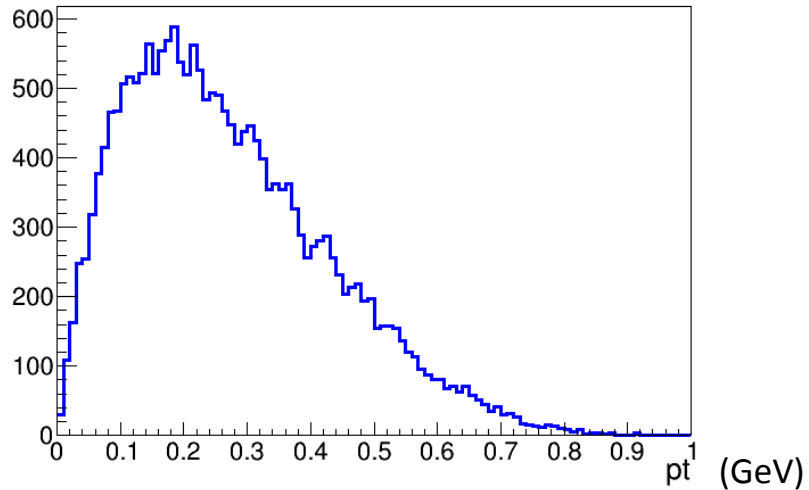# Status of Hough tracking

2016-12-8

outline

- Ks tag efficiency
- Chicj learning and checking
- Implement noise learning in HOUGH (by Yuan Jihong)
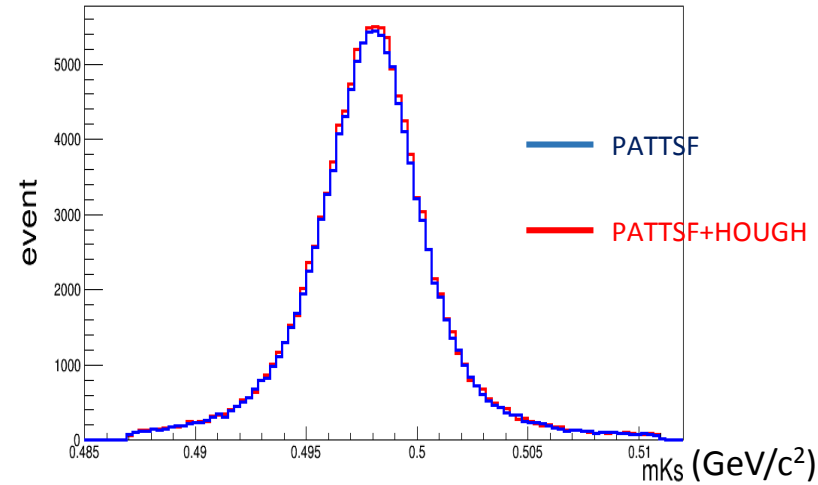- Preliminary double-tag result of (by prof. Zhang)

