

Tracking performance studies



Outline

1. pt resolution and efficiency studies with different pValues requirement
2. V0 objects and tracks VS MC information

1. pt resolution and efficiency studies

data sample

50 000 generic $Y(4S)$ events
release-01-00-00
overlay background

```
bkg_ovl_location = glob.glob('/group/belle2/BGFile/OfficialBKG/  
15thCampaign/bgoverlay_phase3_BGx2/*.root')
```

pt resolution

pVal cut	no cut	pVal > 0	pVal > 10^{-5}	pVal > 10^{-4}	pVal > 10^{-3}
Y4S	2.39 %	2.39%	2.20 %	2.21 %	2.26 %

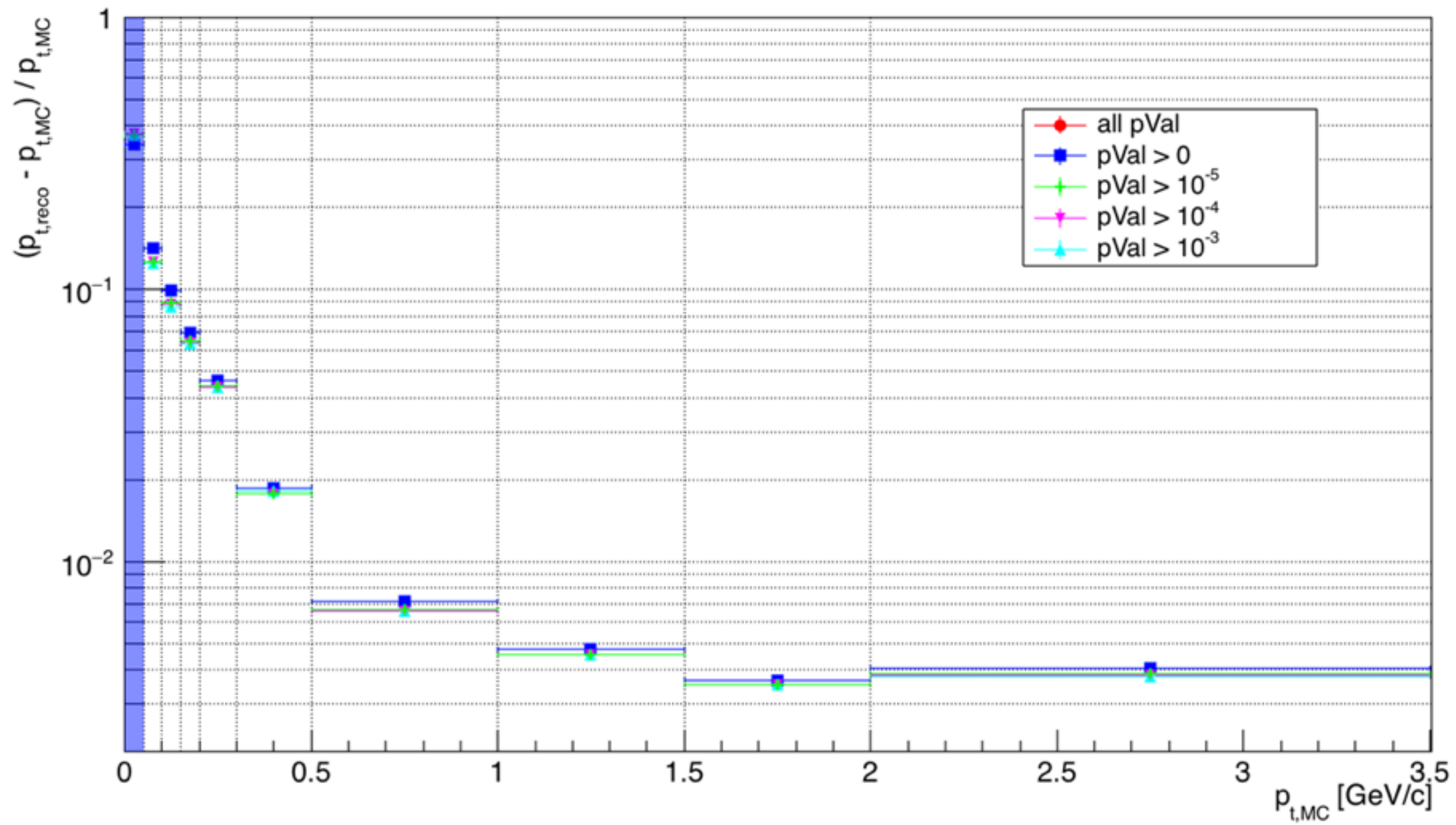
efficiency

pVal cut	no cut	pVal > 0	pVal > 10^{-5}	pVal > 10^{-4}	pVal > 10^{-3}
	normalized to MCParticles				
Y4S	83.75 ± 0.05	83.39 ± 0.05	77.04 ± 0.06	74.83 ± 0.06	70.99 ± 0.06
	normalized to MCRecoTracks				
Y4S	93.39 ± 0.03	93.00 ± 0.03	85.91 ± 0.03	83.45 ± 0.03	79.16 ± 0.03

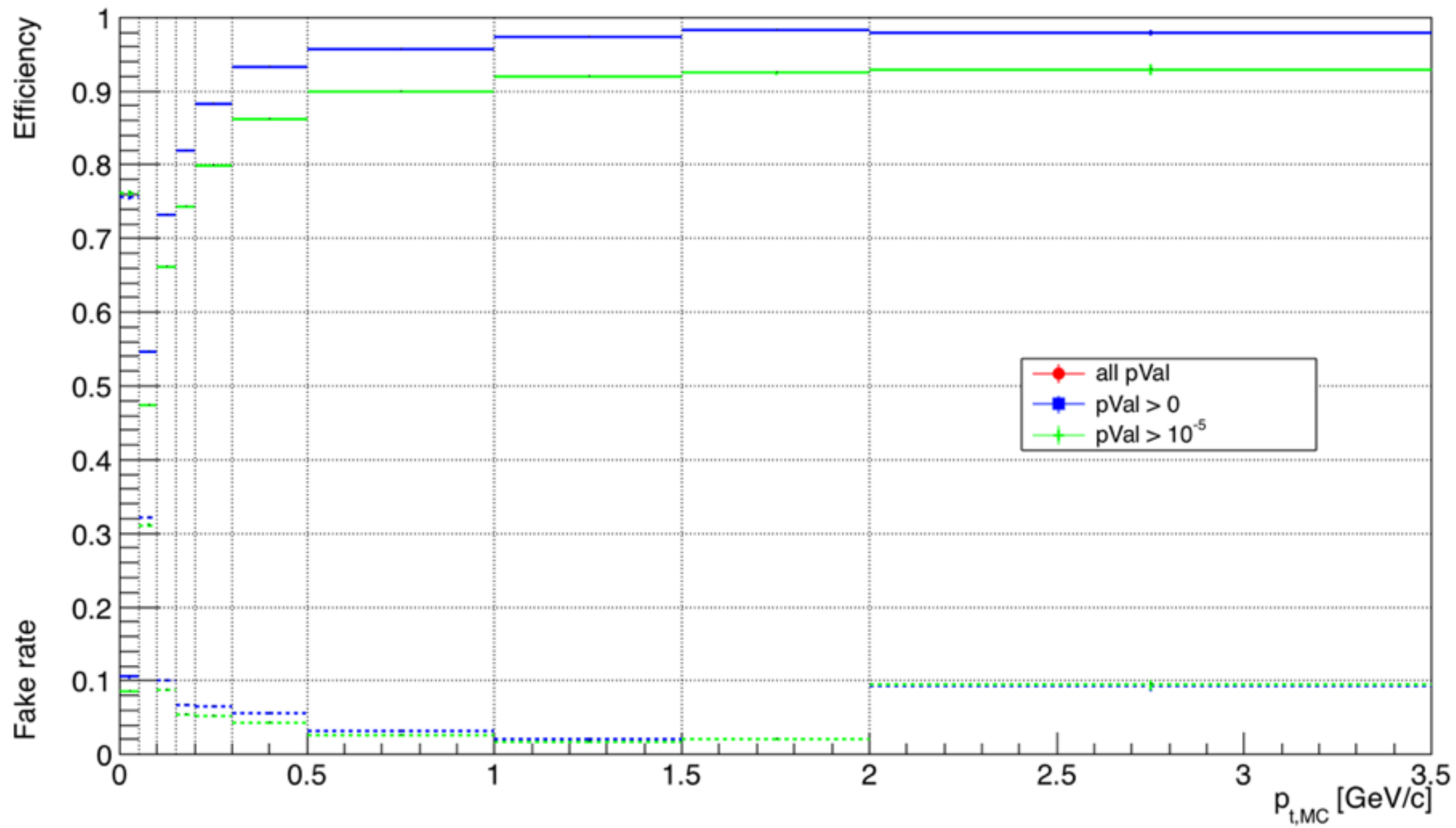
fake rate

pVal cut	no cut	pVal > 0	pVal > 10^{-5}	pVal > 10^{-4}	pVal > 10^{-3}
Y4S	8.99 %	8.81%	9.93 %	10.33 %	11.05 %

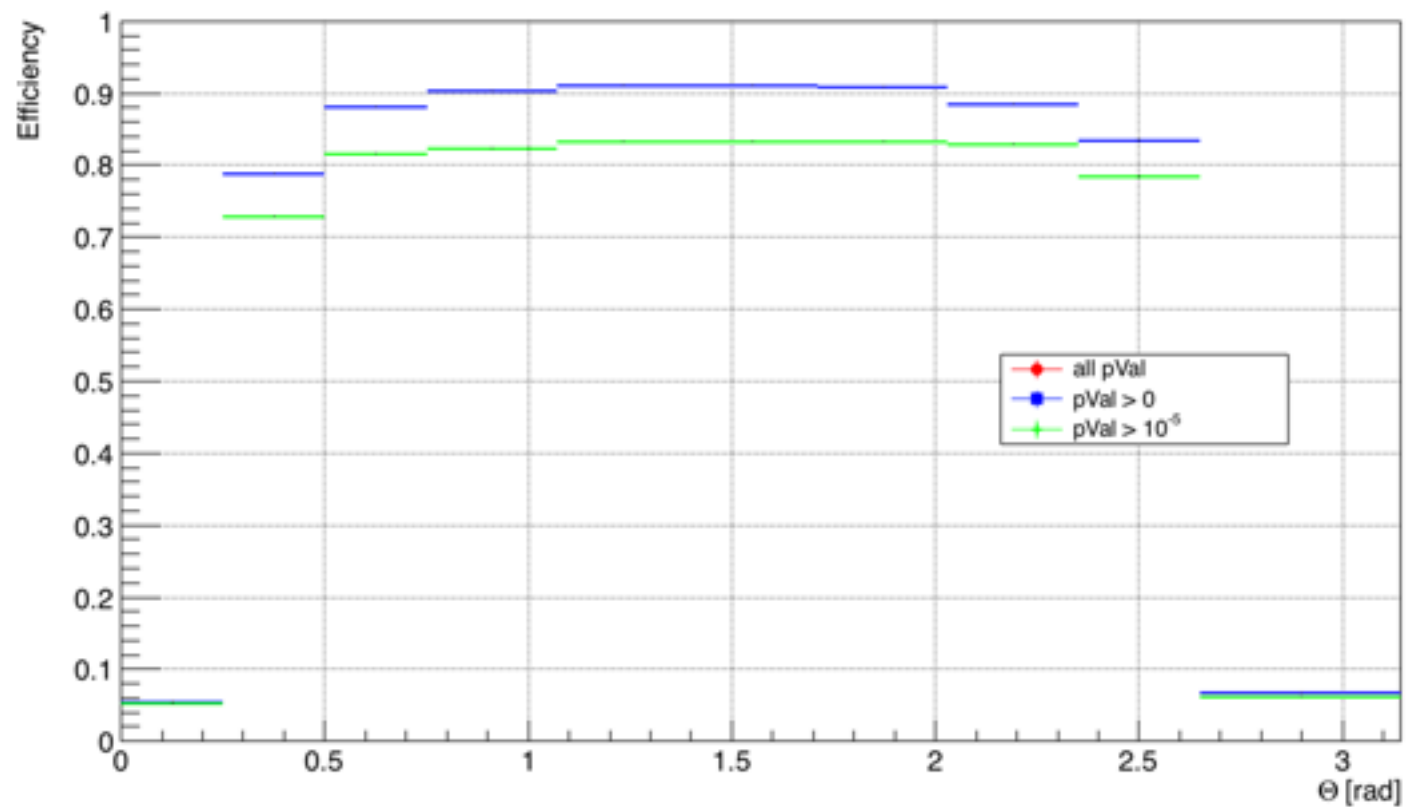
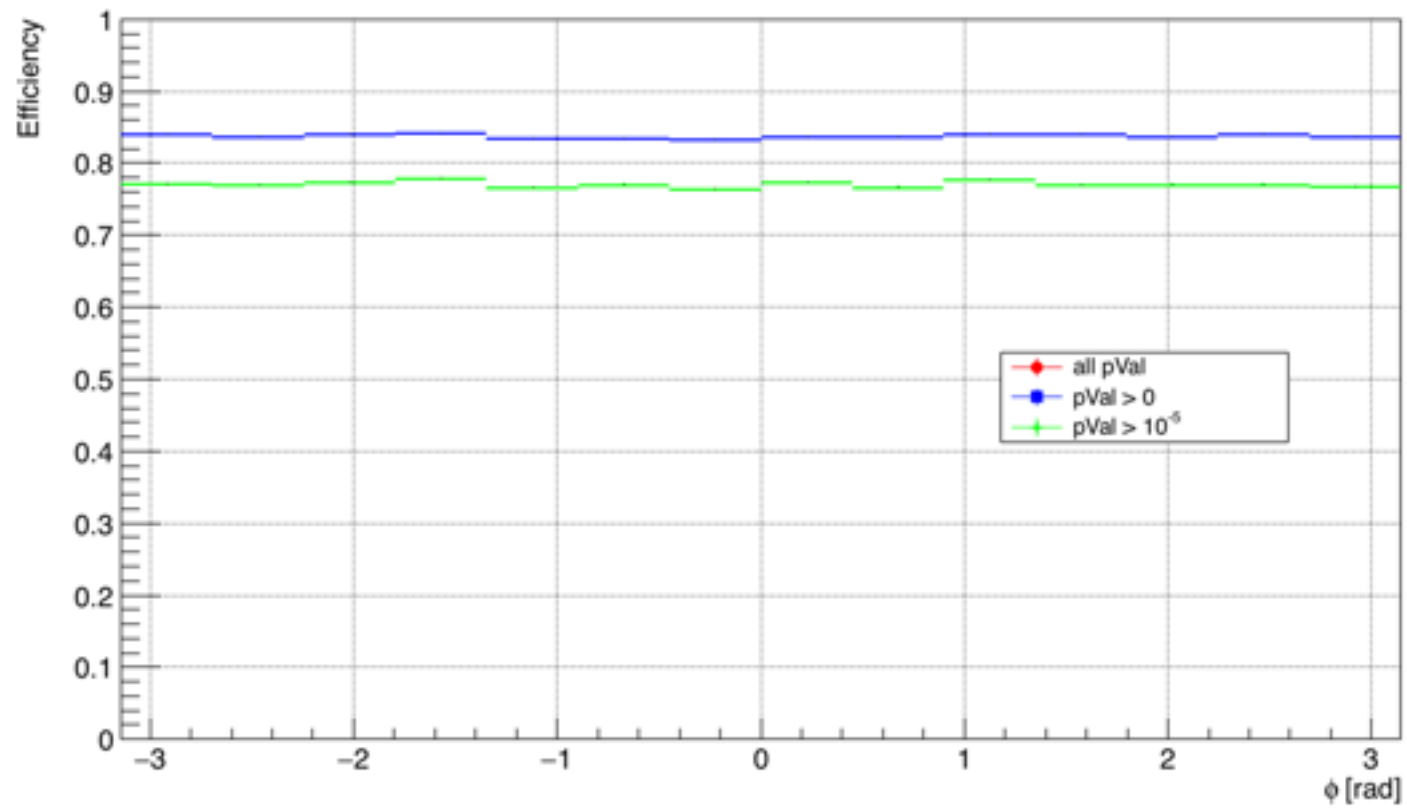
p_t resolution VS p_t



efficiency VS pt



efficiency VS θ , ϕ



data sample

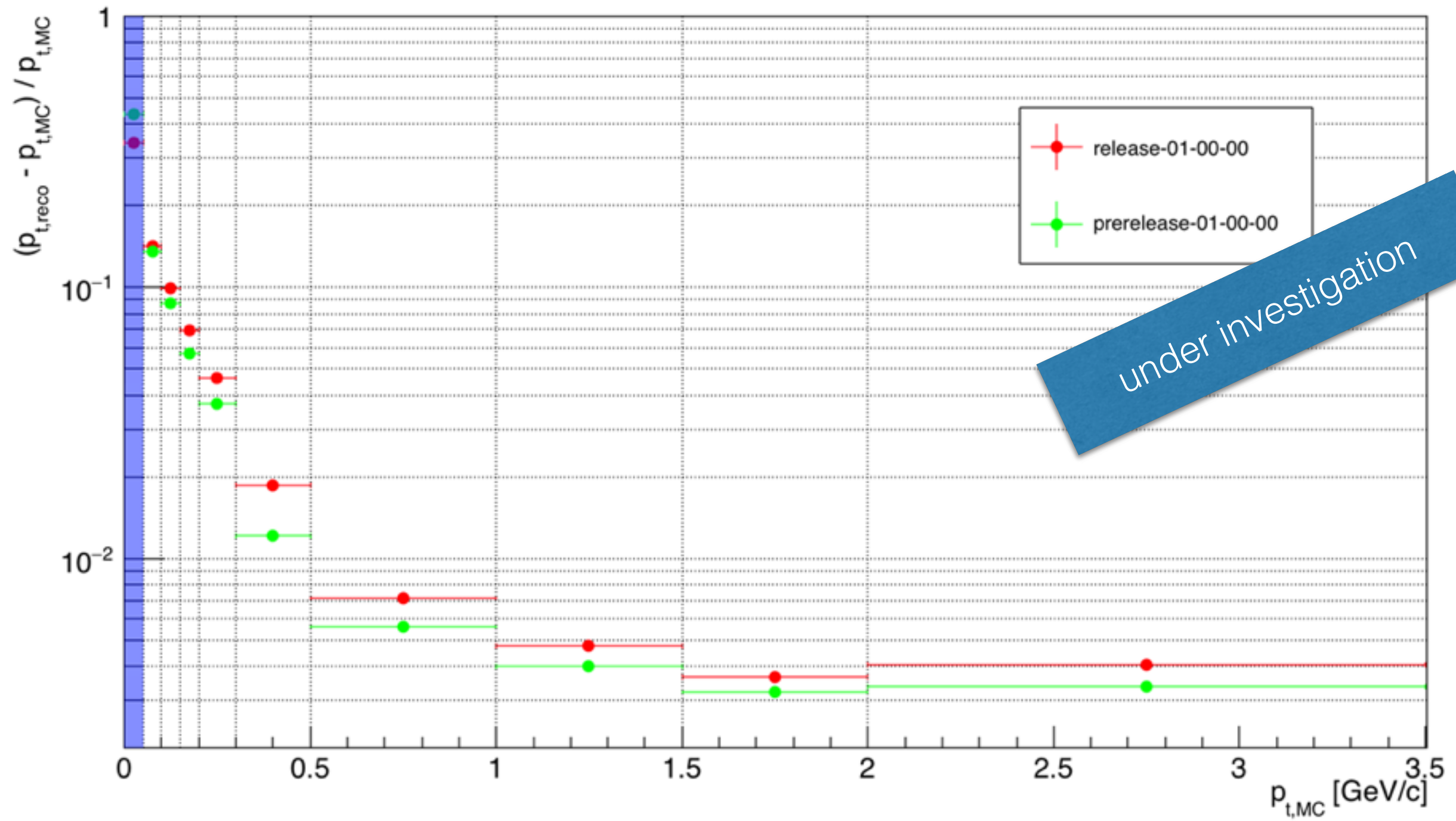
50 000 generic Y(4S) events
release-01-00-00
overlay background

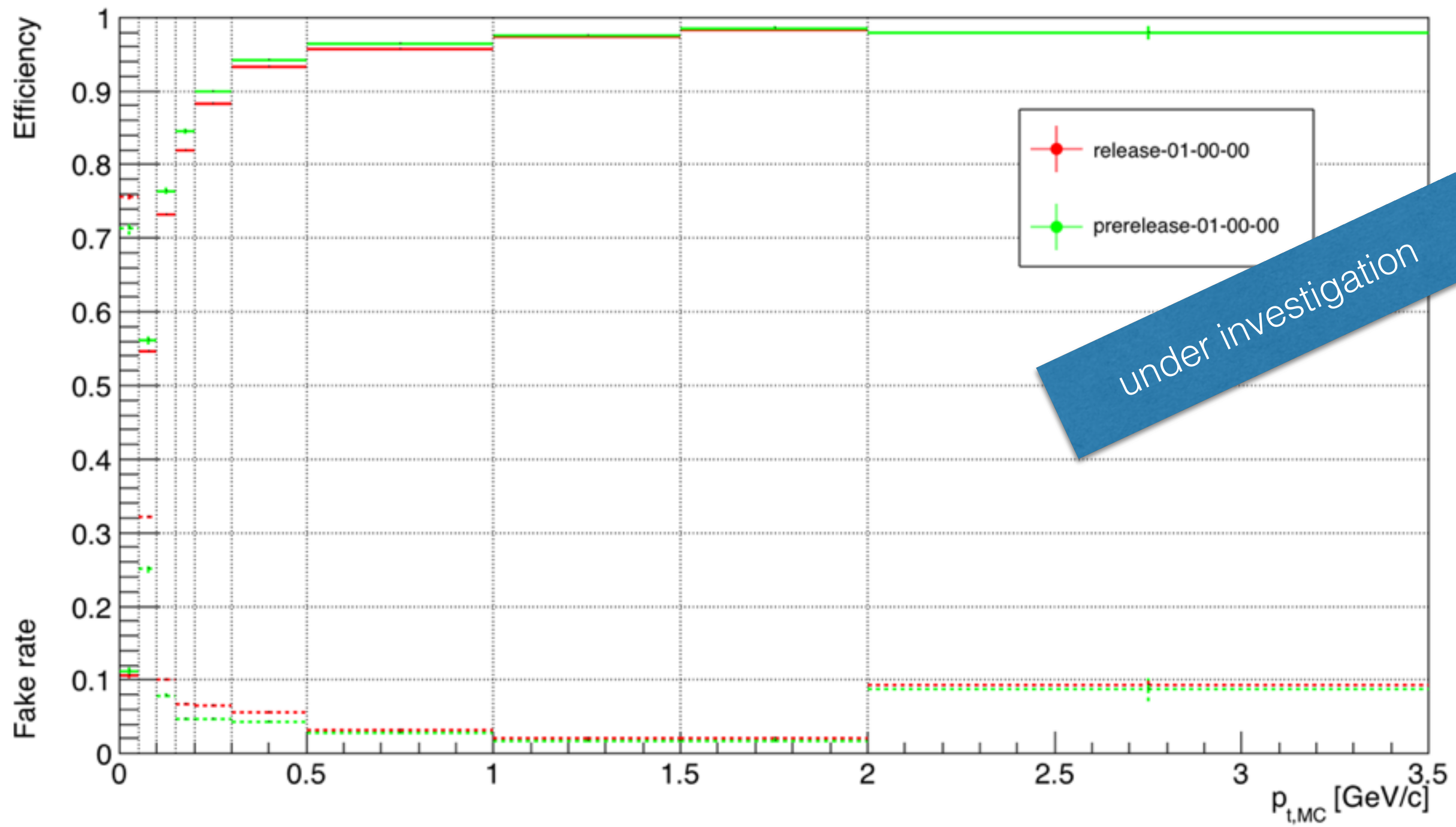
```
bkg_ovl_location = glob.glob('/group/belle2/BGFile/OfficialBKG/  
15thCampaign/bgoverlay_phase3_BGx2/*.root')
```

old data sample

10 000 generic Y(4S) events
prerelease-01-00-00
overlay background

```
bkg_ovl_location = glob.glob('/sw/belle2/bkg/*.root')
```

