

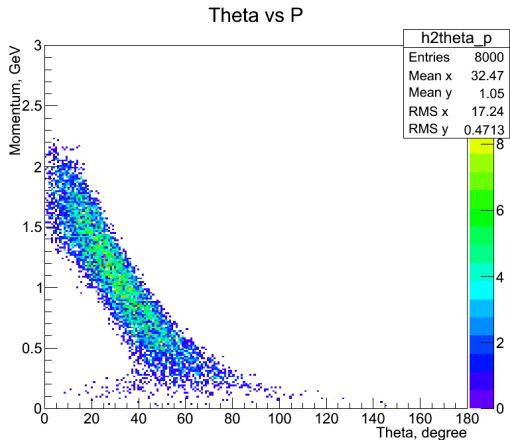
Kinematics of the reaction

$$p\bar{p} \rightarrow \eta_c \rightarrow \phi\phi \rightarrow K^+K^-K^+K^-,$$

$$E_{CM}=2980 \text{ MeV}, p_z=3677 \text{ MeV}$$

67 % of events have one K
with $\theta < 20^\circ$

8 % of events have one K
with $\theta < 5^\circ$

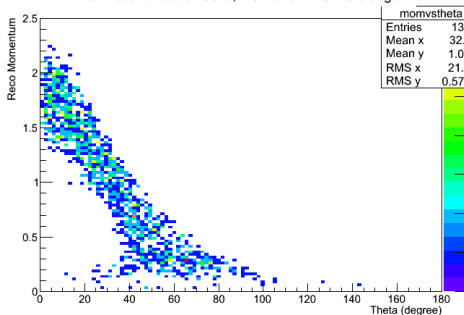


Non-reconstructed kaons

There is not corresponding tracks to primary MCTrack or reconstructed momentum outside 10% range

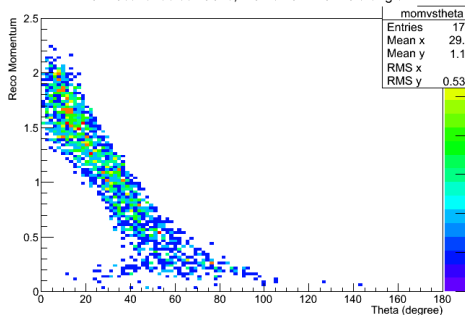
STT

Non-reconstructed kaons, Momentum VS theta angle



TPC

Non-reconstructed kaons, Momentum VS theta angle

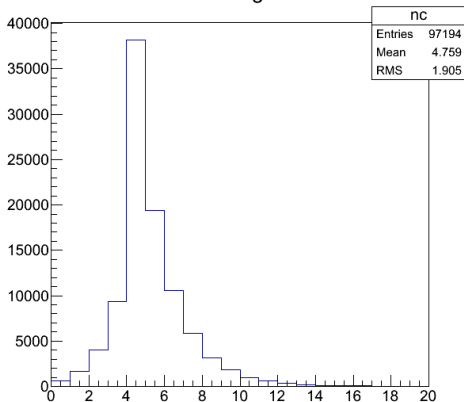


98k events on GRID - run 921 (STT) and 100k events run 971 (TPC)

- Charged candidates with opposite charge are combined to ϕ candidate with ϕ mass preselection $1.02 \pm 0.2 \text{ GeV}$
- Vertex fit is performed and best η_c candidate in each event is selected by minimal χ^2 .
- Events with ϕ candidate within mass window: $0.99 \text{ GeV} < m(K + K^-) < 1.05 \text{ GeV}$ are selected
- η_c mass window [2.90;3.06] GeV

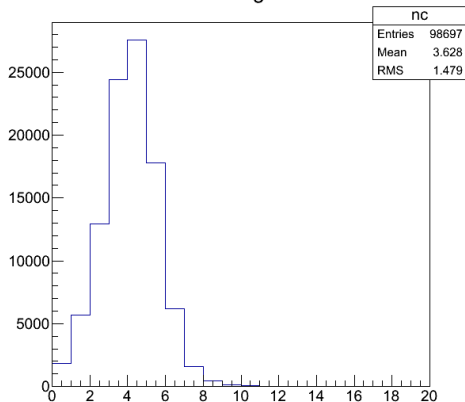
Number of reconstructed charged tracks

STT
n charged



83% ≥ 4 tracks

TPC
n charged

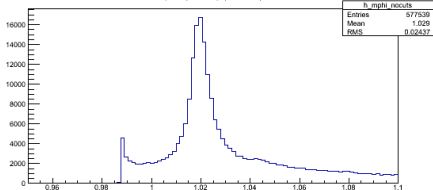


54% ≥ 4 tracks

Invariant mass (No cuts applied)

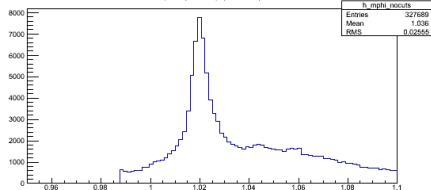
STT

$\phi: m(K+K^-)$ (nocuts)