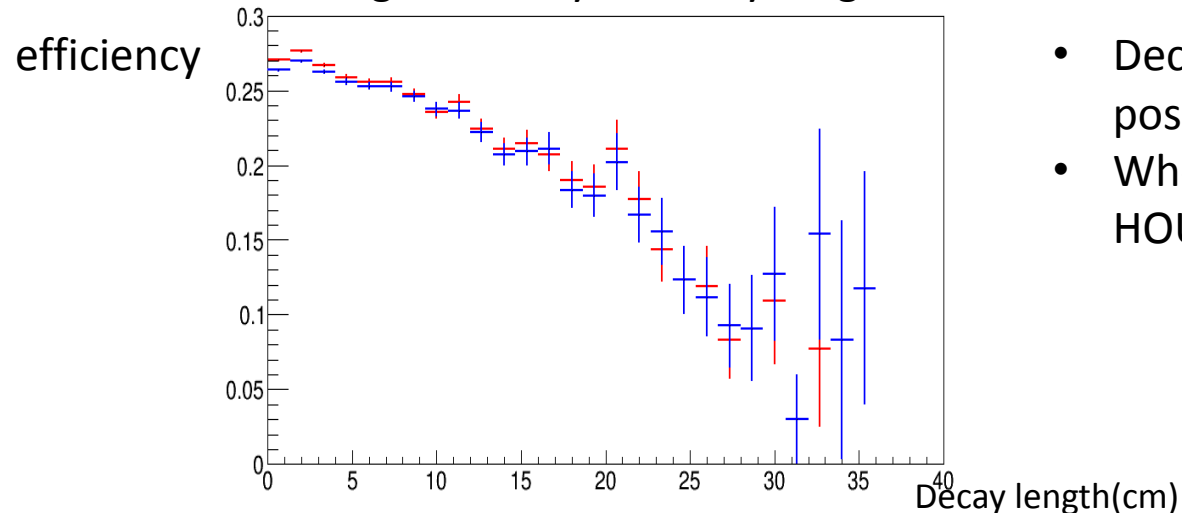# Ds⁻ -> K⁻Ks π⁰, Ks -> π⁺π⁻

pt distribution of π (from MC)

About 15% track inside (50~120MeV)

mass distribution of taged Ds

number of taged Ds ↑ 1.87% after HOUGH
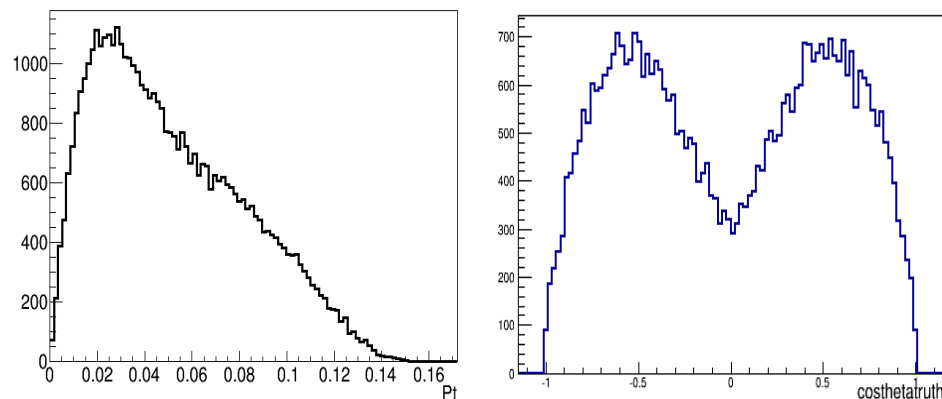
D tag efficiency vs decay length

- Decay length : from MC , the position of Ks decay to π⁺π⁻
- When decay length inside |25cm| HOUGH can improve tag efficiency

$\Psi' \rightarrow e^+ e^- \chi_{cJ}$, $\chi_{cJ} \rightarrow \Upsilon J/\Psi$, $J/\Psi \rightarrow l^+ l^-$
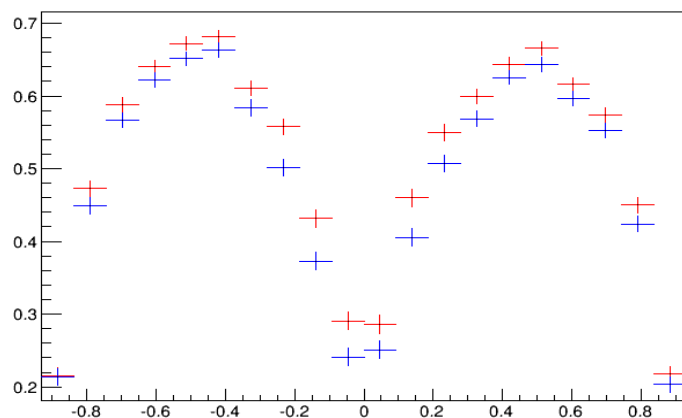
Pt distribution of e (from MC)   cos distribution of e (from MC)
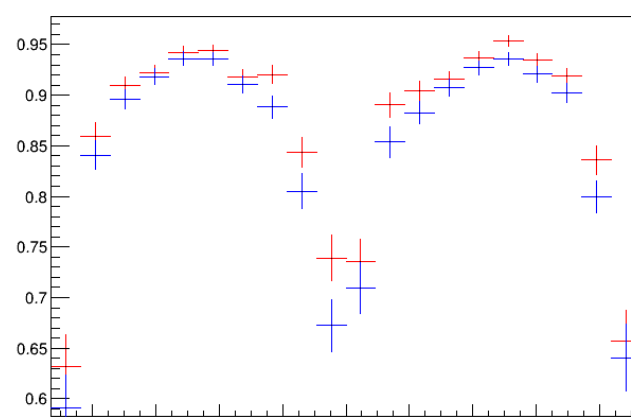