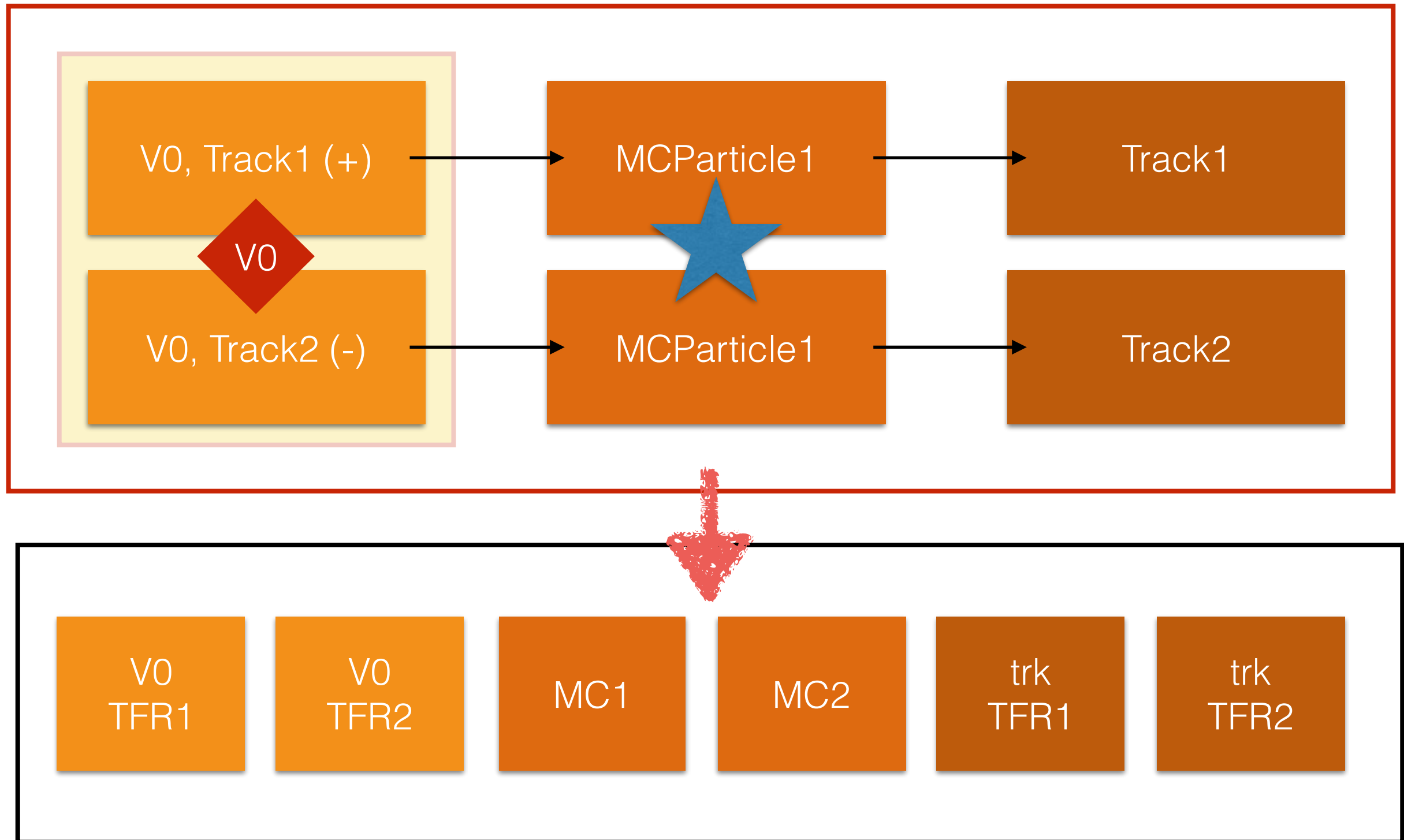




2. VOs, tracks & MC information

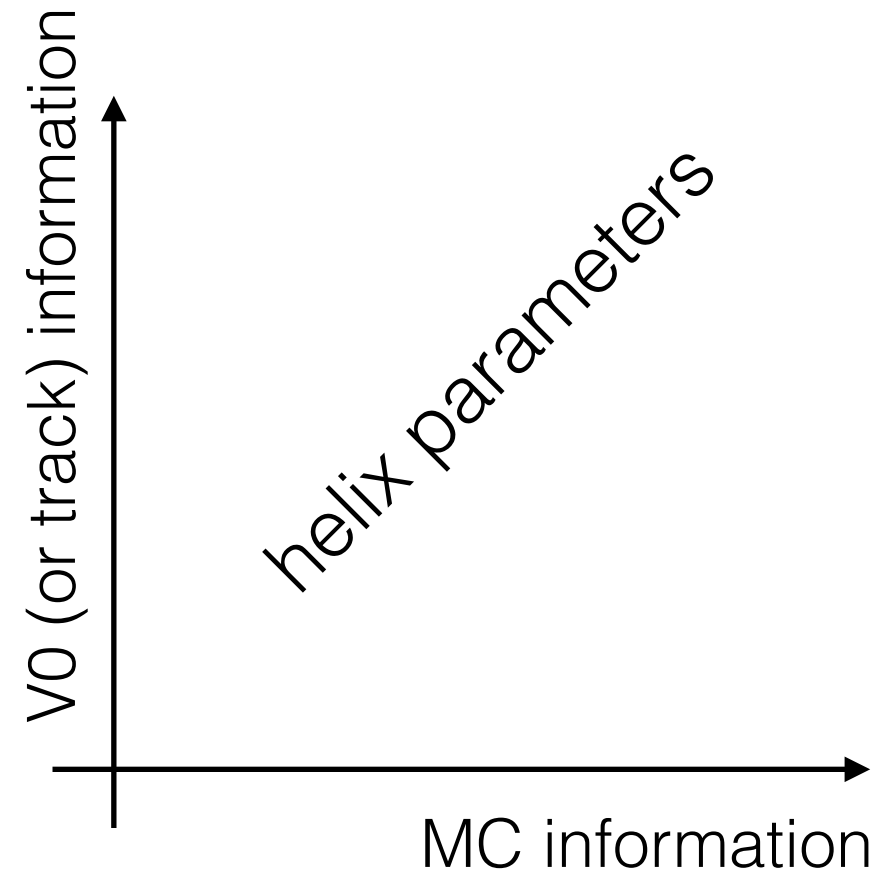
What are we talking about

if



★ :same mother

what in the plots



data sample

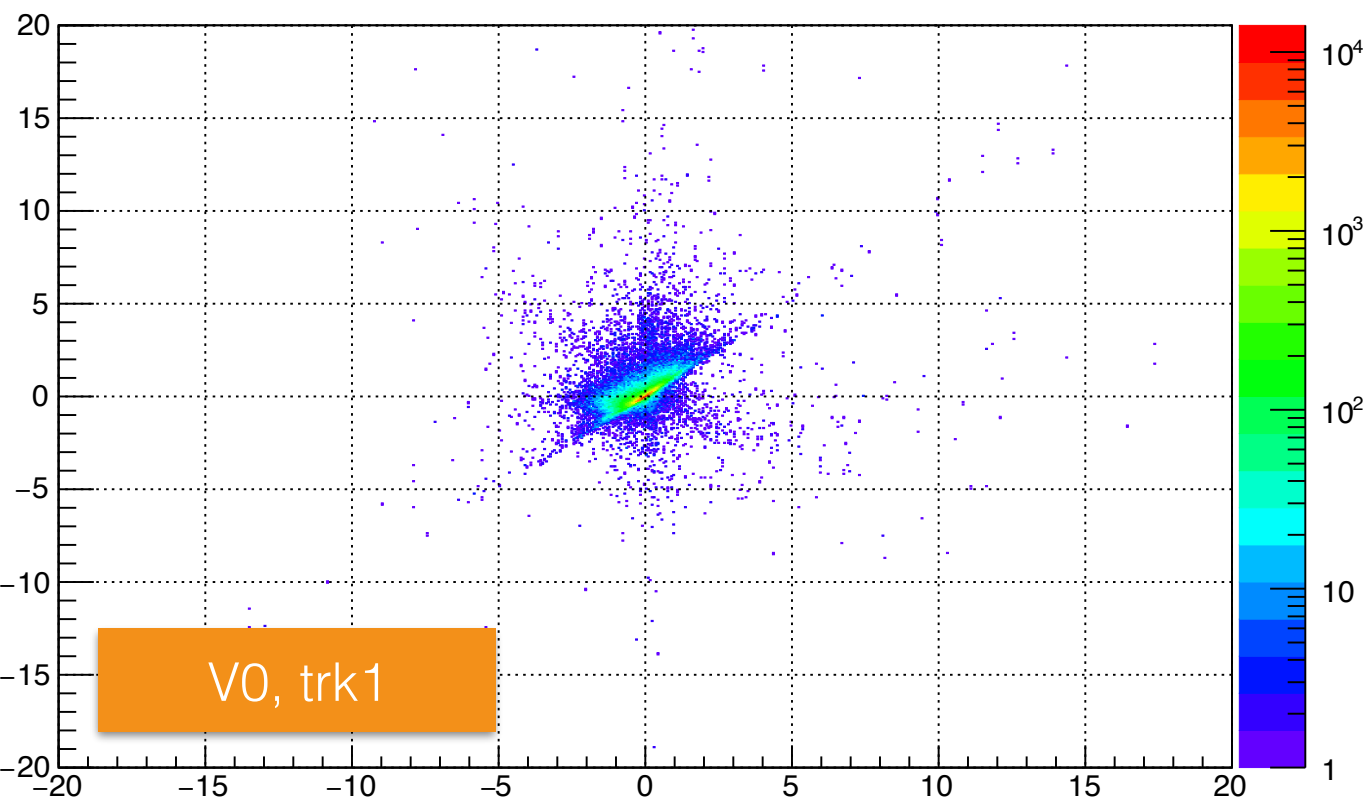
1 000 000 Λ particle gun
release-01-00-00
overlay background

first look

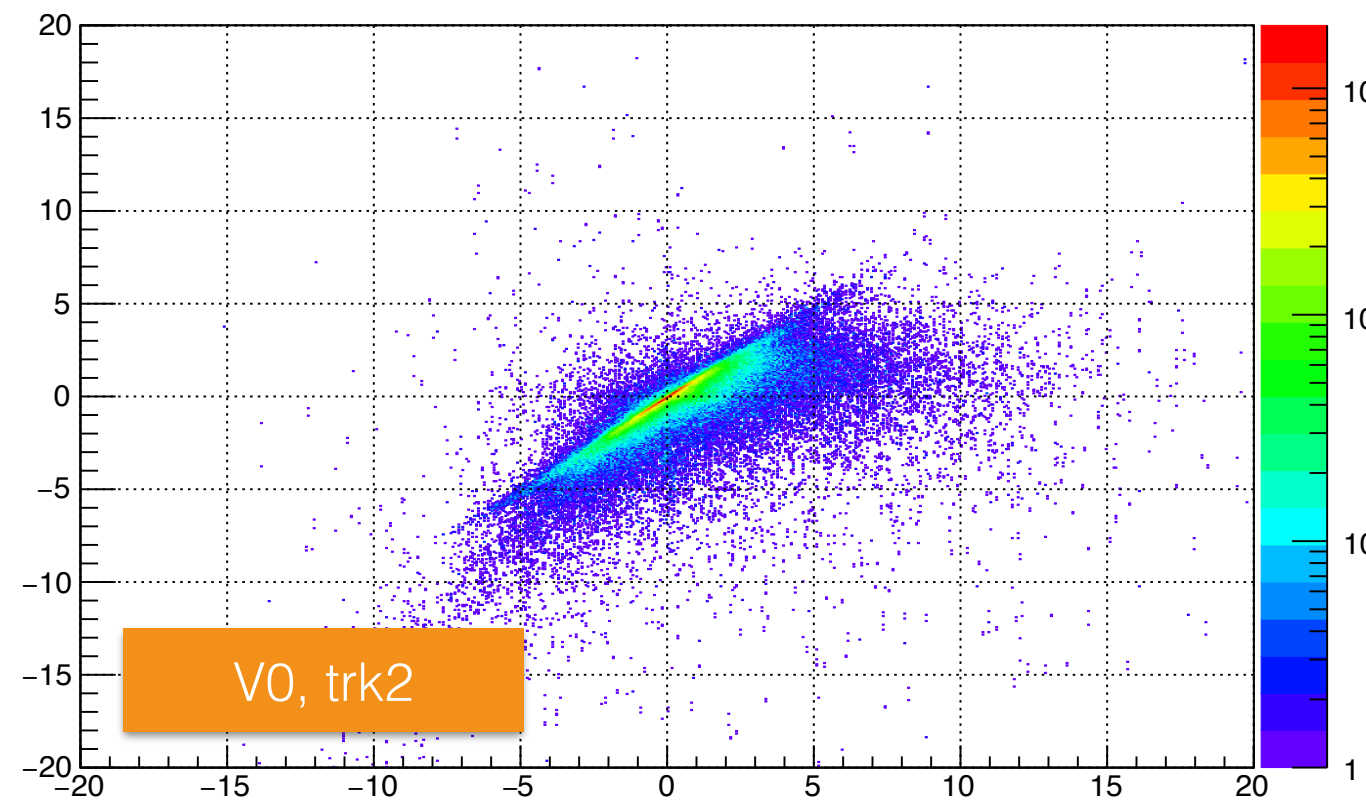
d0

Λ (0: p^+ 1: π^-)

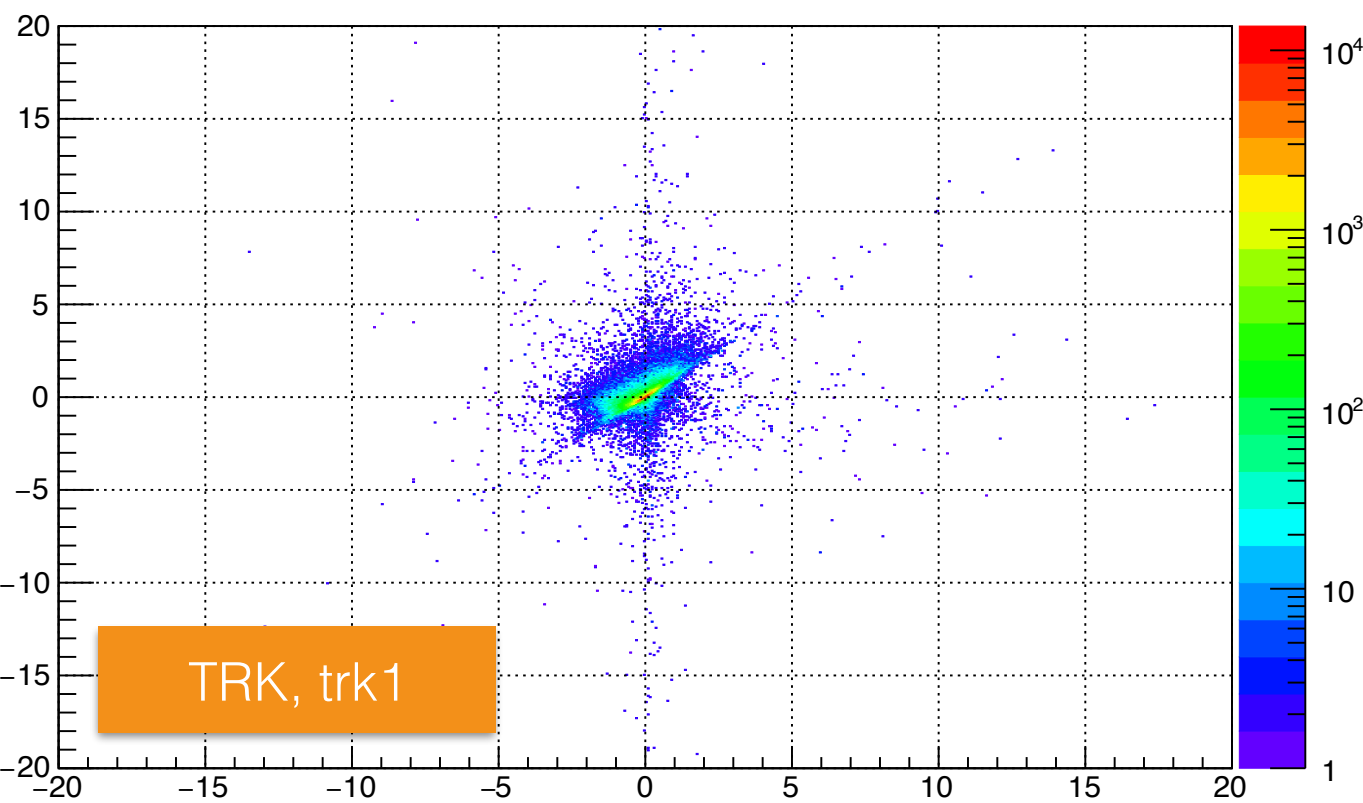
V0hd0_0:MChd0_0



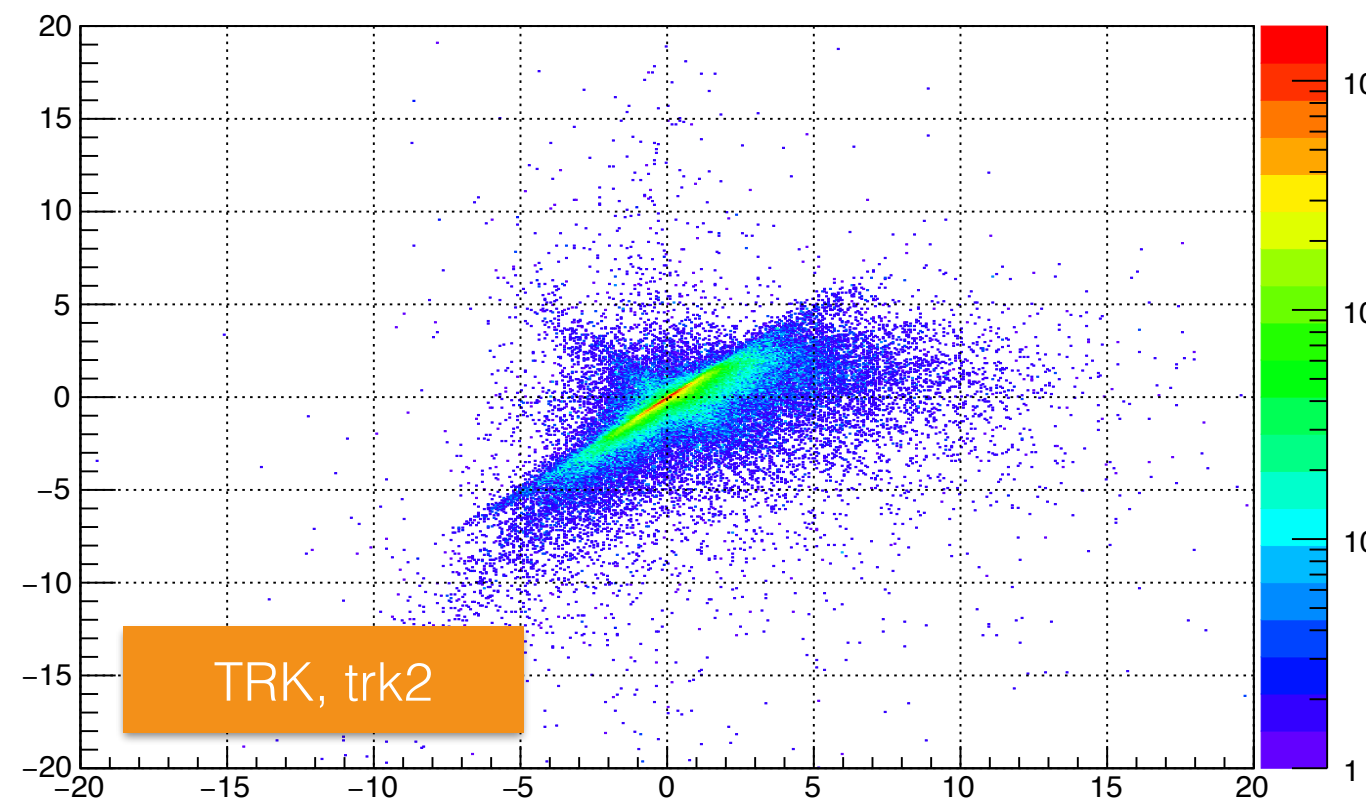
V0hd0_1:MChd0_1



TRKhd0_0:MChd0_0



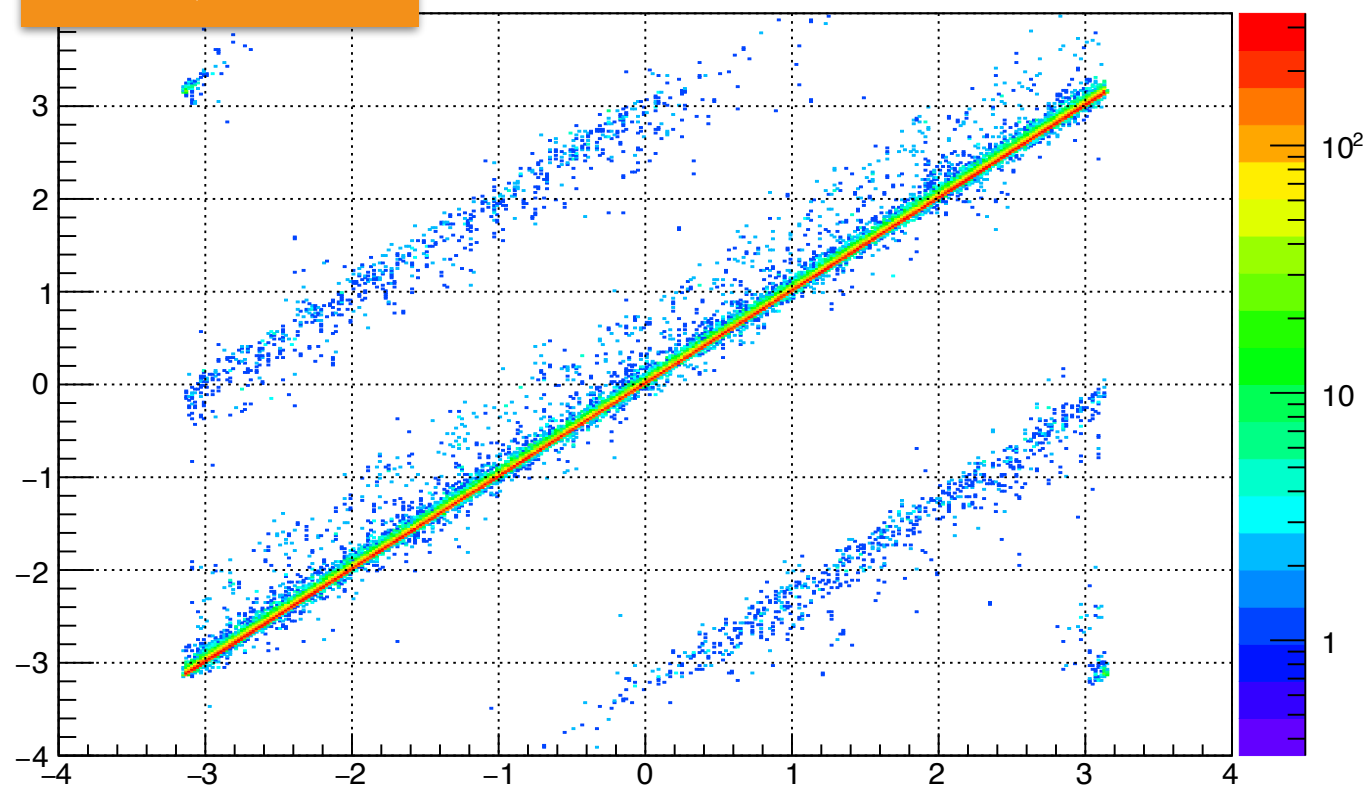
TRKhd0_1:MChd0_1



ϕ Λ (0: p^+ 1: π^-)

