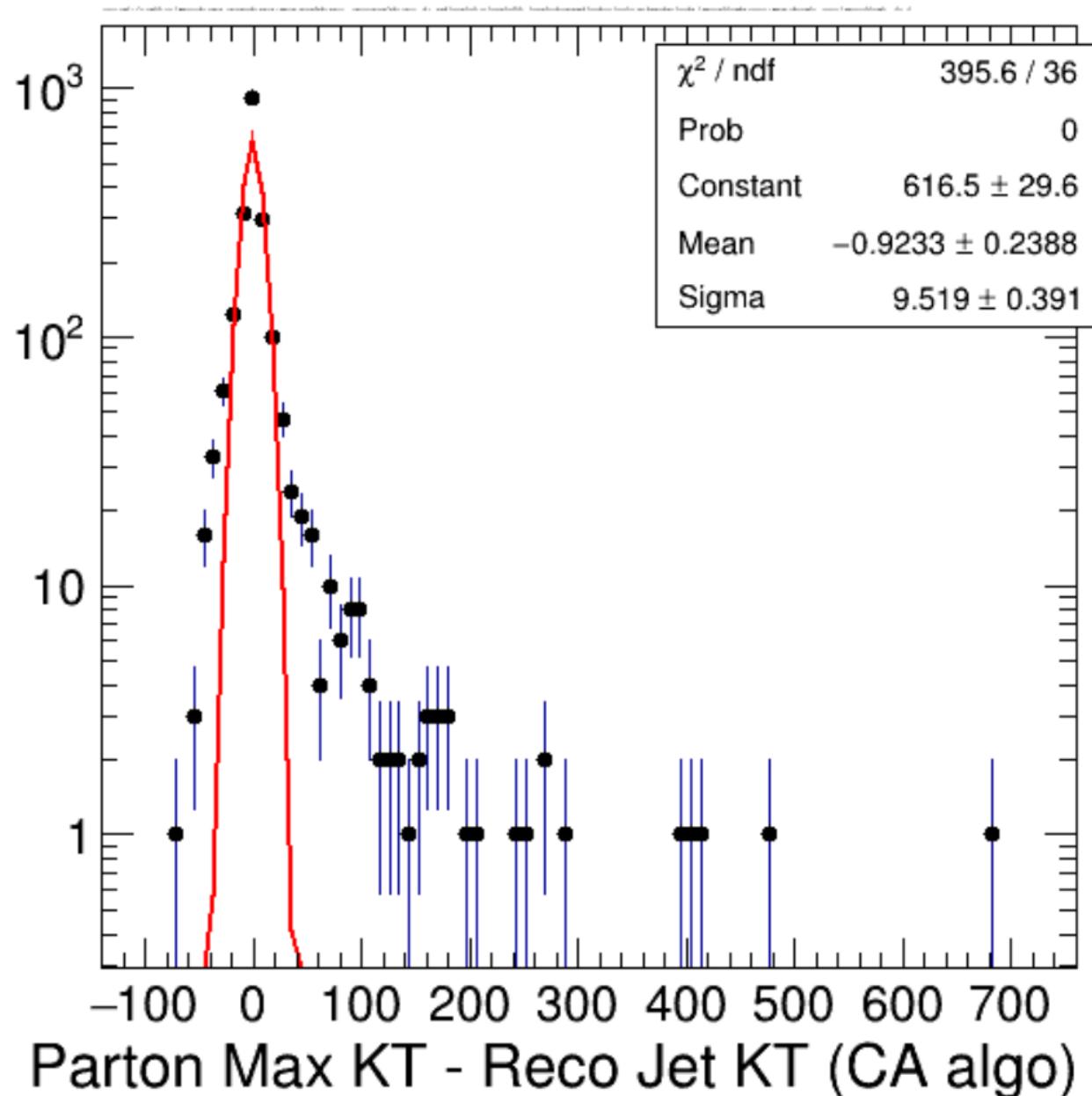
# Unbeautified bad plot



# Unbeautified resolution function



# Unbeautified resolution function



# Unbeautified resolution function