Event Selection :

- 2 lepton from J/ Ψ , at least one from Ψ'
- define tracks with a momentum larger than 1 GeV as leptons from J/
- 3 or 4 tracks
- one good photon
- 1C kinematic fit
    - chi2<5 (e$^+$ e$^-$ (missing) l$^+$ l$^-$ Υ , 1C fit)
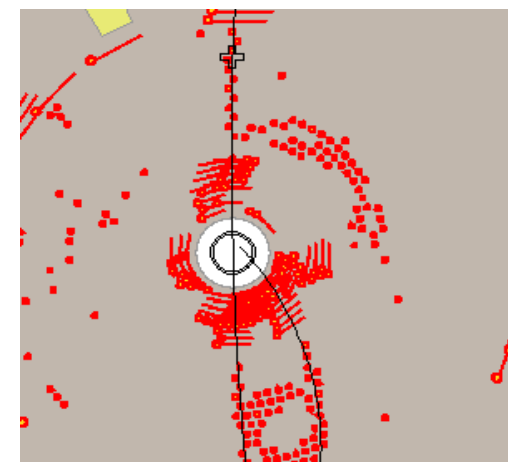   - m(l$^+$ l$^-$)>3.06GeV && m(l$^+$ l$^-$)<3.14GeV
    - m(ΥJ/ Ψ)>3.49GeV

From pt (0~160MeV)   From pt (50~160MeV)