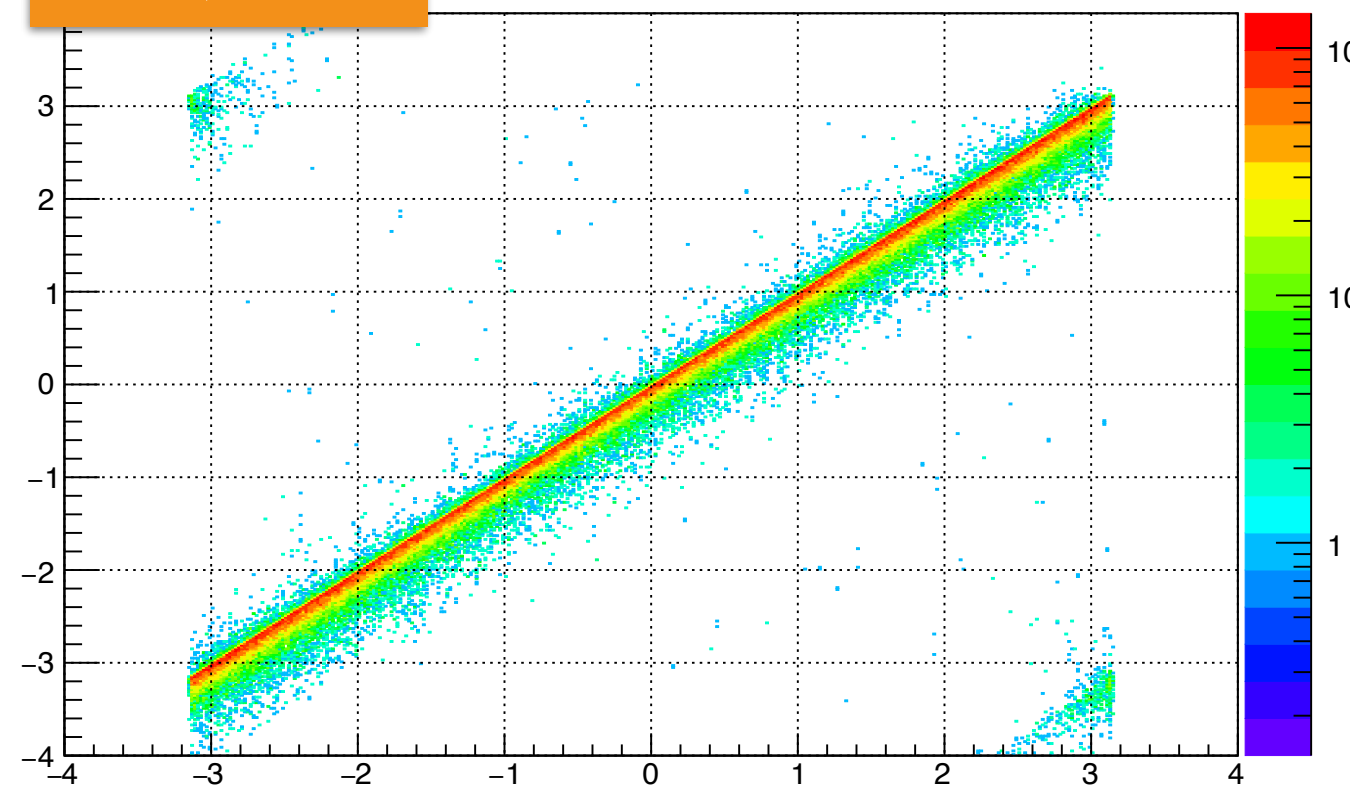
V0, trk1

V0hphi_0:MChphi_0



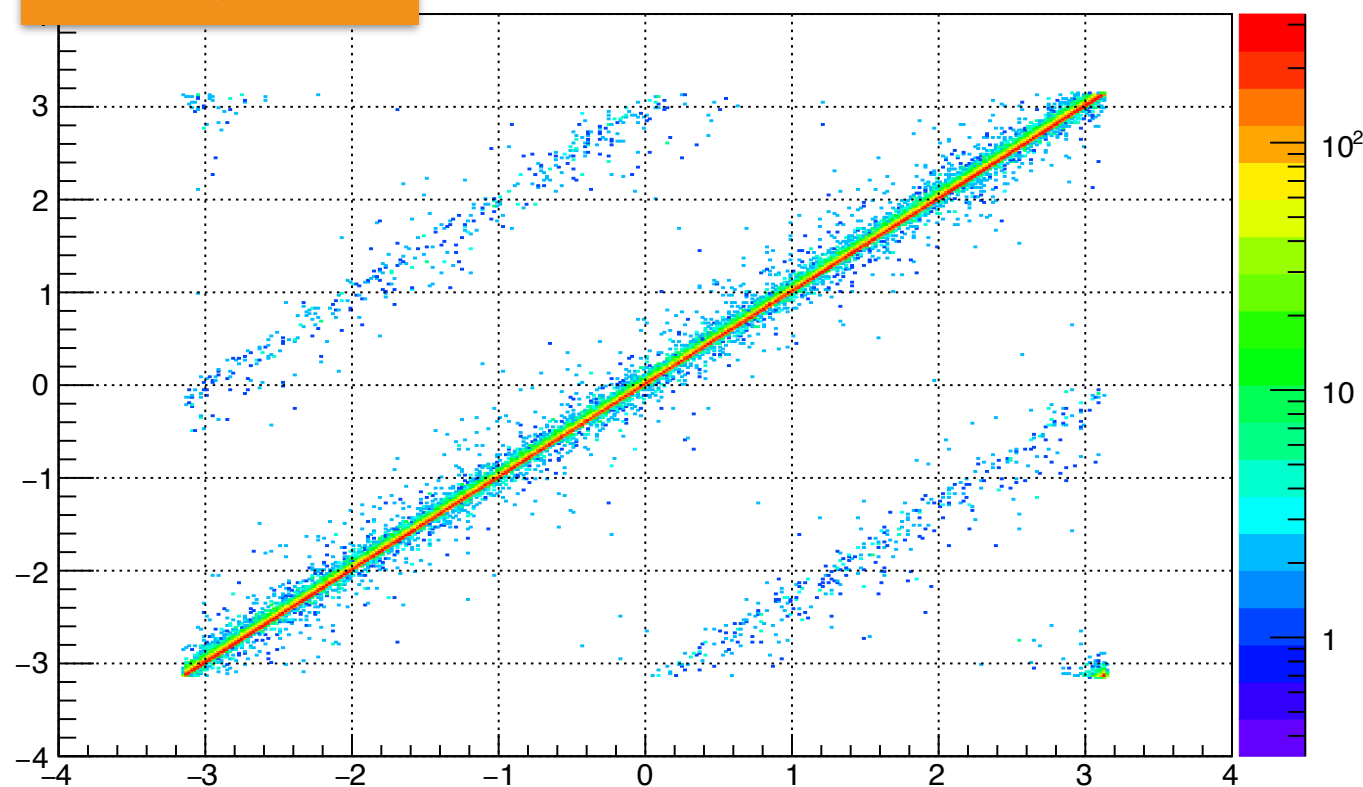
V0, trk2

V0hphi_1:MChphi_1



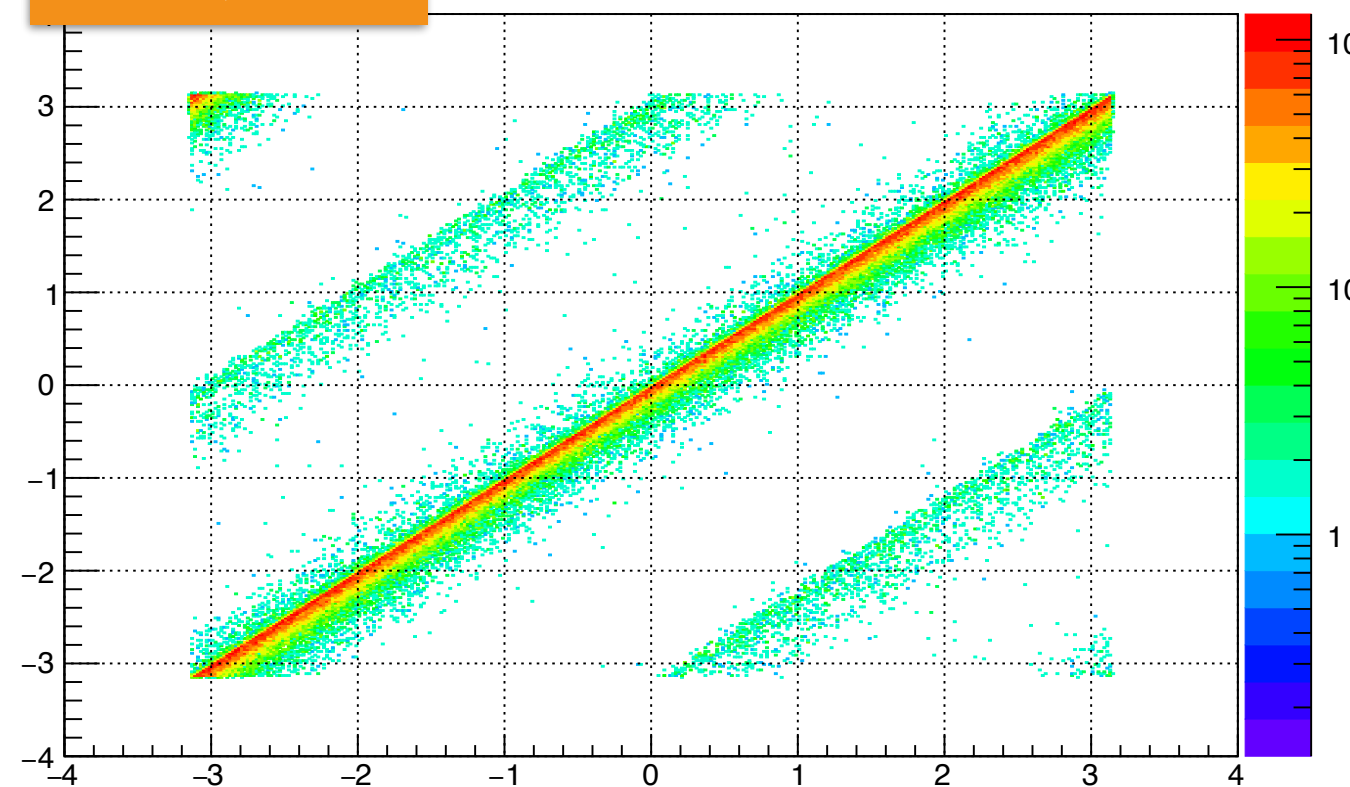
TRK, trk1

TRKhphi_0:MChphi_0



TRK, trk2

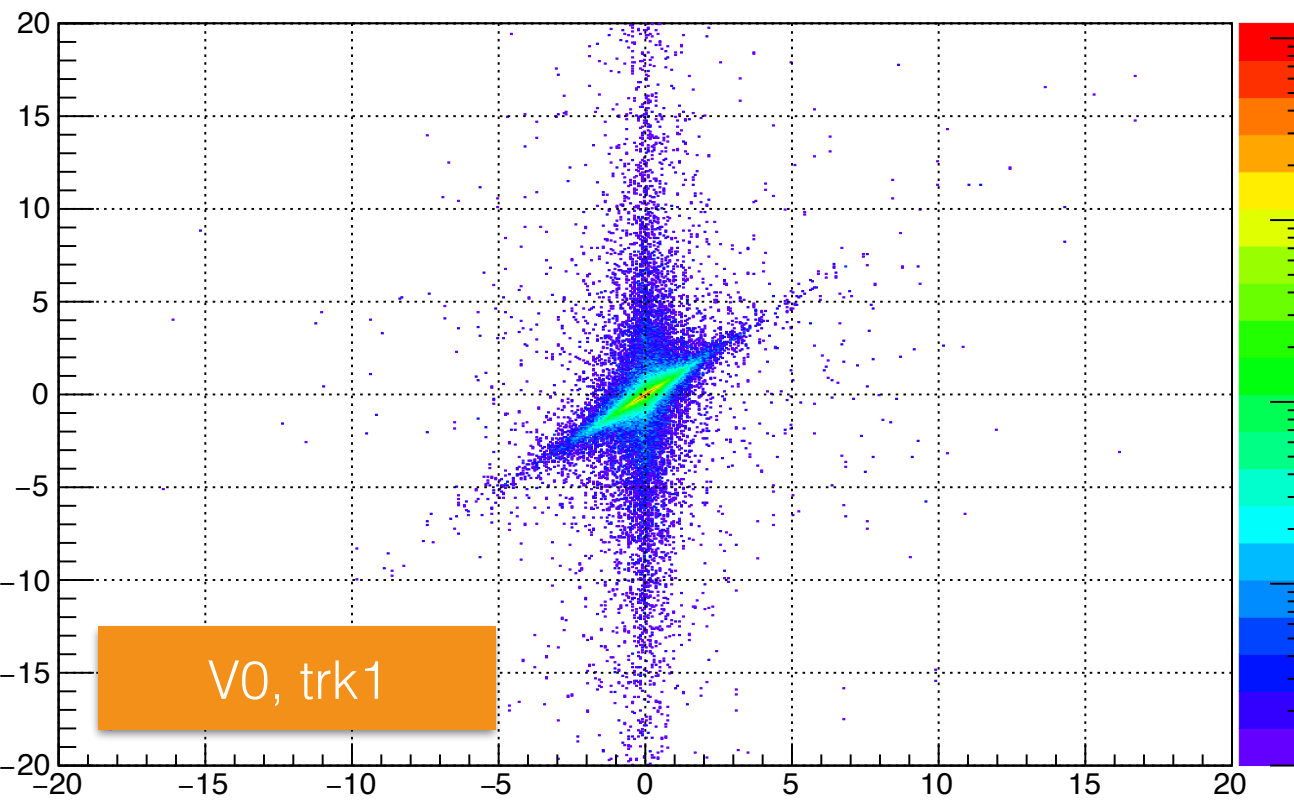
TRKhphi_1:MChphi_1



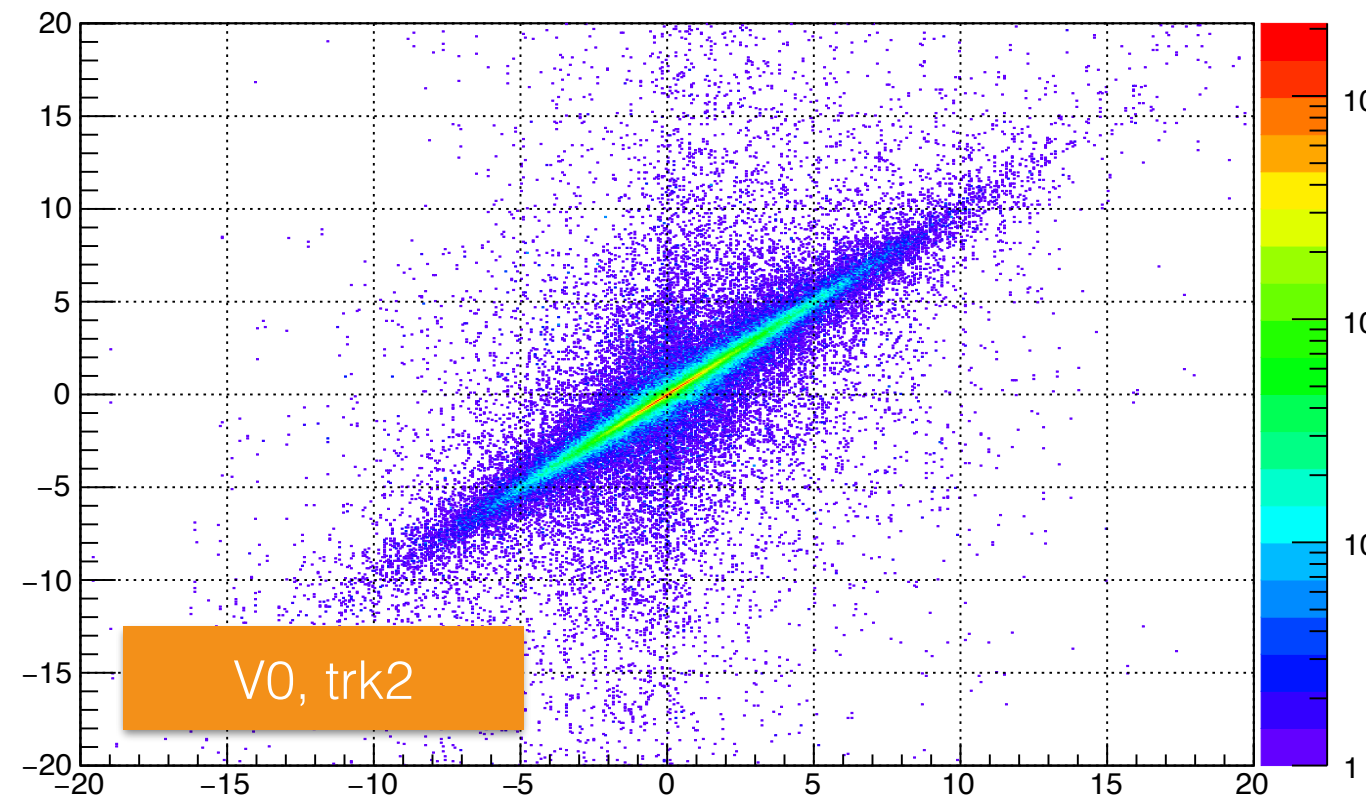
z0

Λ (0: p^+ 1: π^-)