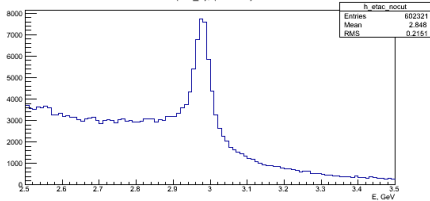


TPC

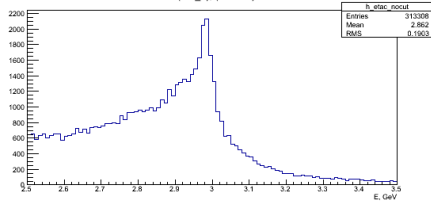
$\phi: m(K+K^-)$ (nocuts)



$m(\eta_c)$, (no cuts)



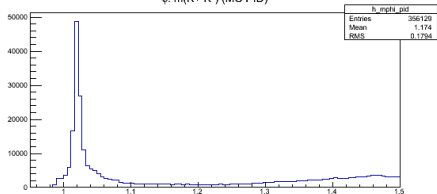
$m(\eta_c)$, (no cuts)



Monte Carlo based PID

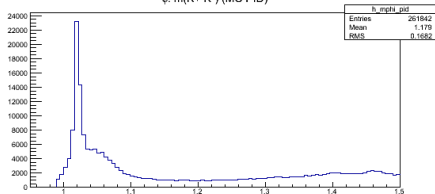
STT

ϕ : $m(K^+ K^-)$ (MC PID)

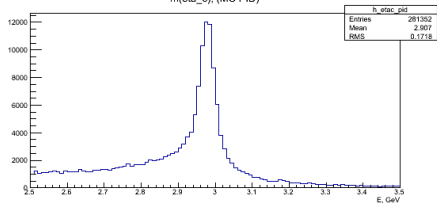


TPC

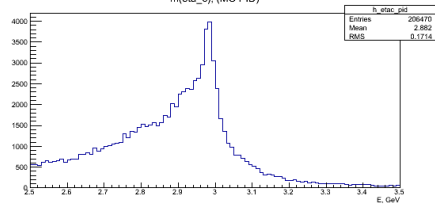
ϕ : $m(K^+ K^-)$ (MC PID)



$m(\eta_c)$, (MC PID)



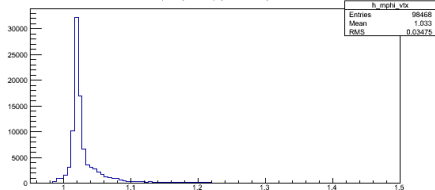
$m(\eta_c)$, (MC PID)



Best candidate from vertex fit

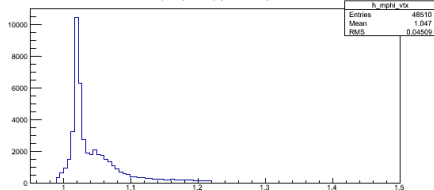
STT

ψ : $m(K^+ K^-)$ (Vertex fit)

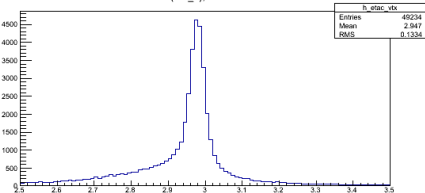


TPC

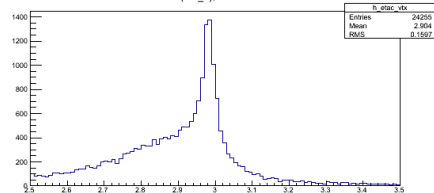
ψ : $m(K^+ K^-)$ (Vertex fit)



$m(\eta_c)$, Vertex fit



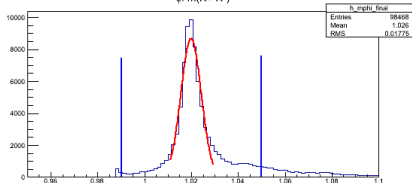
$m(\eta_c)$, Vertex fit



Cut on invariant mass

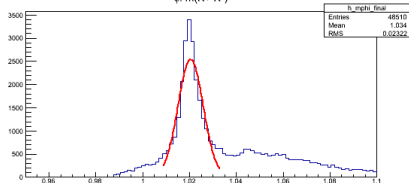
STT

ϕ : m(K+ K-)

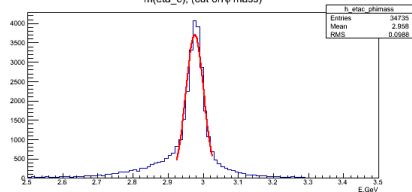


TPC

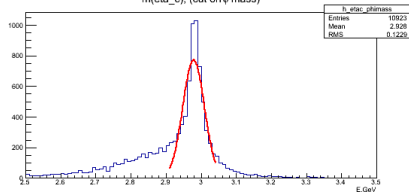
ϕ : m(K+ K-)



m(η_c), (cut on ϕ mass)



m(η_c), (cut on ϕ mass)



- $\sigma(\phi) = 4.4$ MeV
- $\sigma(\eta_c) = 25.4$ MeV
- $\varepsilon_{ff} = 26.4\%$

- $\sigma(\phi) = 5.4$ MeV
- $\sigma(\eta_c) = 30.8$ MeV
- $\varepsilon_{ff} = 6.7\%$