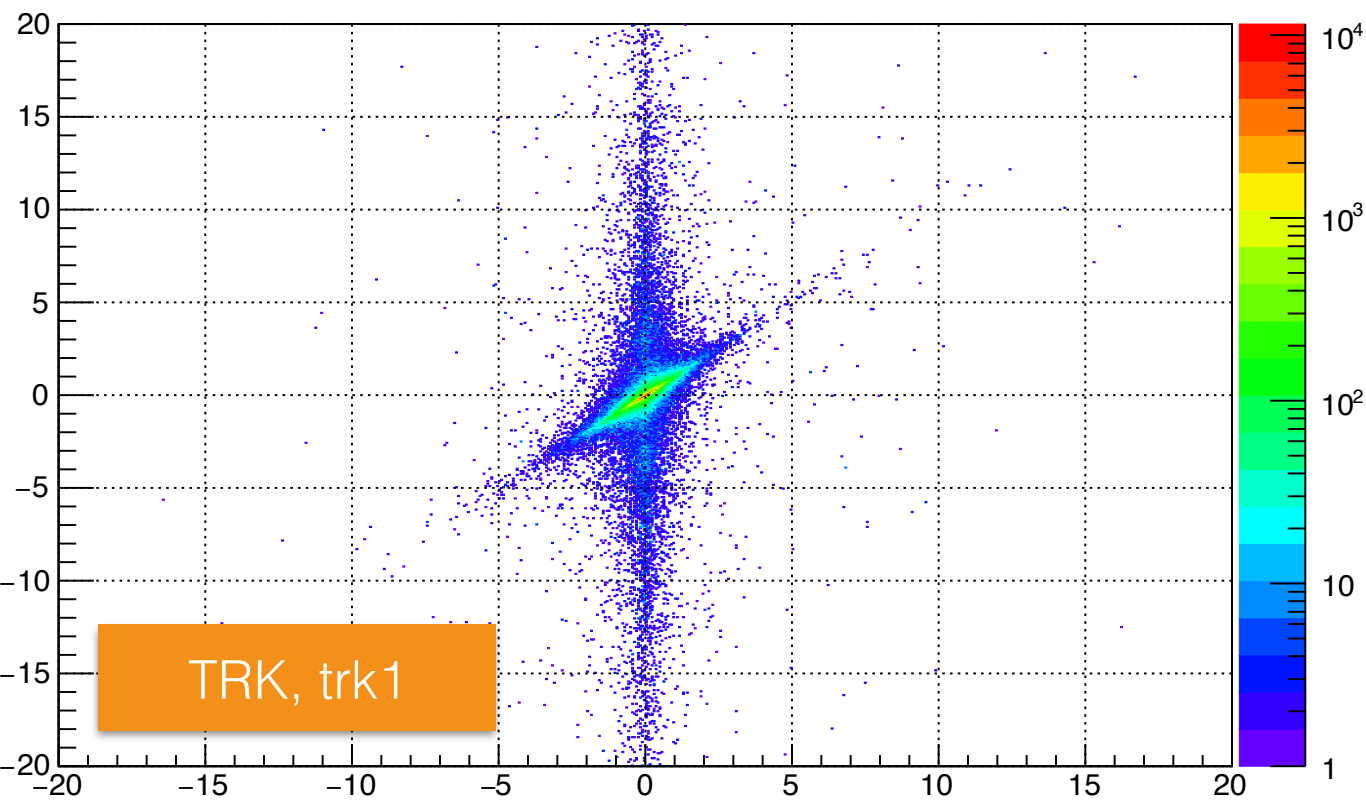
V0hz0_0:MChz0_0



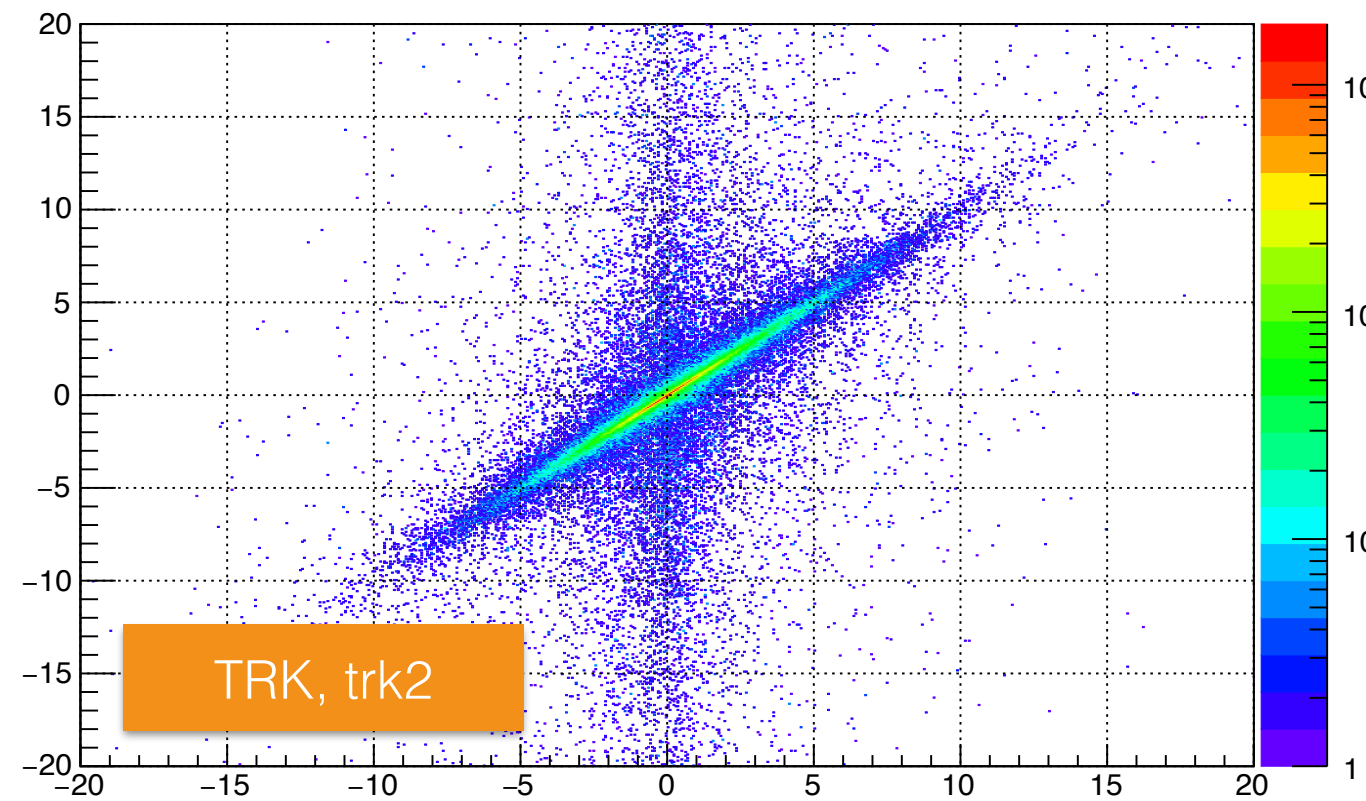
V0hz0_1:MChz0_1



TRKhz0_0:MChz0_0



TRKhz0_1:MChz0_1



Summary

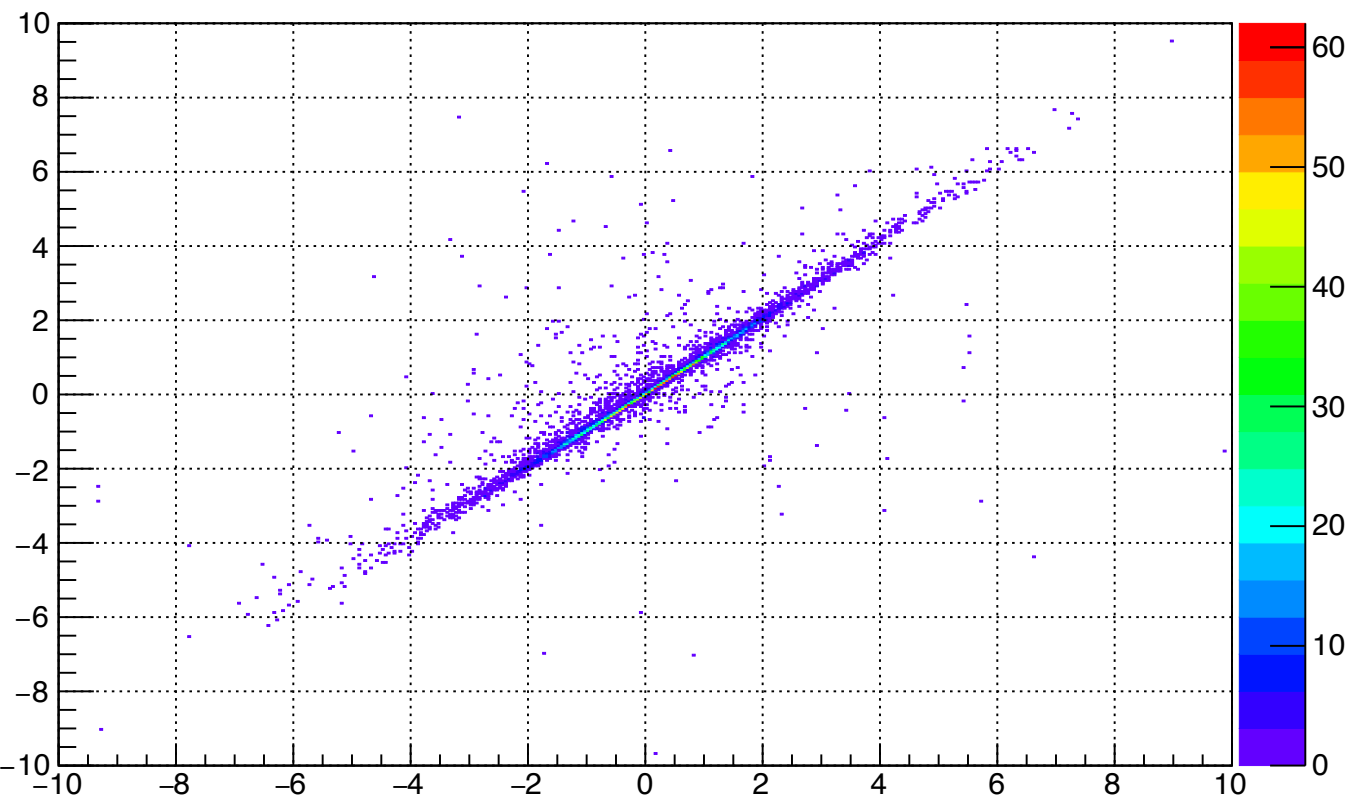
- with (any) cut on pVal:
 - no gain in pt resolution
 - drop in the efficiency
- helix parameters from V0s daughters/
tracks related to MCParticles under
investigation

backup

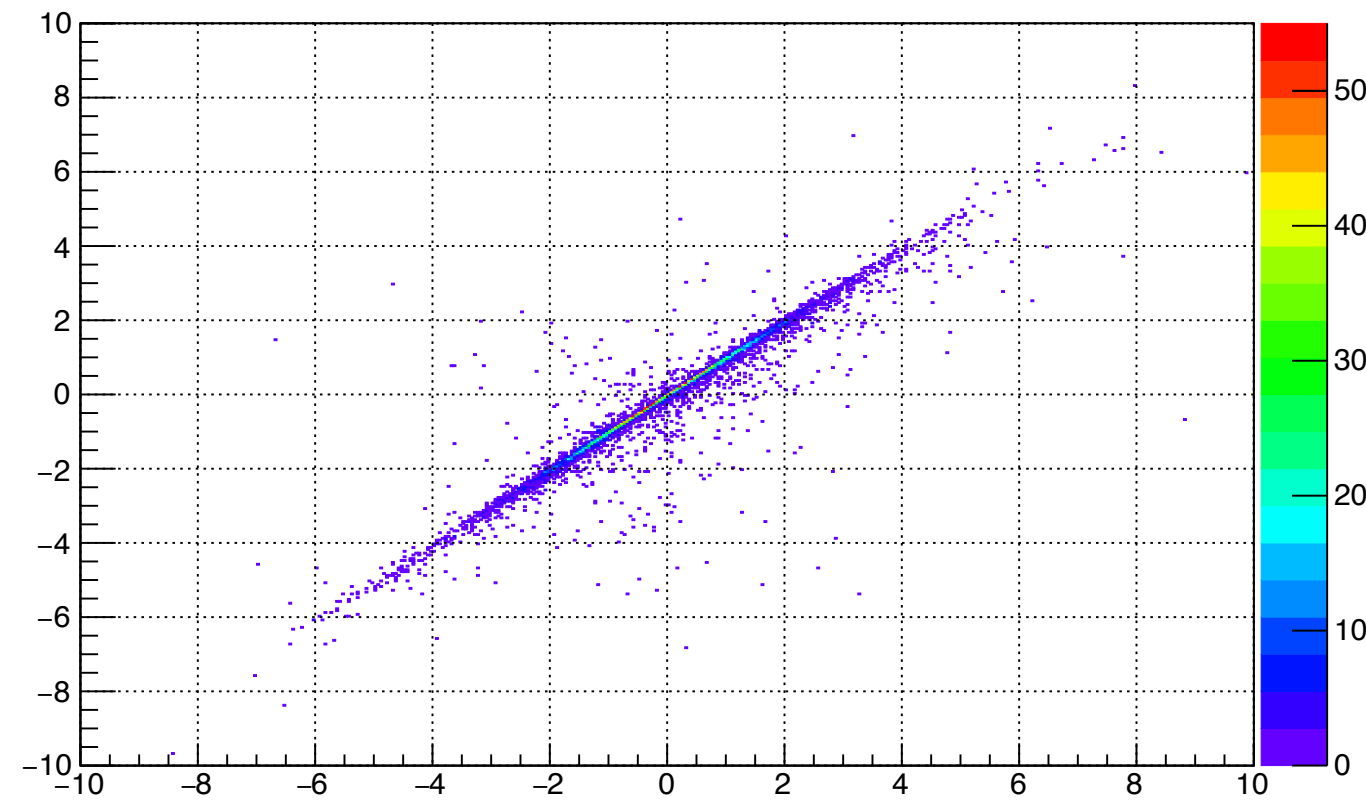
$K_S (0: \pi^+ 1: \pi^-)$

Y(4S)

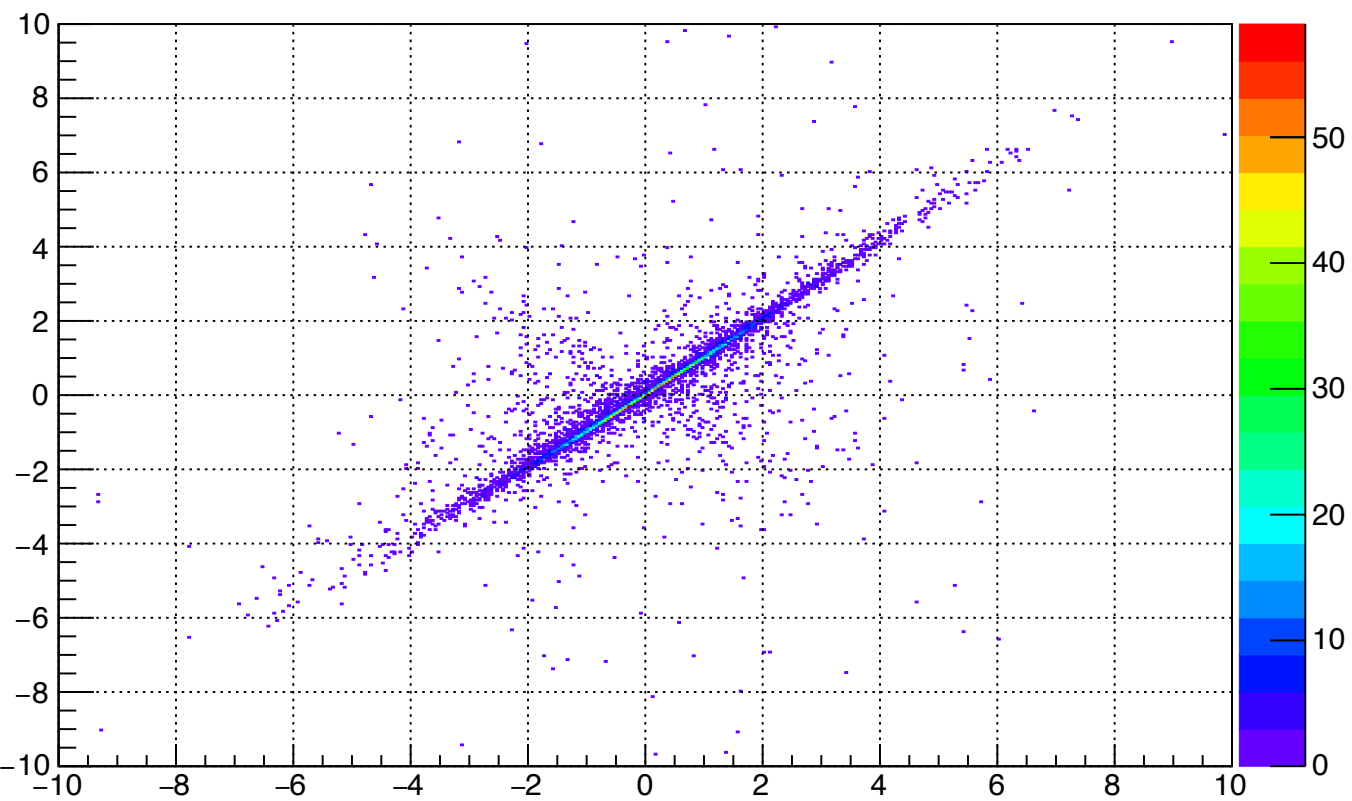
V0hd0_0:MChd0_0



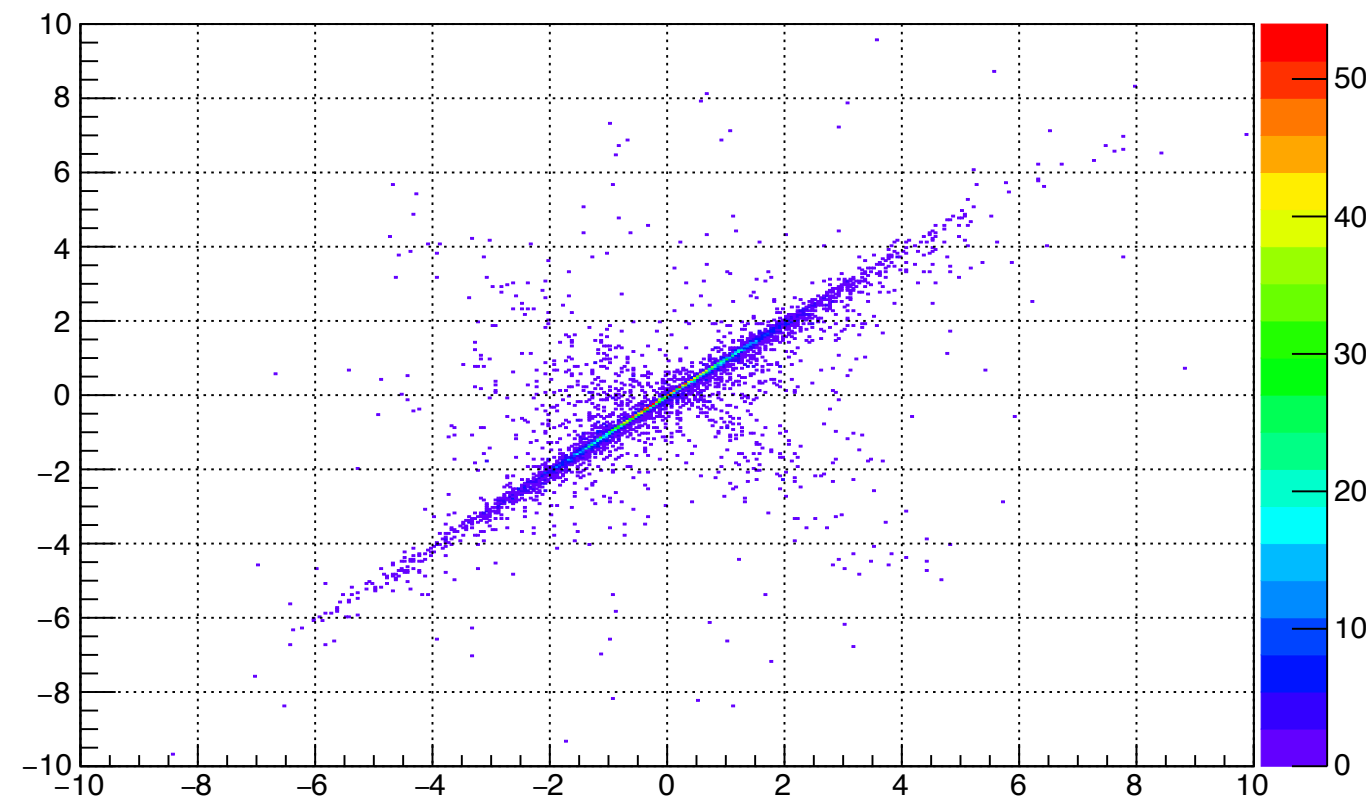
V0hd0_1:MChd0_1



TRKh0_0:MChd0_0



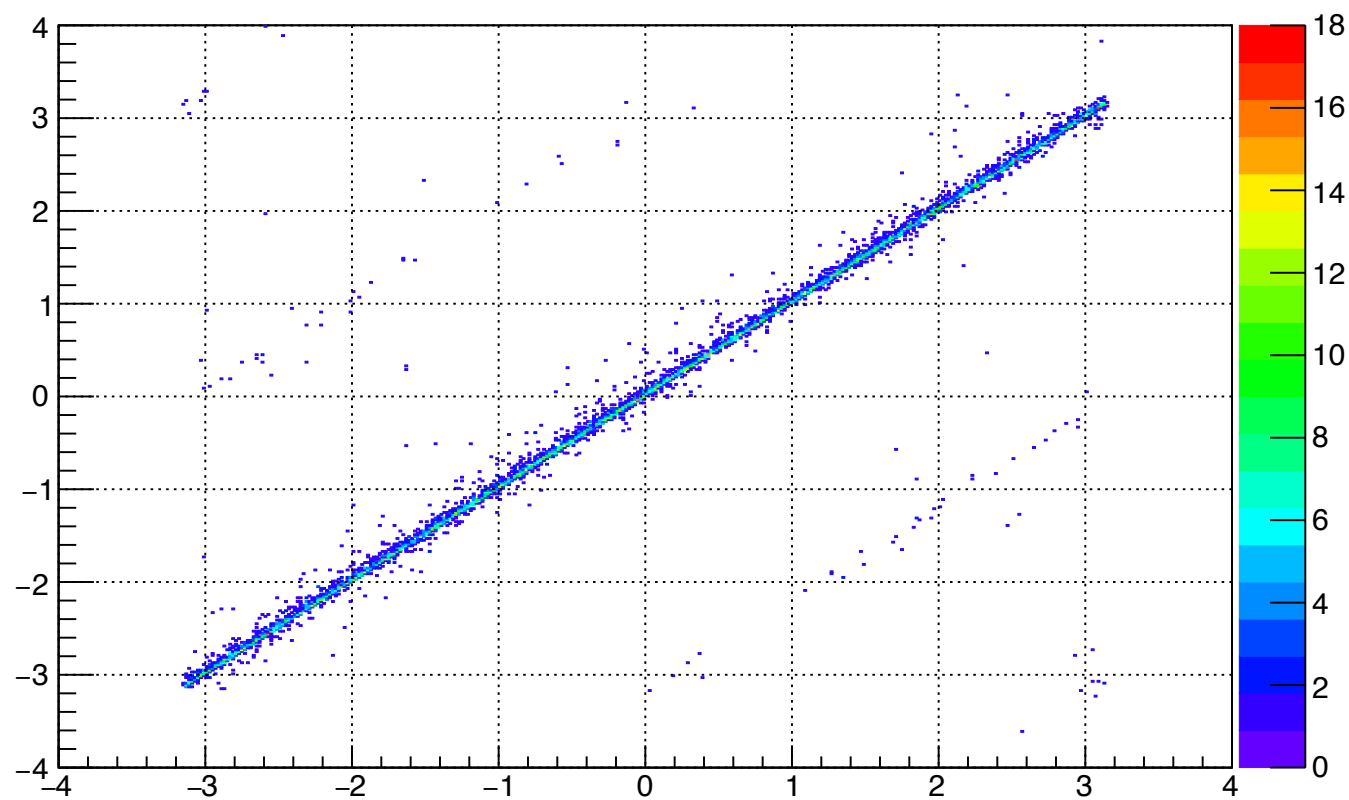
TRKh0_1:MChd0_1



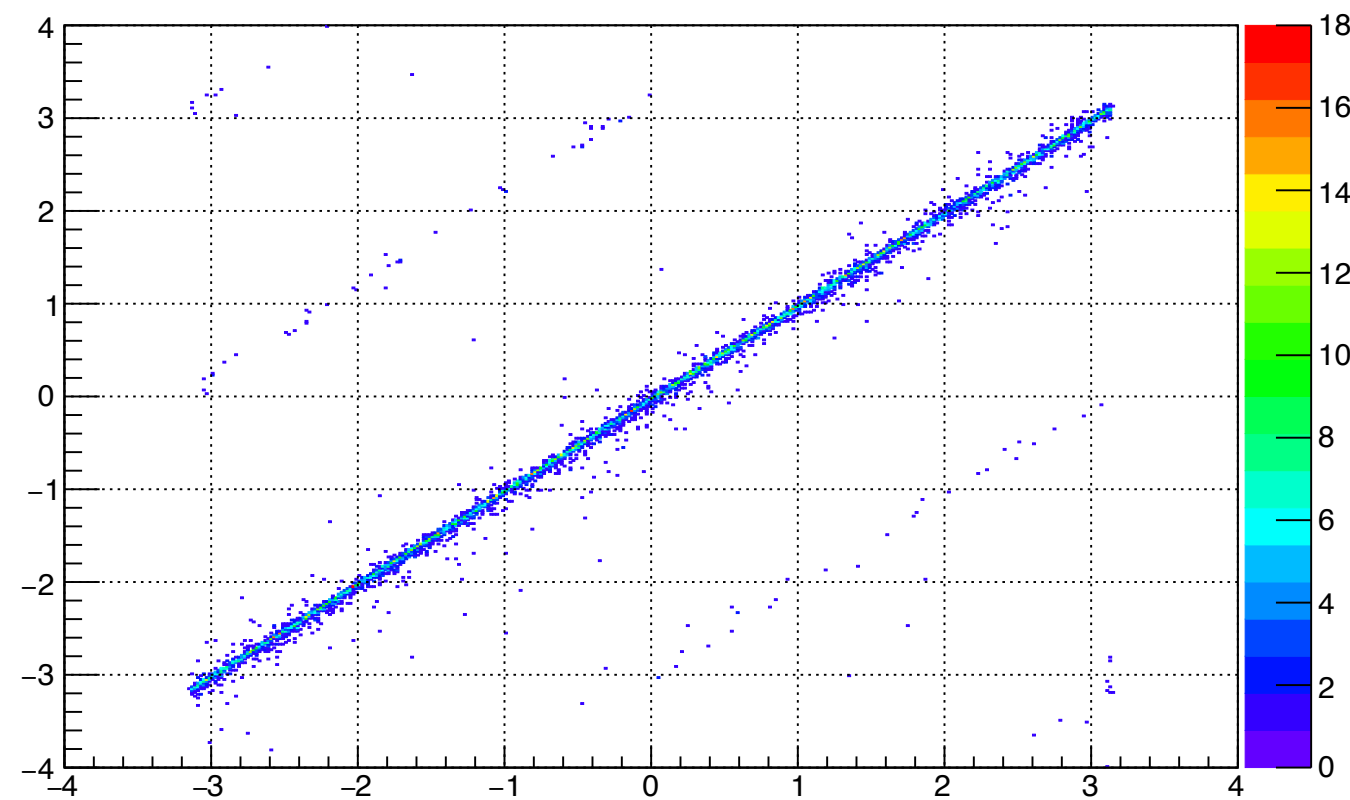
$K_S (0: \pi^+ 1: \pi^-)$

Y(4S)

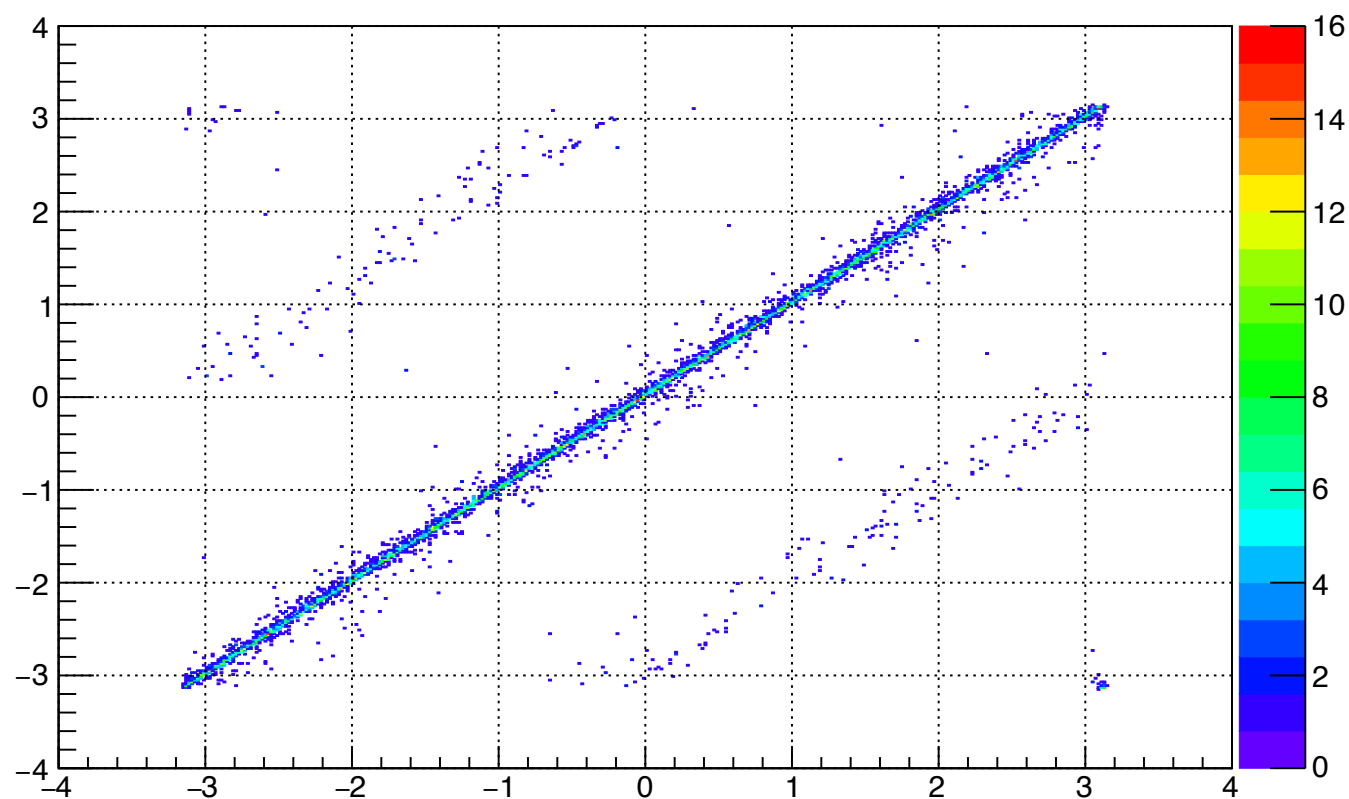
V0hphi_0:MChphi_0



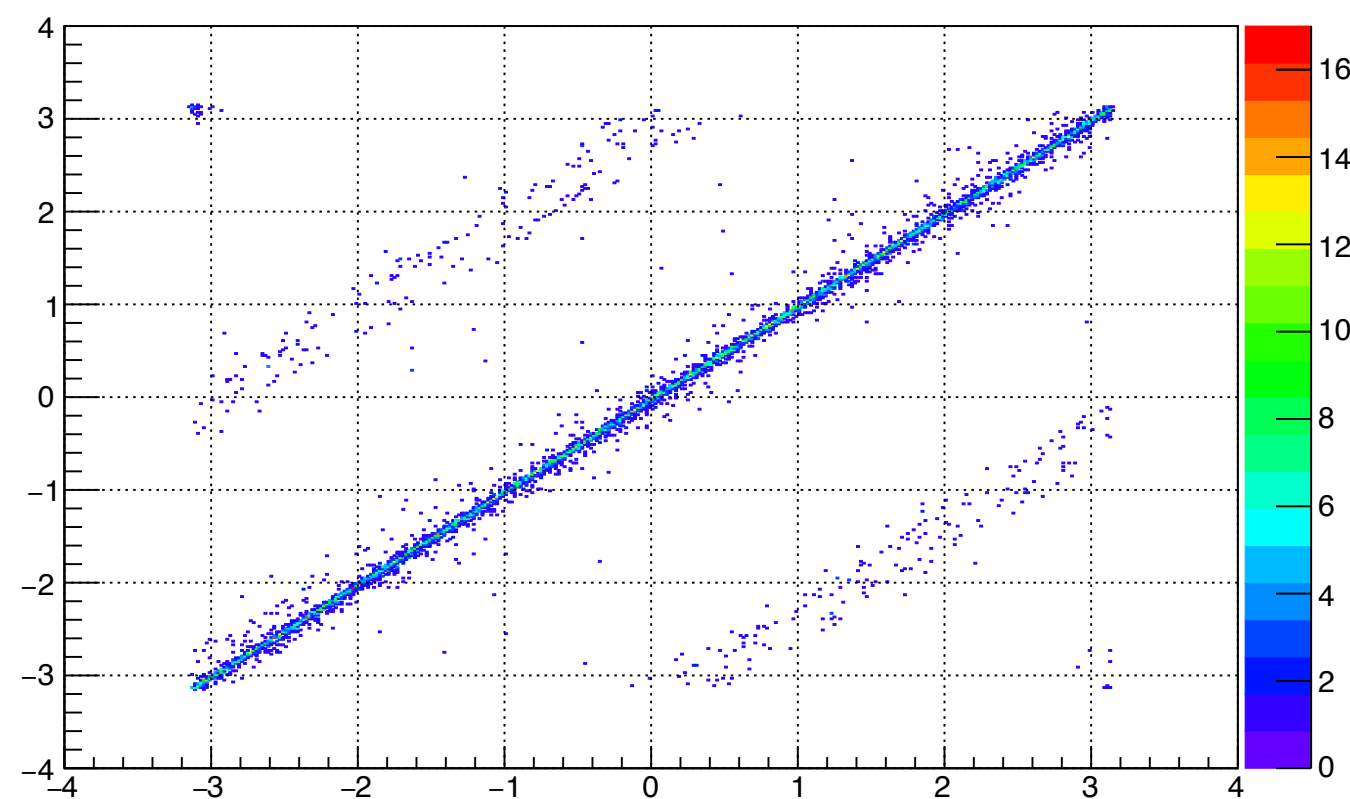
V0hphi_1:MChphi_1



TRKhphi_0:MChphi_0



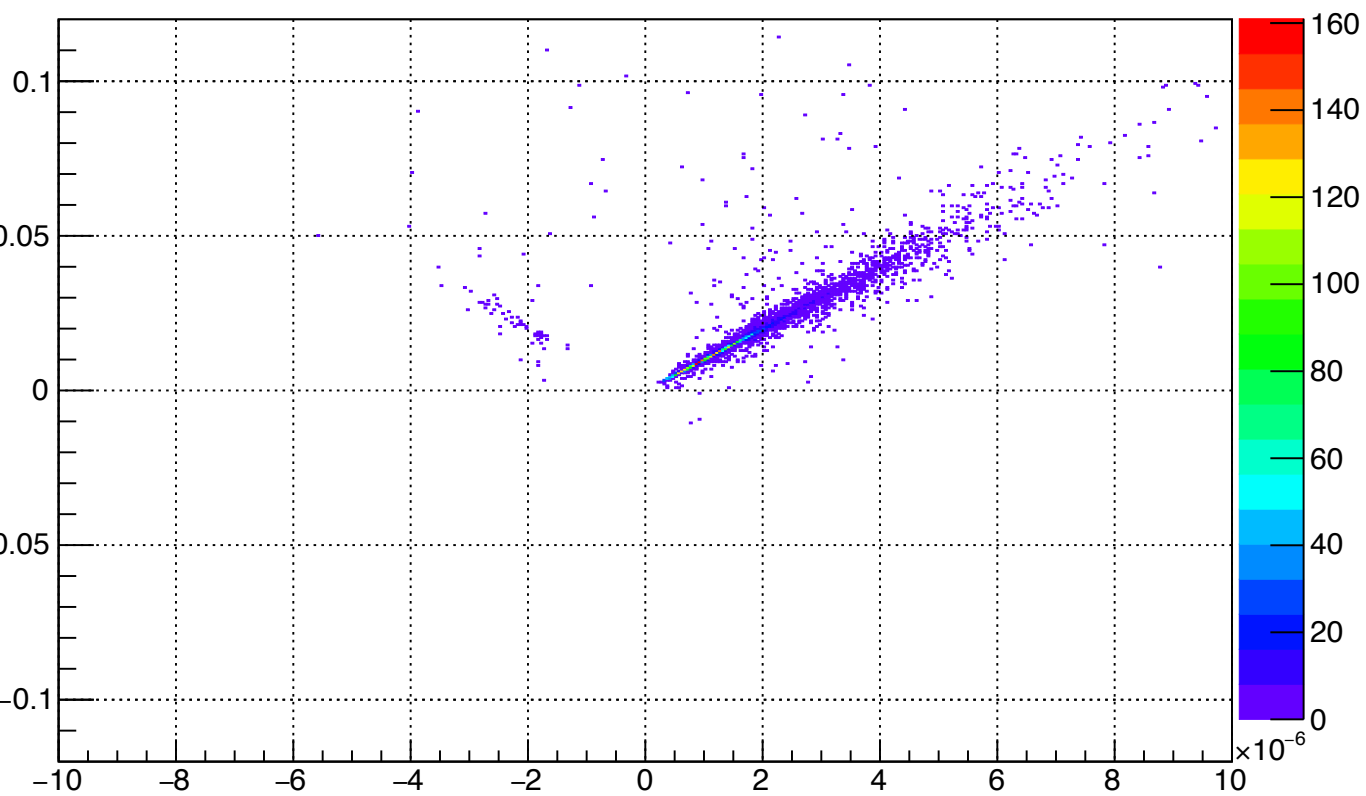
TRKhphi_1:MChphi_1



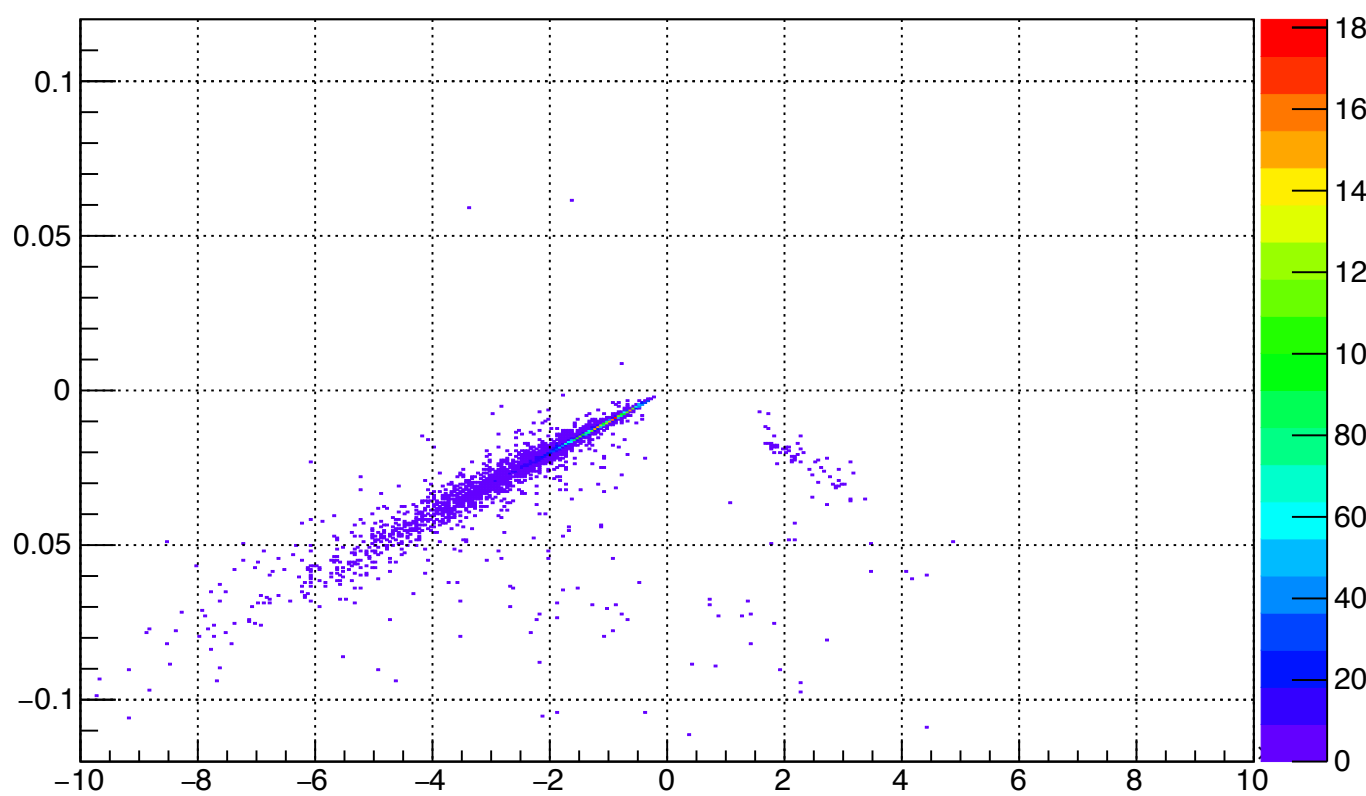
$K_S (0: \pi^+ 1: \pi^-)$

Y(4S)

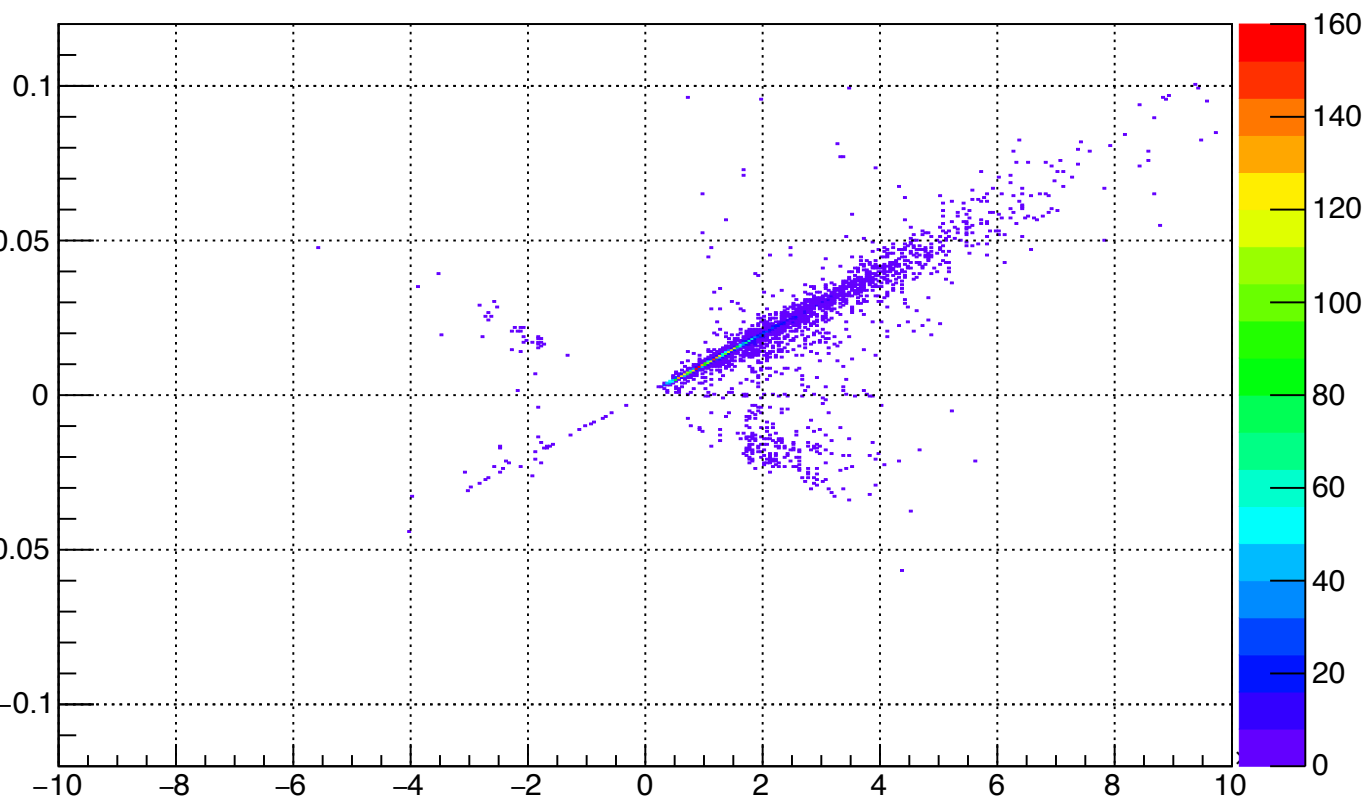
V0homega_0:MChomega_0



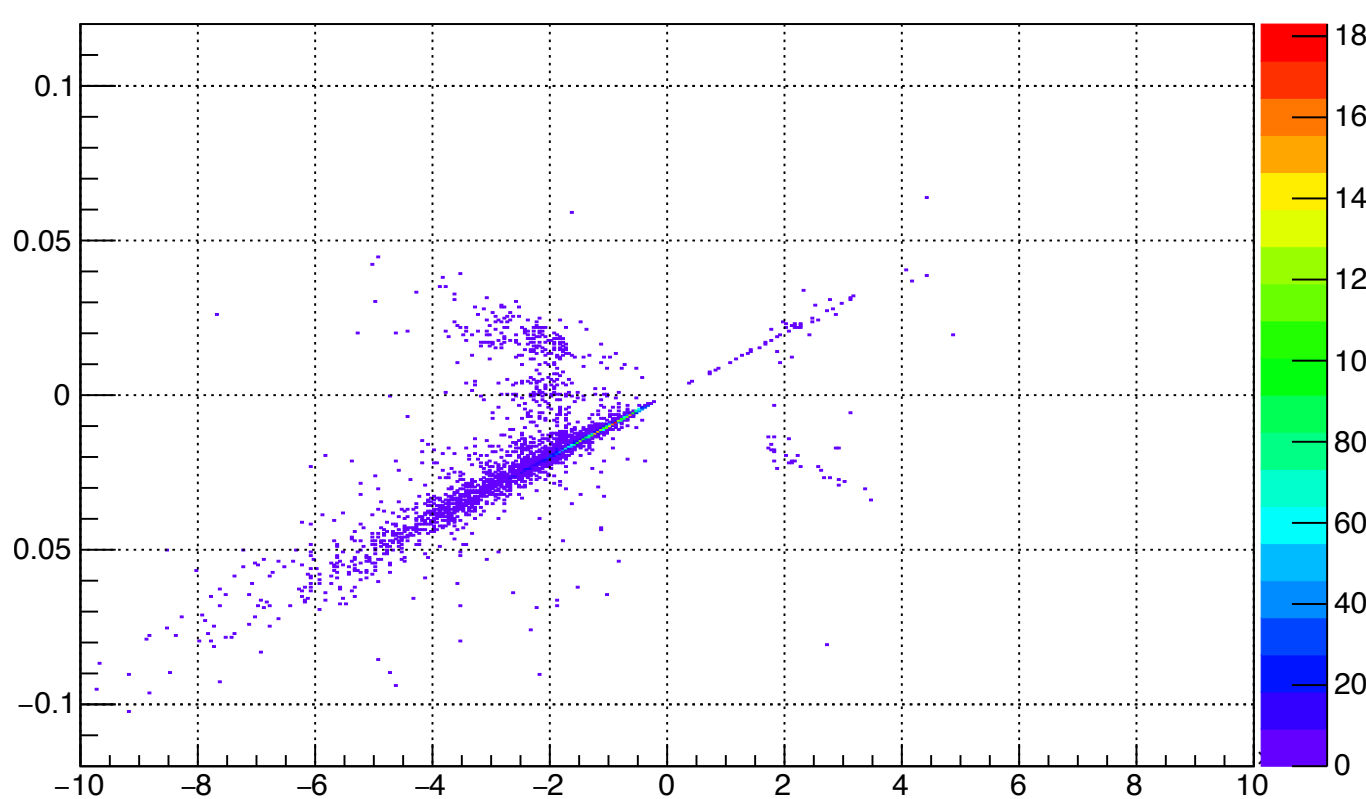
V0homega_1:MChomega_1



TRKhomega_0:MChomega_0



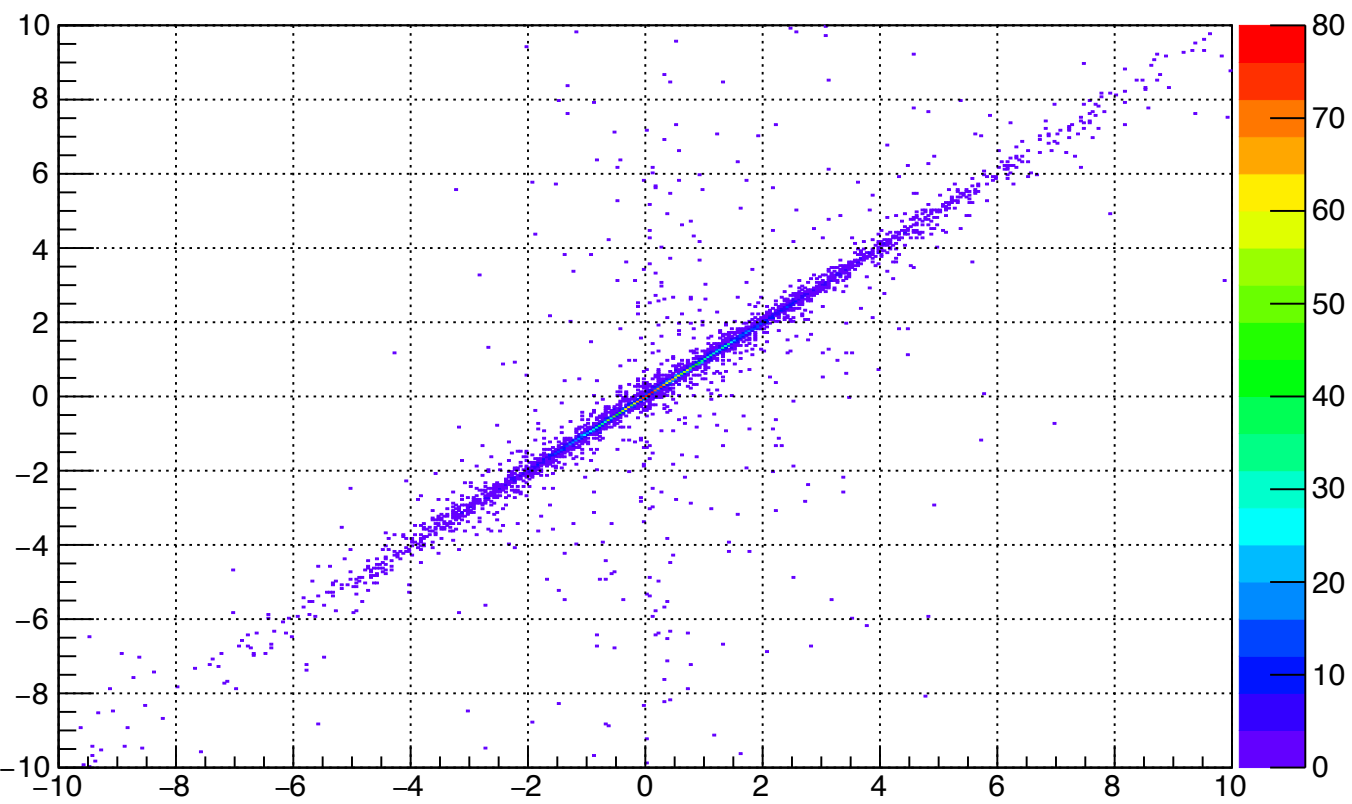
TRKhomega_1:MChomega_1



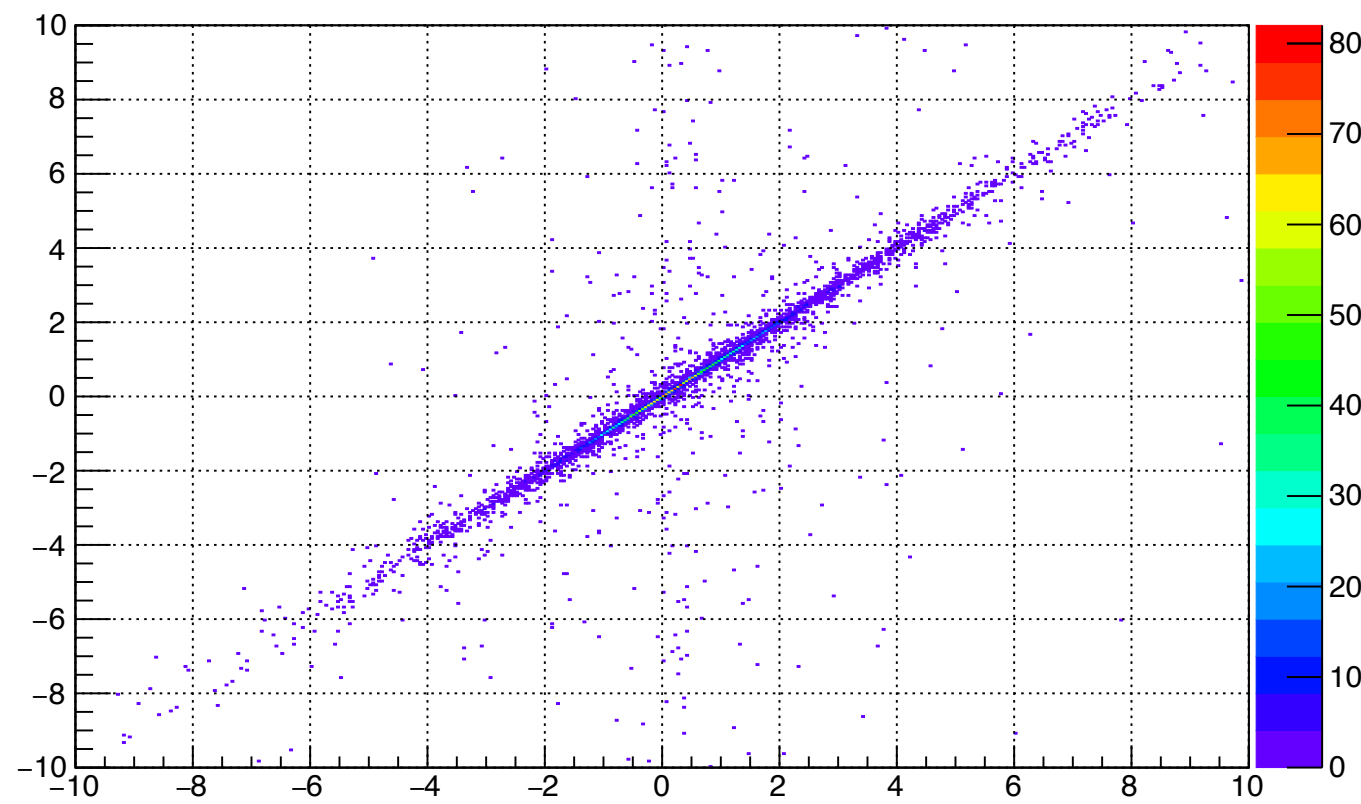
$K_S (0: \pi^+ 1: \pi^-)$

Y(4S)

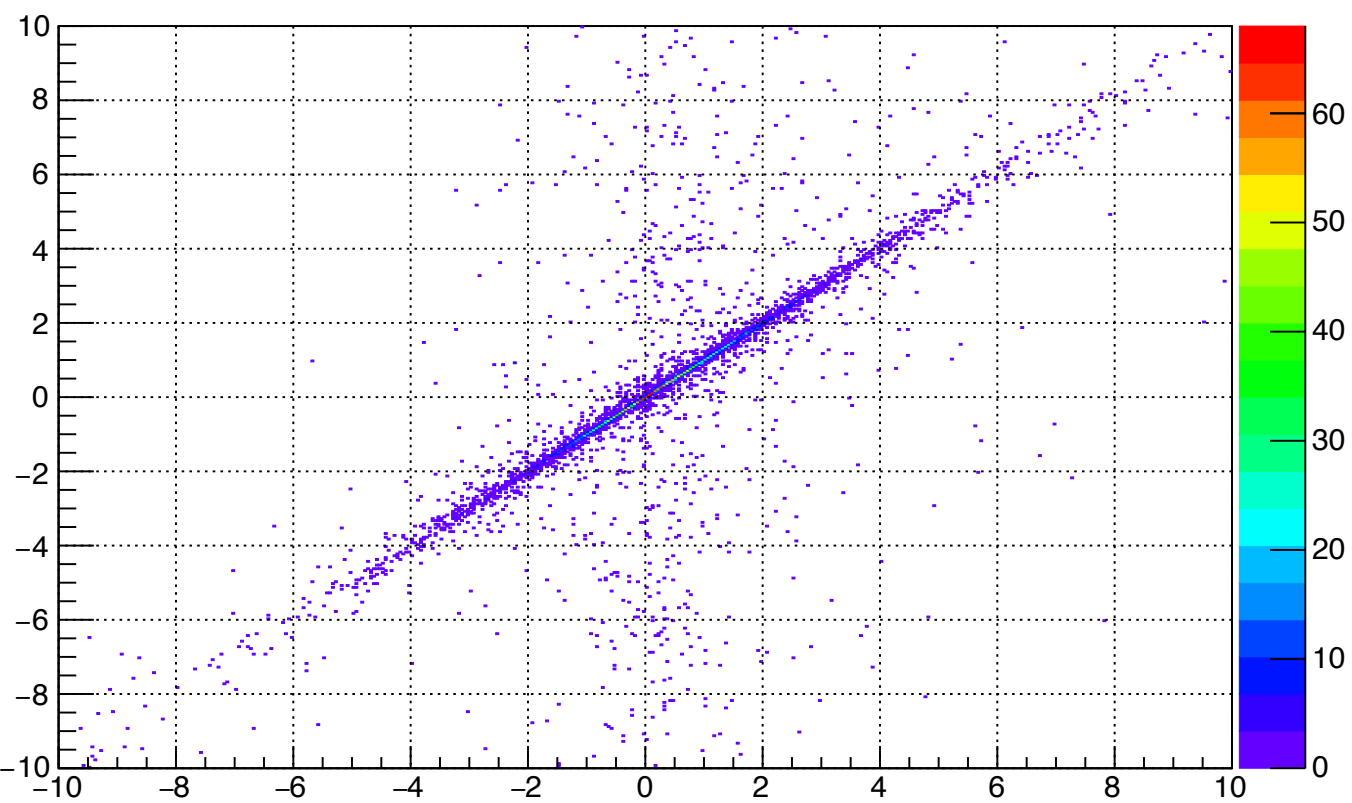
V0hz0_0:MChz0_0



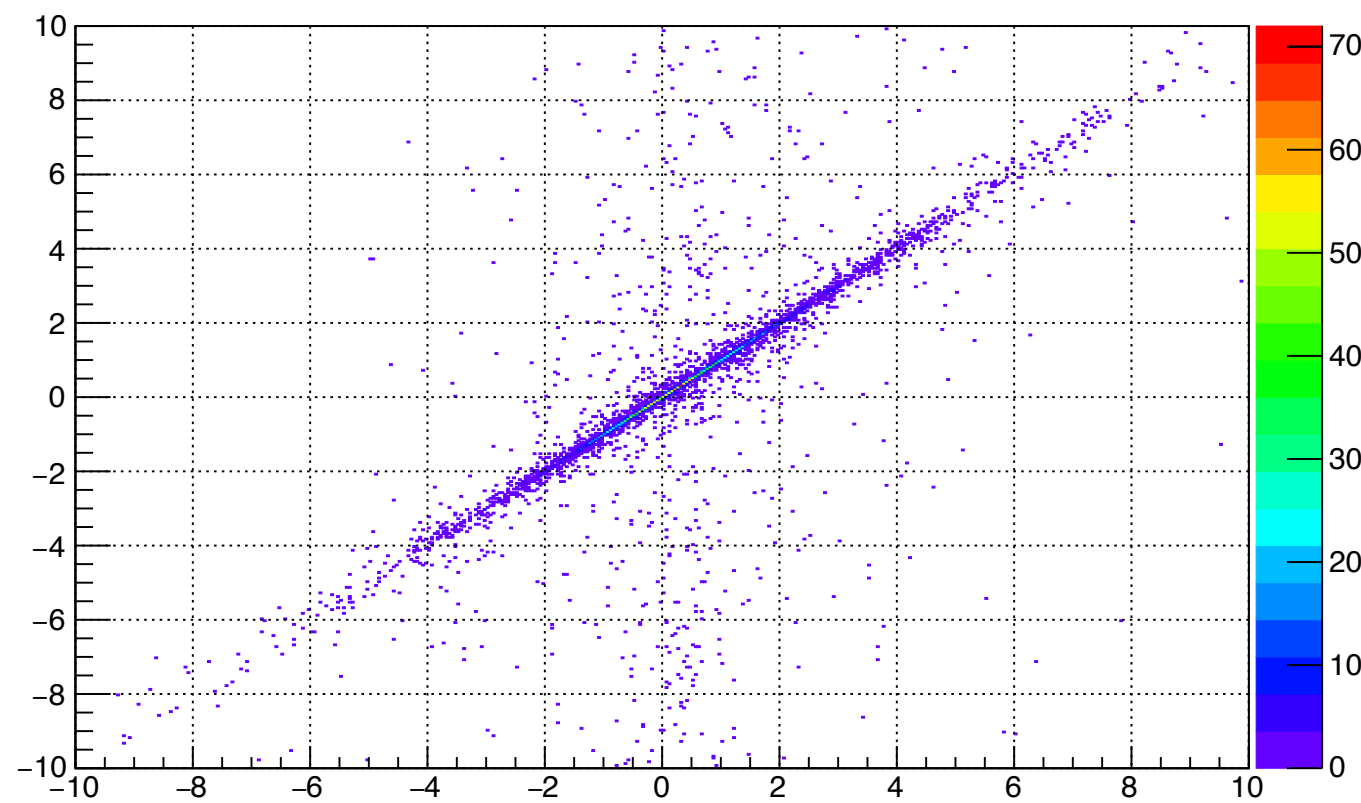
V0hz0_1:MChz0_1



TRKhz0_0:MChz0_0



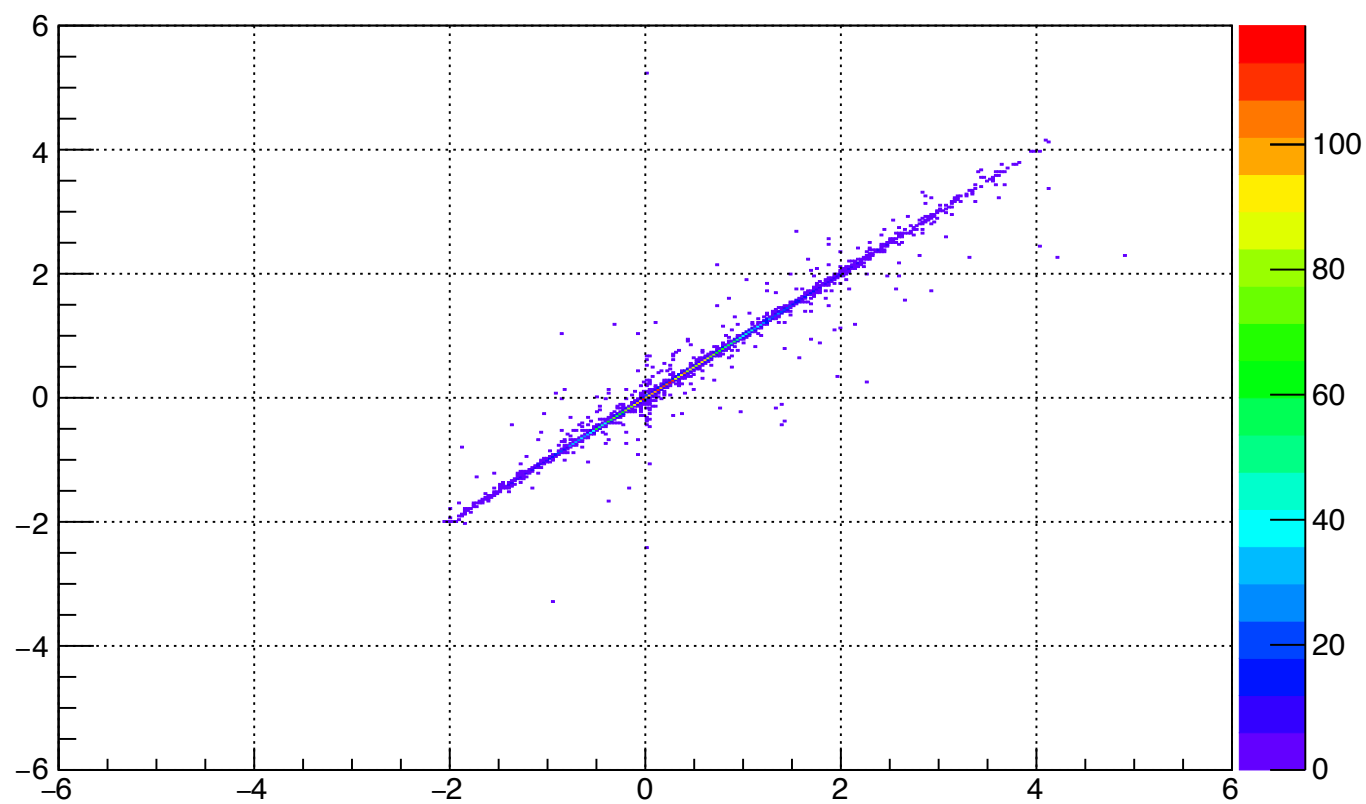
TRKhz0_1:MChz0_1



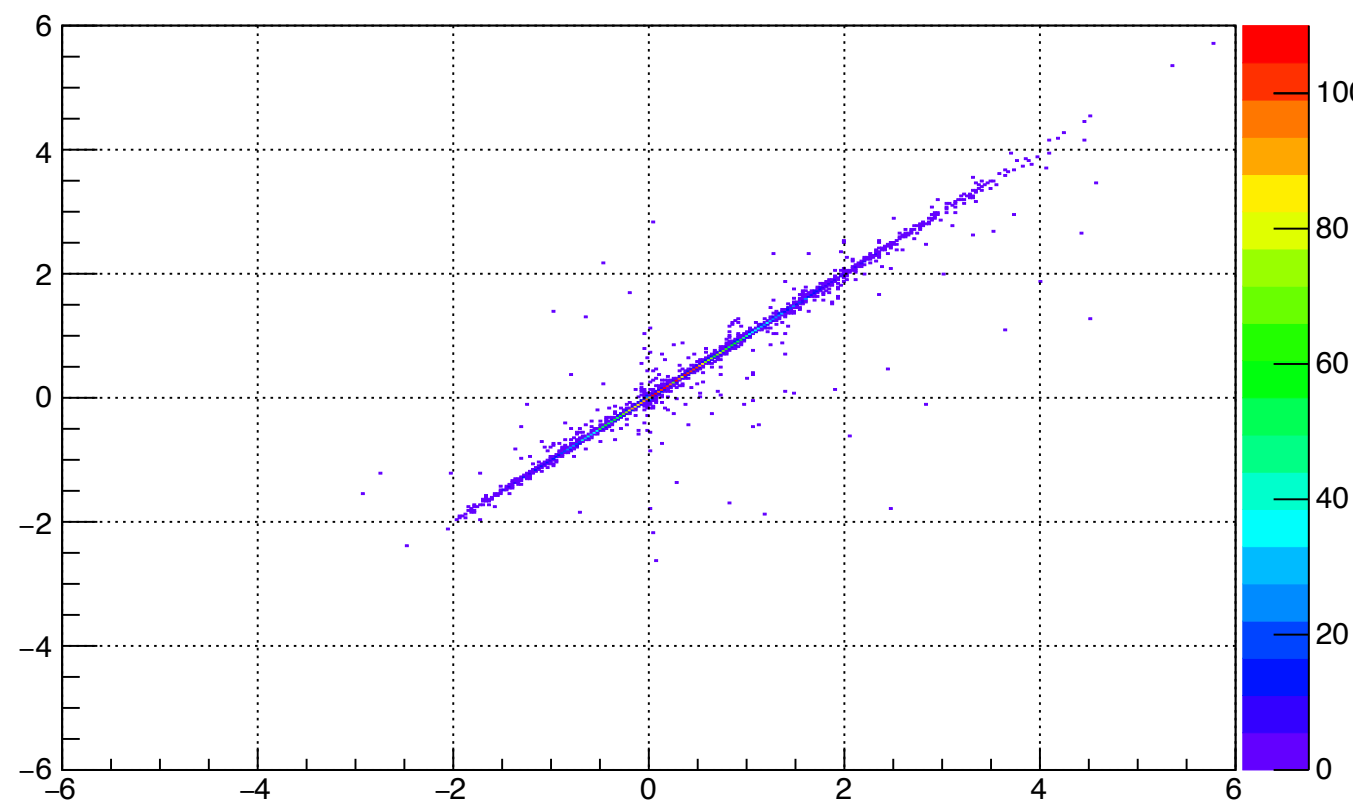
$K_S (0: \pi^+ 1: \pi^-)$

Y(4S)

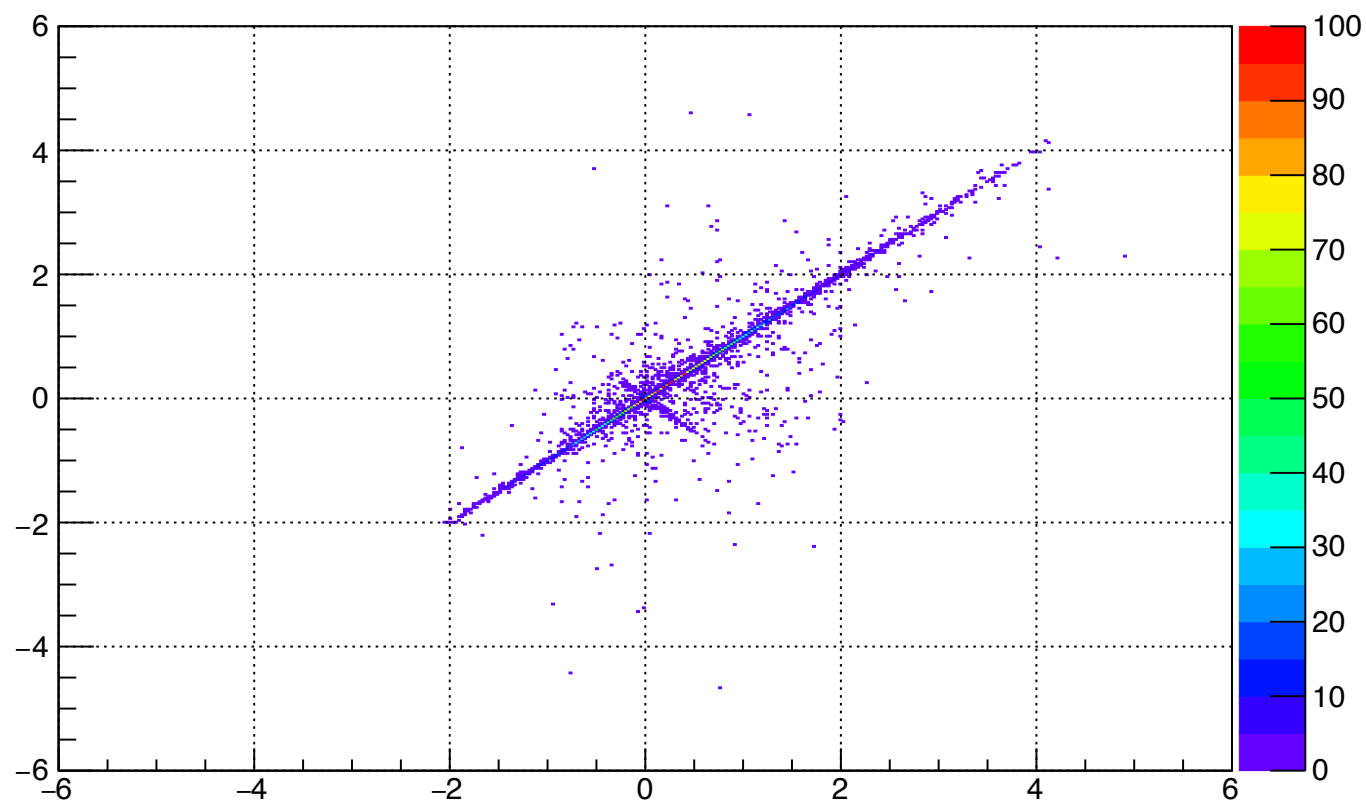
V0hcotTheta_0:MChcotTheta_0



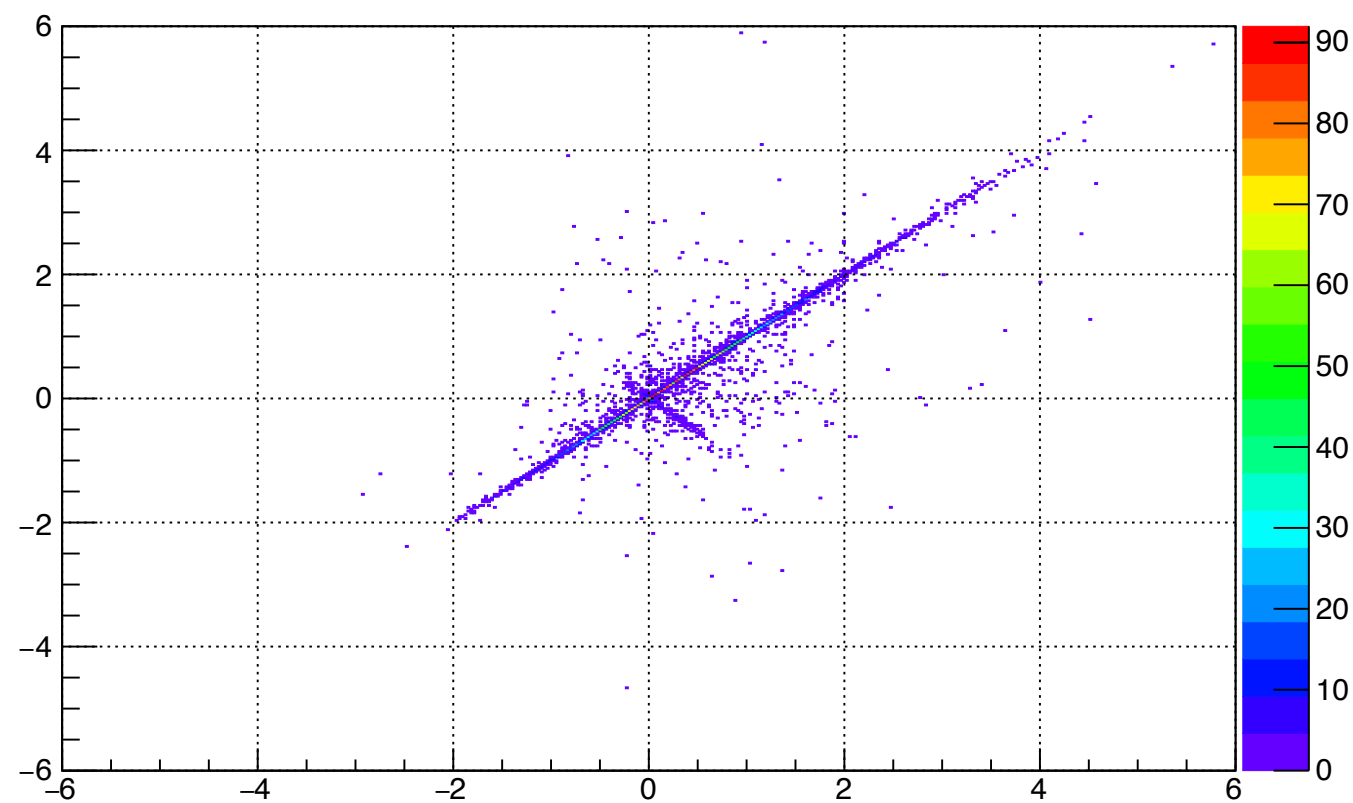
V0hcotTheta_1:MChcotTheta_1



TRKhcotTheta_0:MChcotTheta_0

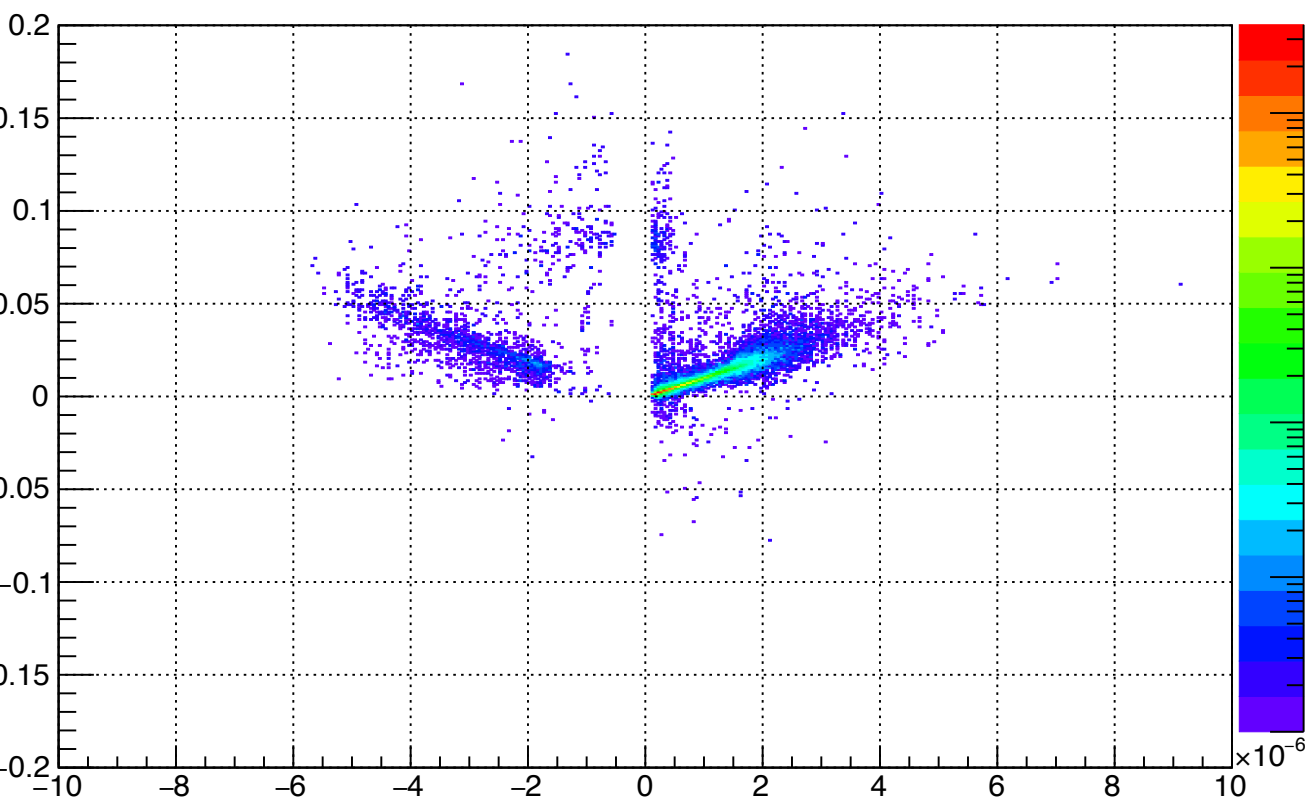


TRKhcotTheta_1:MChcotTheta_1

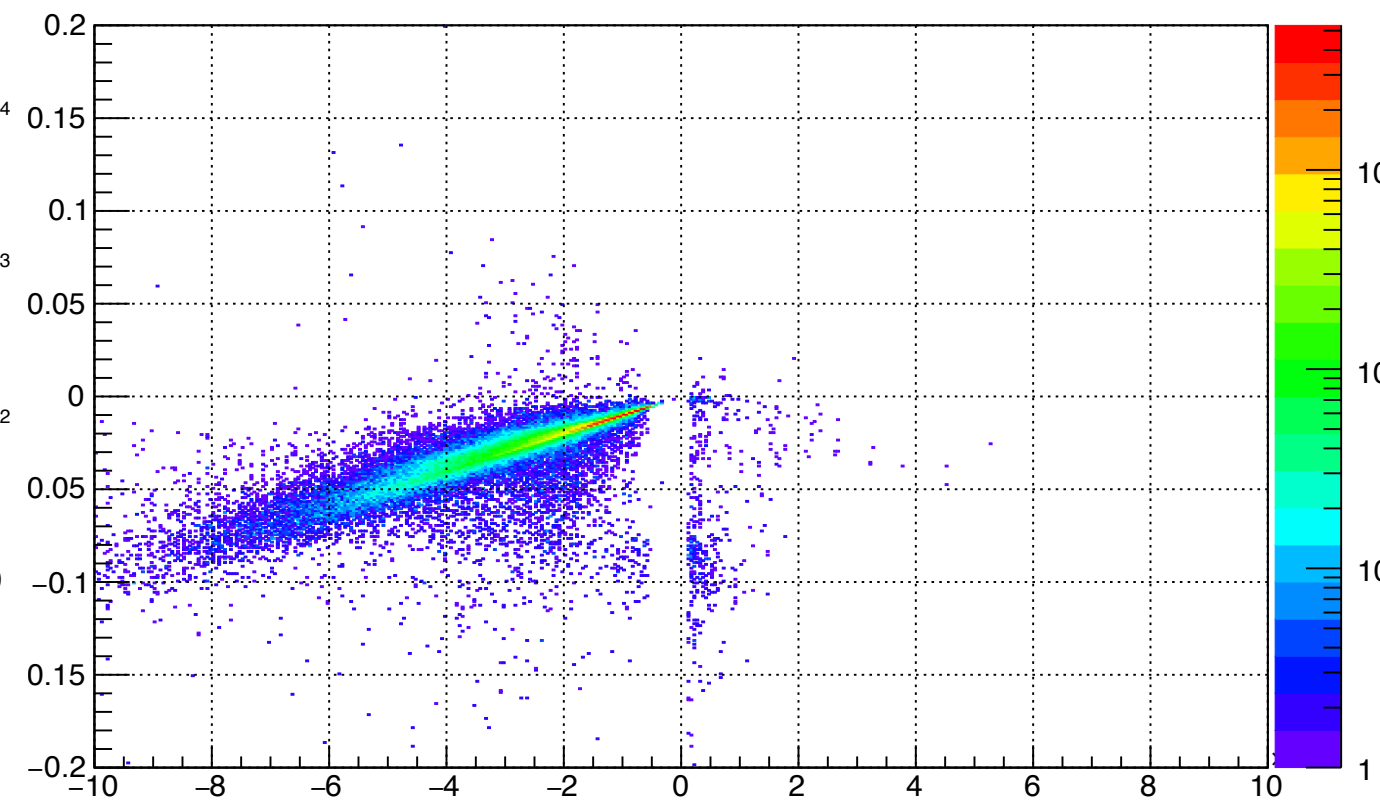


Λ (0: ρ^+ 1: π^-)

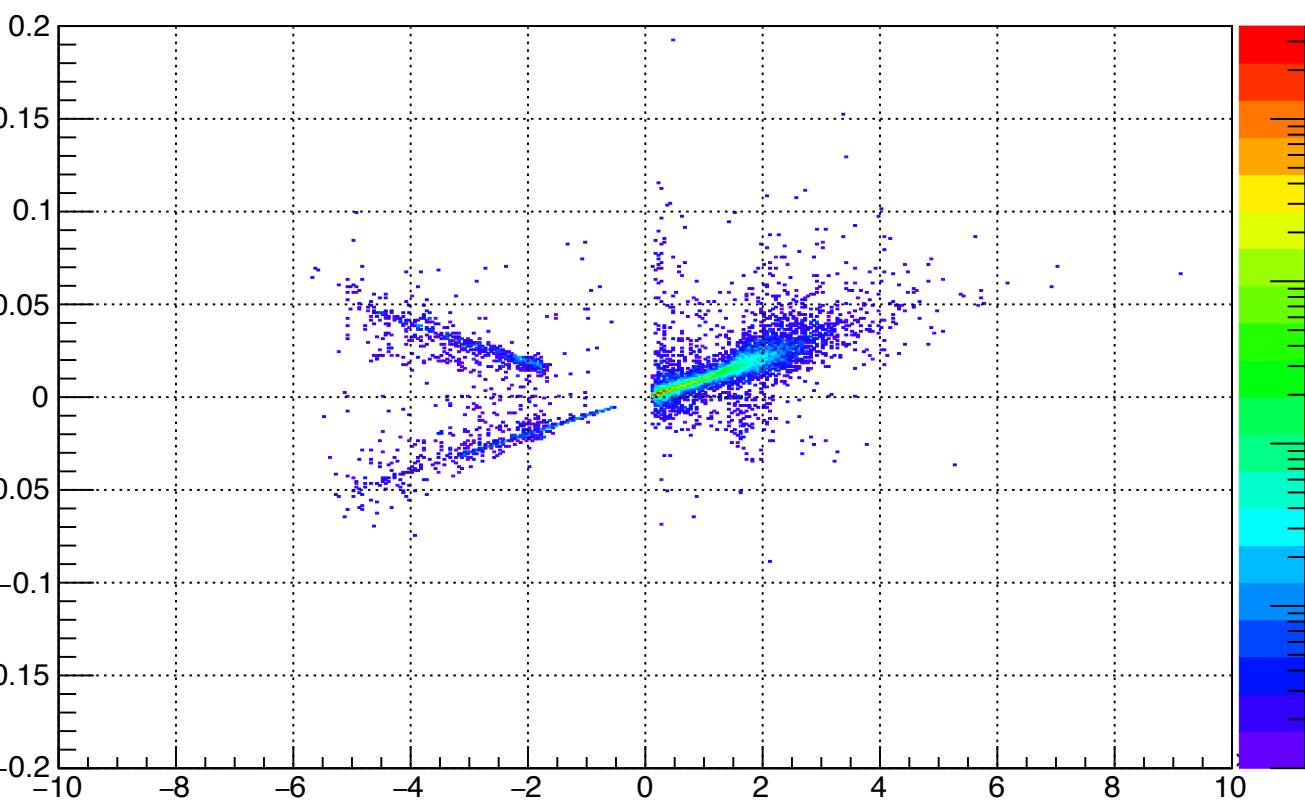
V0omega_0:MChomega_0



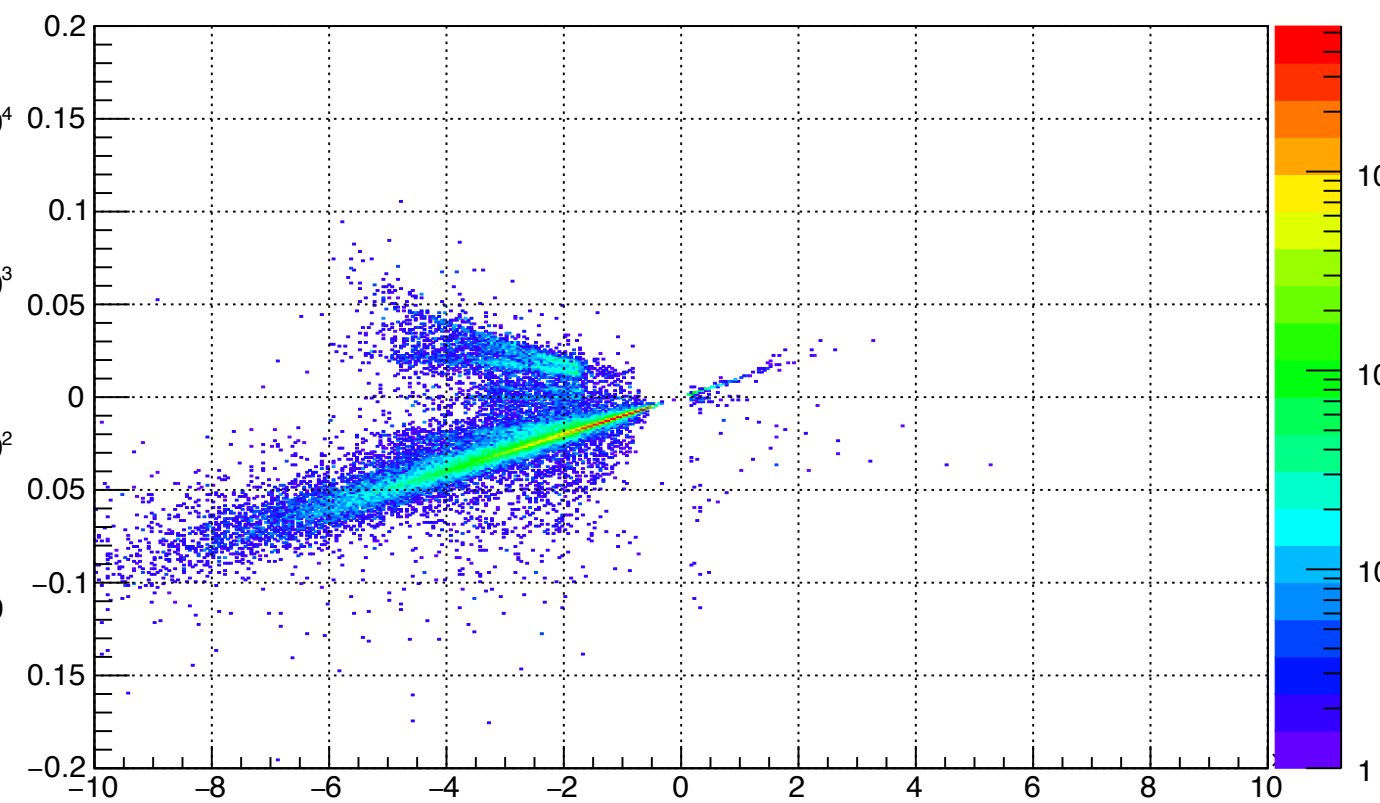
V0omega_1:MChomega_1



TRKhomega_0:MChomega_0

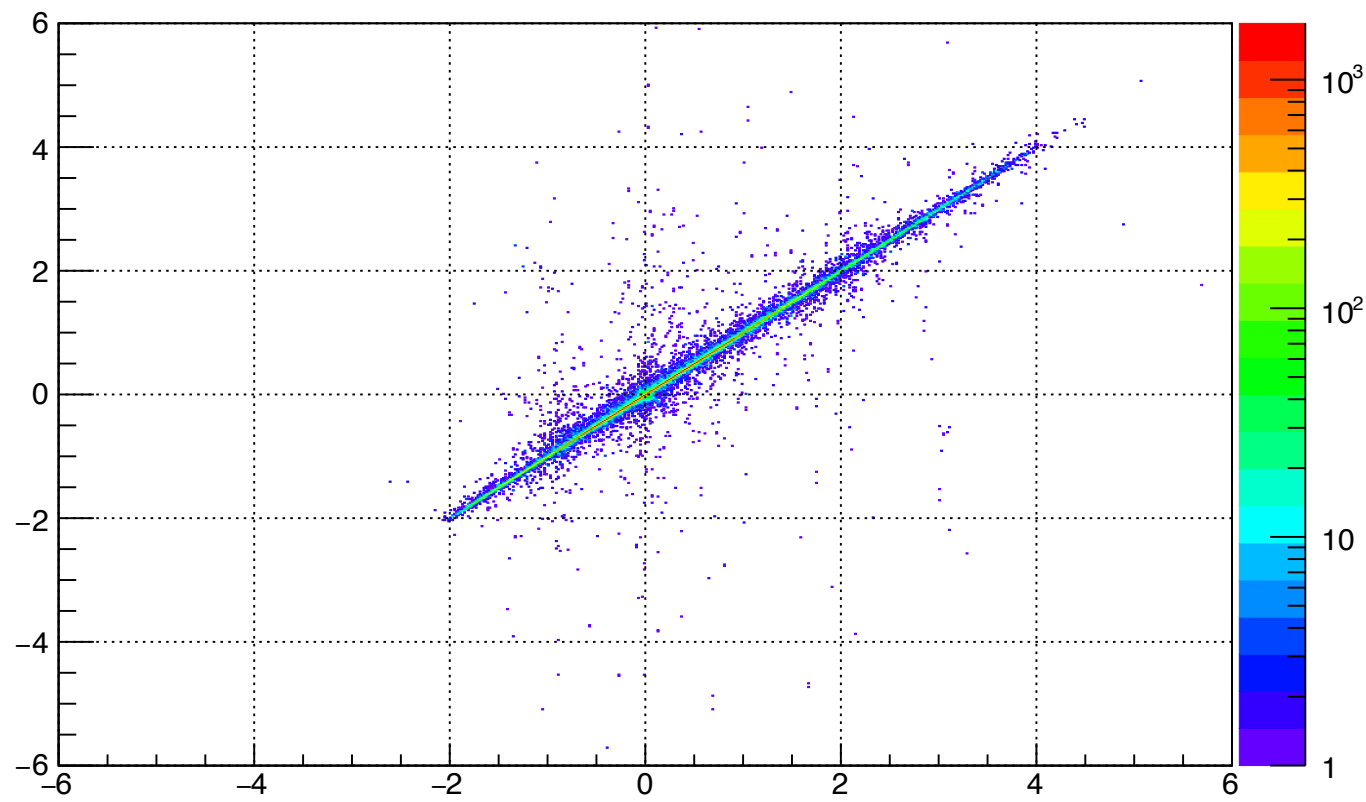


TRKhomega_1:MChomega_1

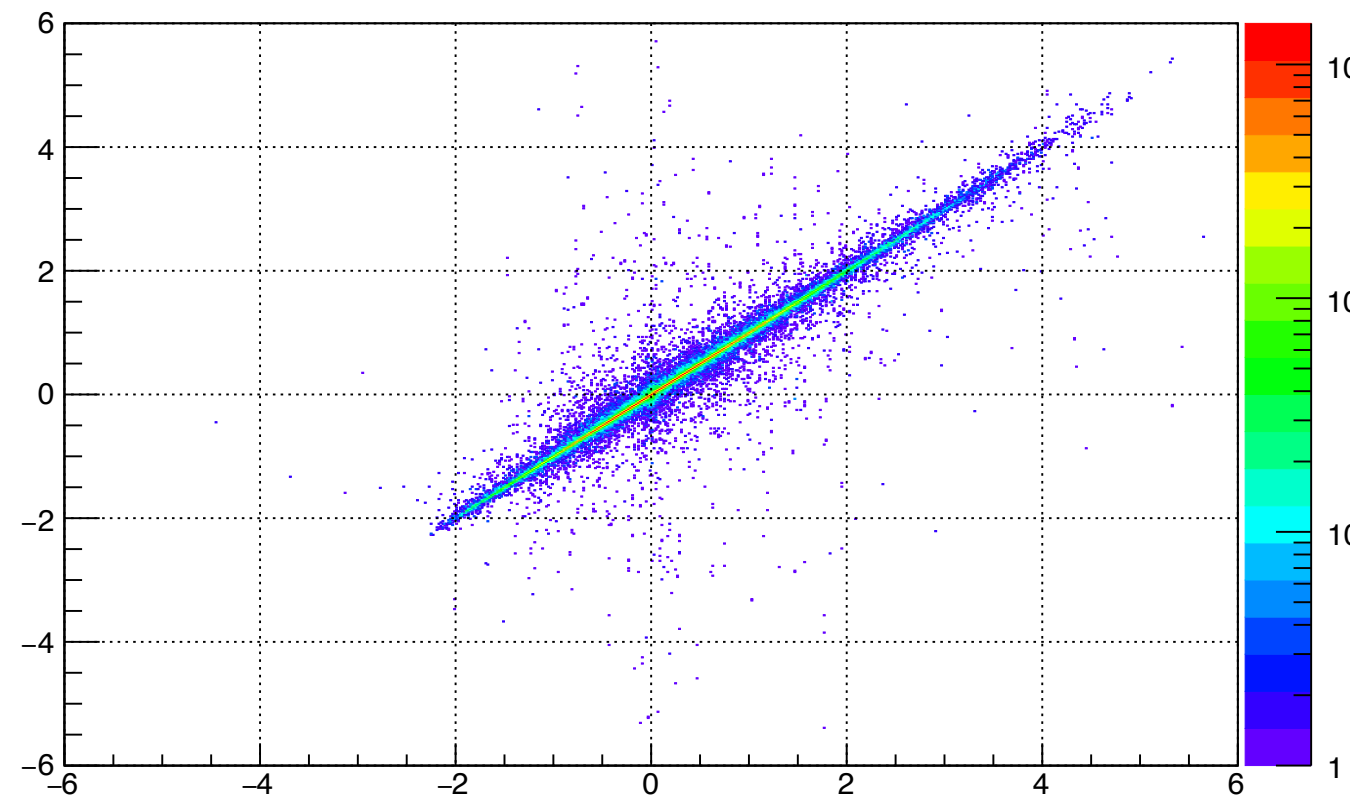


Λ (0: p^+ 1: π^-)

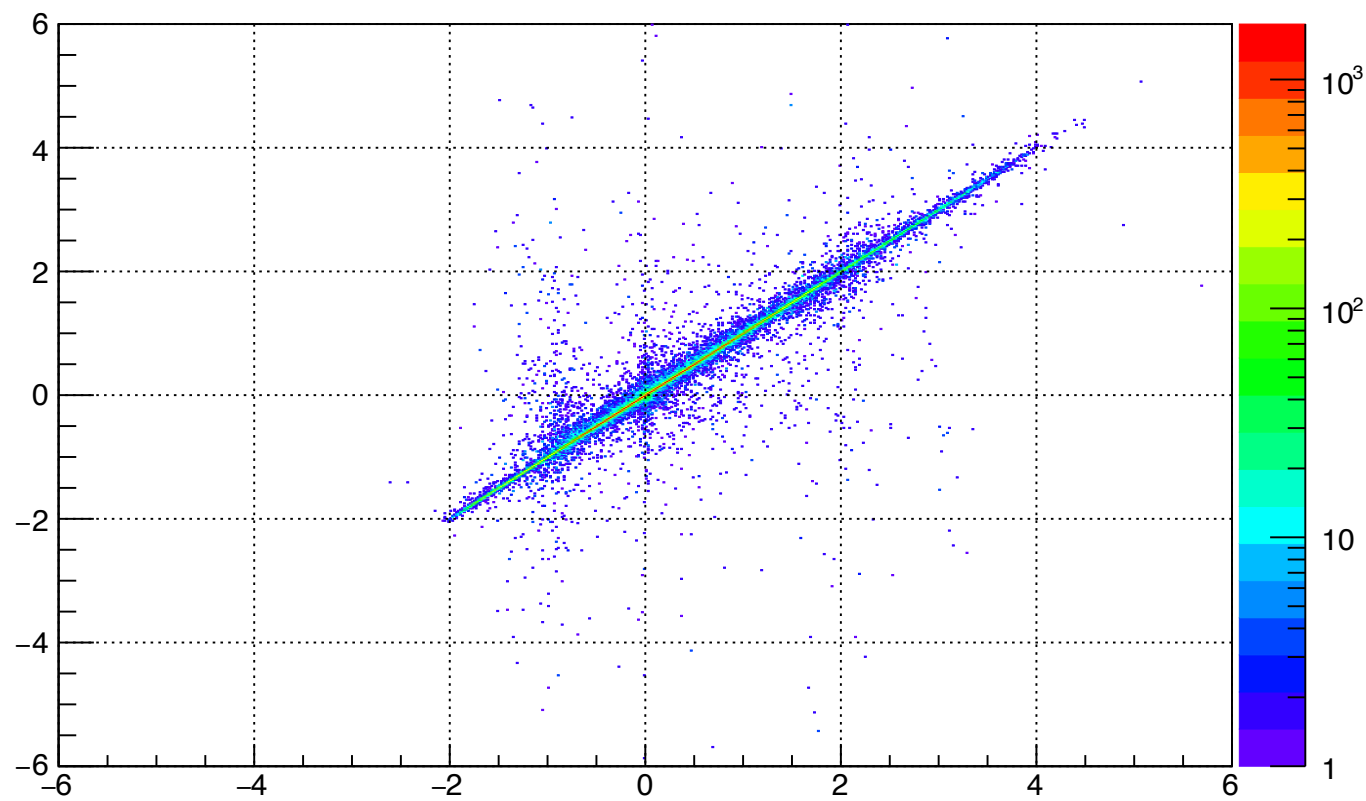
V0hcotTheta_0:MChcotTheta_0



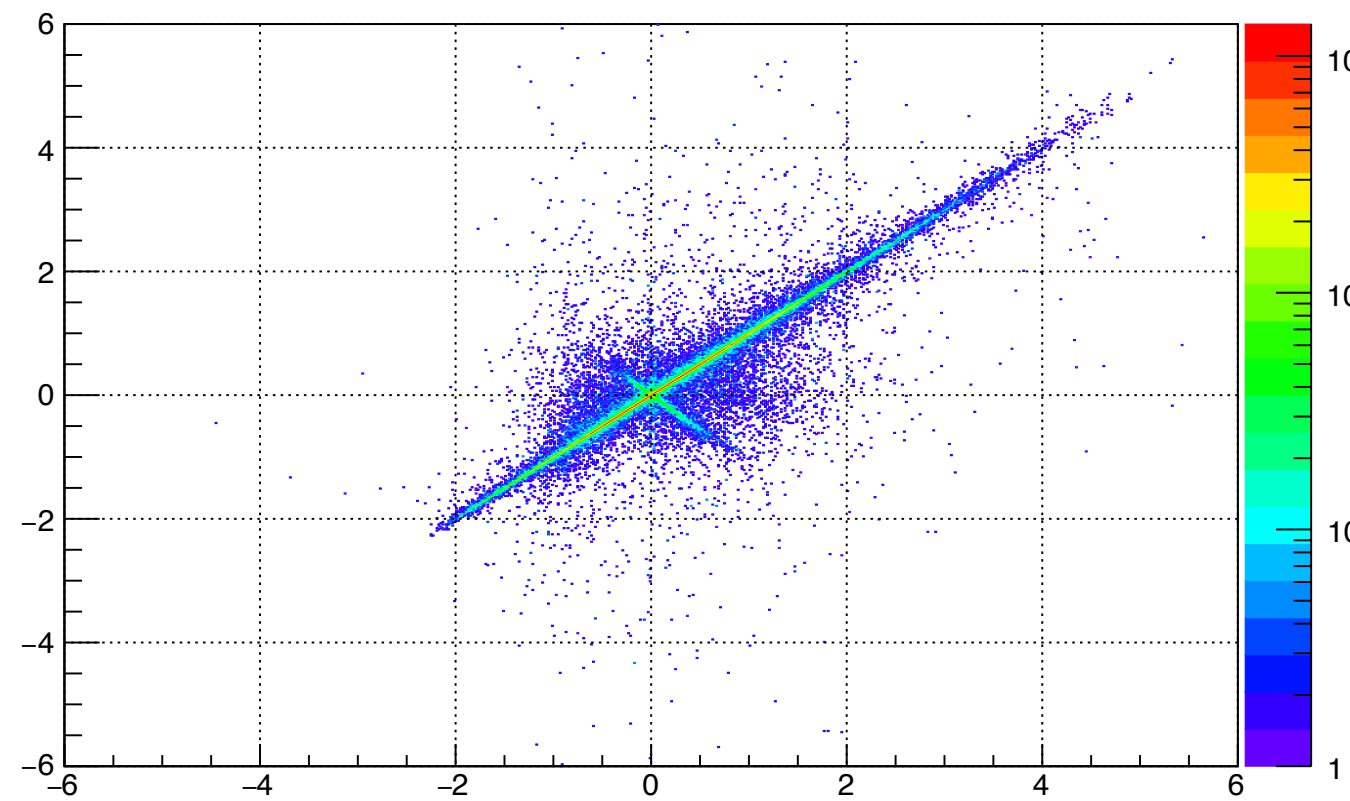
V0hcotTheta_1:MChcotTheta_1



TRKhcotTheta_0:MChcotTheta_0

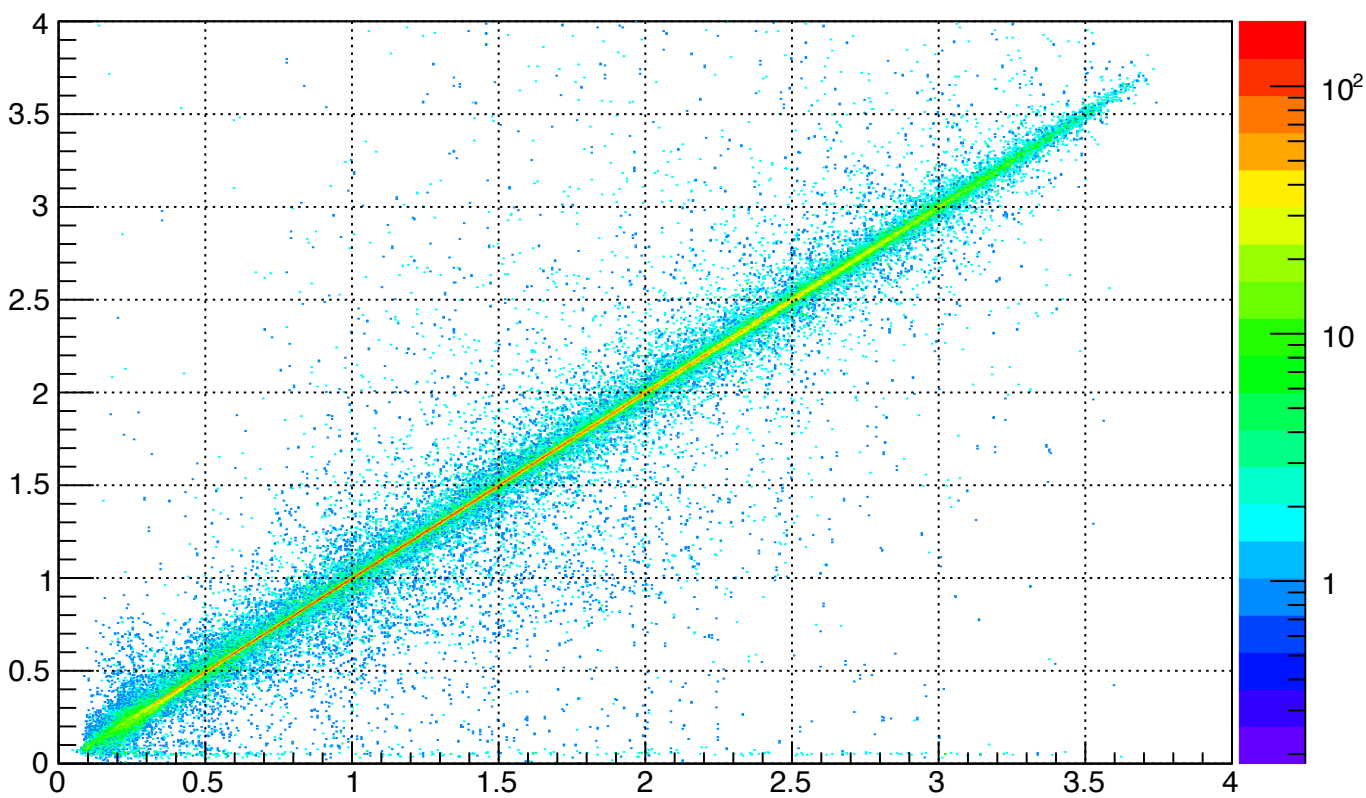


TRKhcotTheta_1:MChcotTheta_1

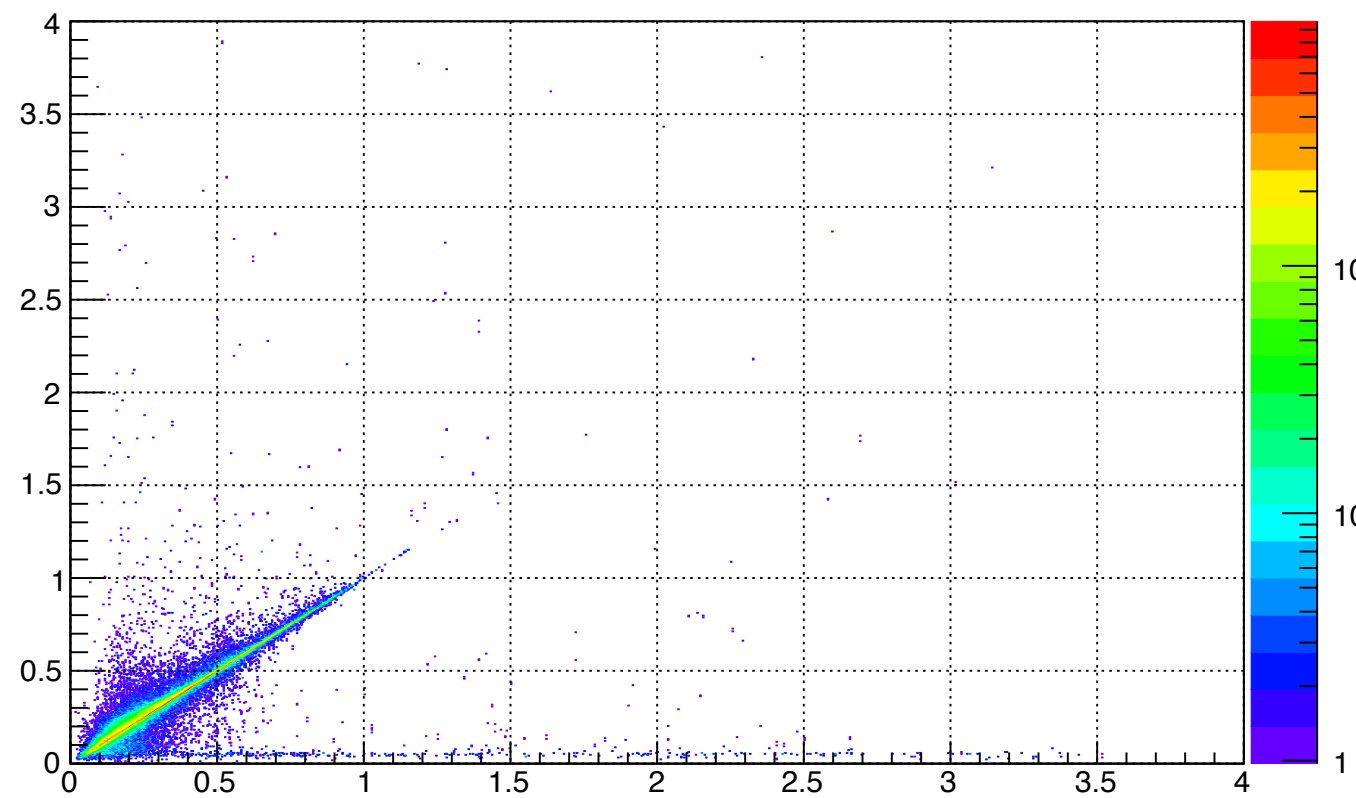


Λ (0: p^+ 1: π^-)

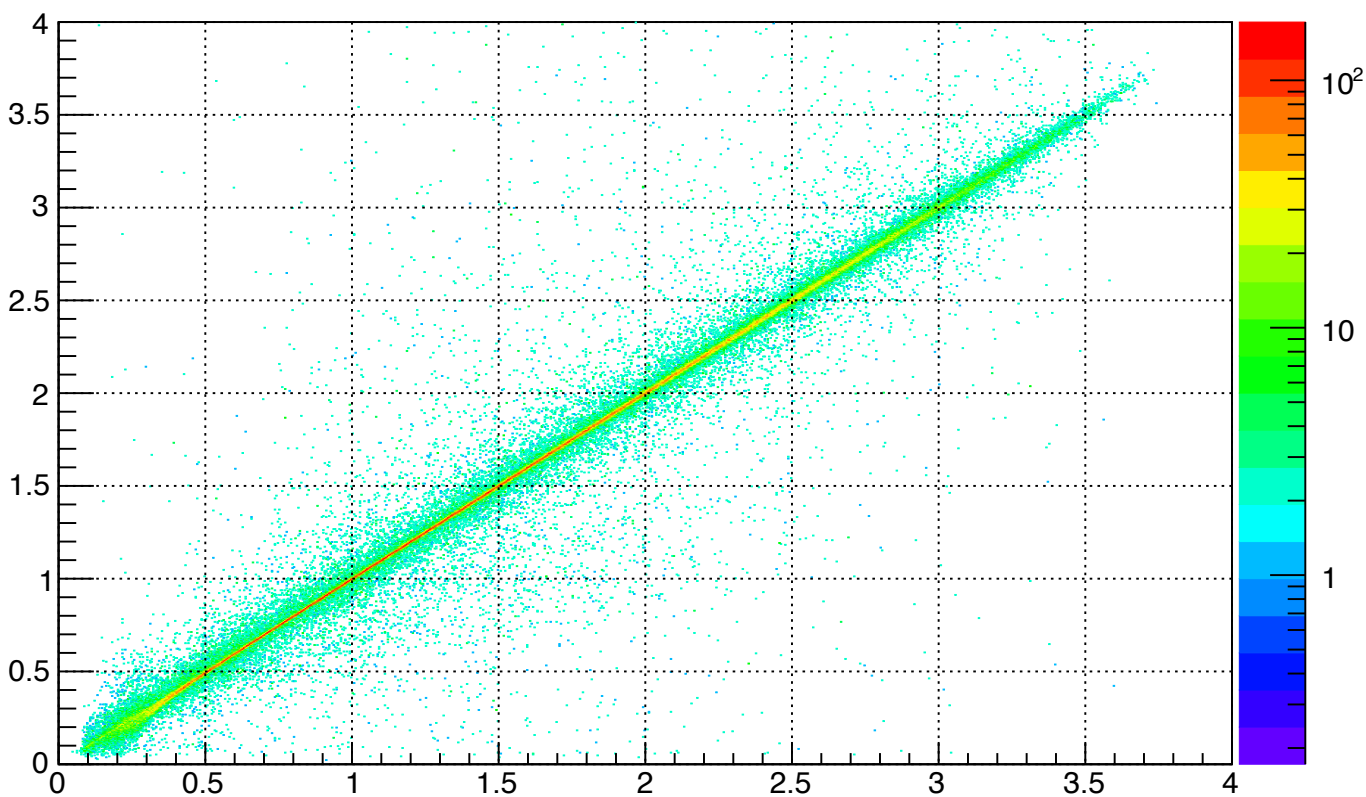
V0momentum_0.Perp():MChmomentum_0.Perp()



V0momentum_1.Perp():MChmomentum_1.Perp()



TRKmomentum_0.Perp():MChmomentum_0.Perp()



TRKmomentum_1.Perp():MChmomentum_1.Perp()