PATTSF

PATTSF+HOUGH

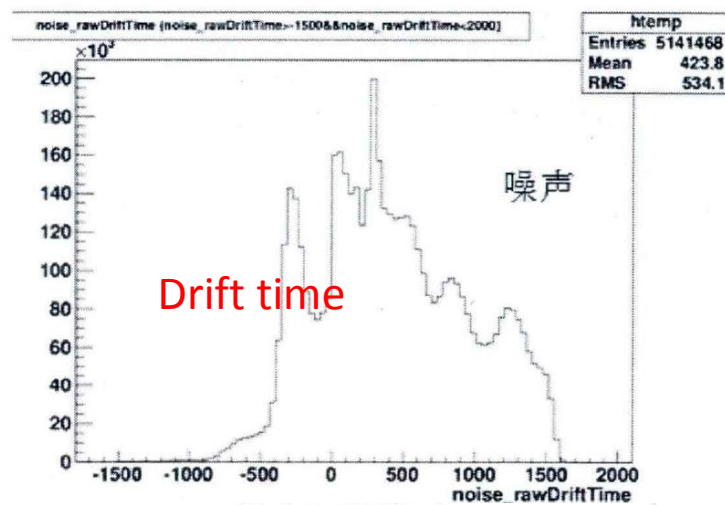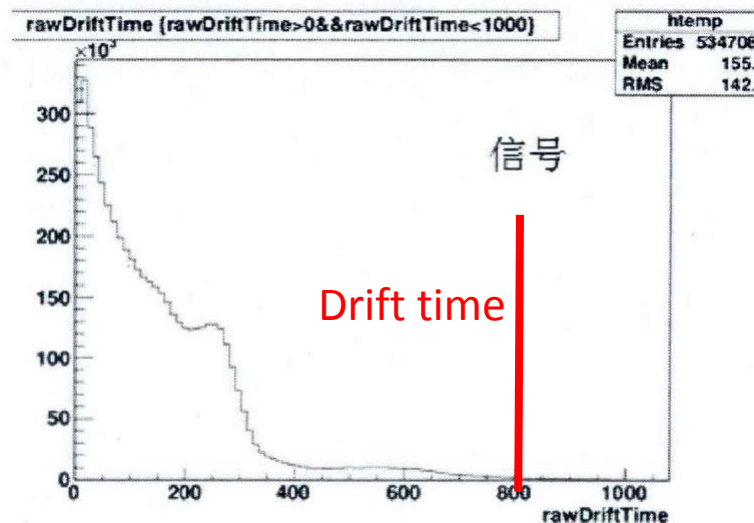Tracking efficiency ↑ 2.6%   Tracking efficiency ↑ 1.5%   Particle e performs different from pion
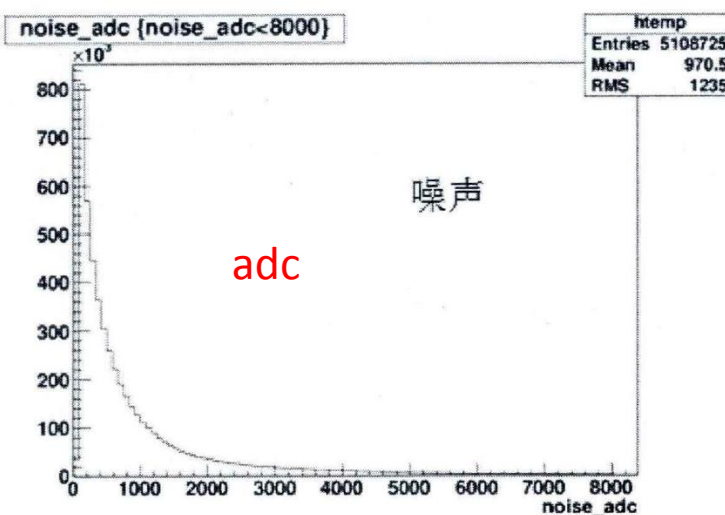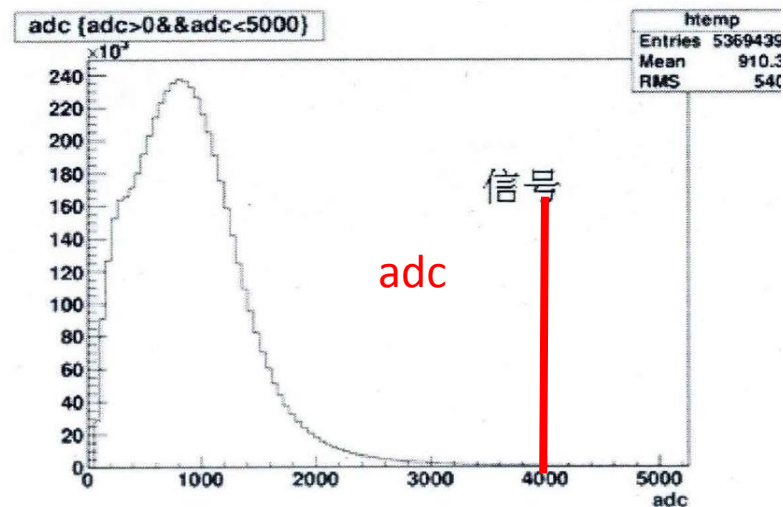
Noise Learning

By Yuan Jihong

From barrel barbar events , run 26865
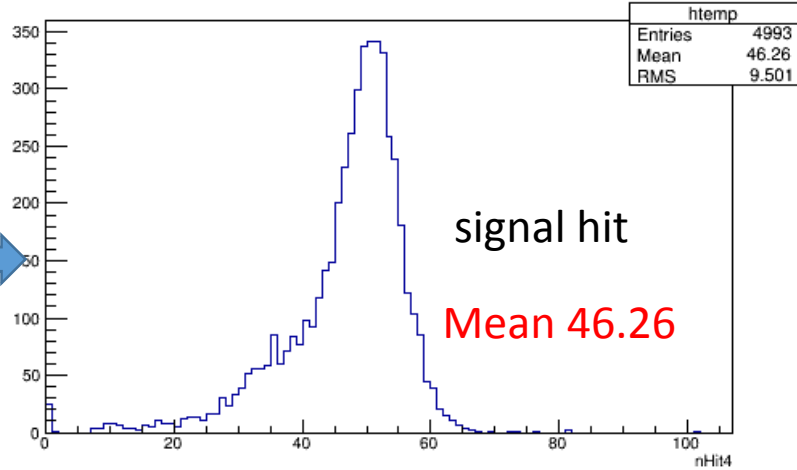

(0,800)

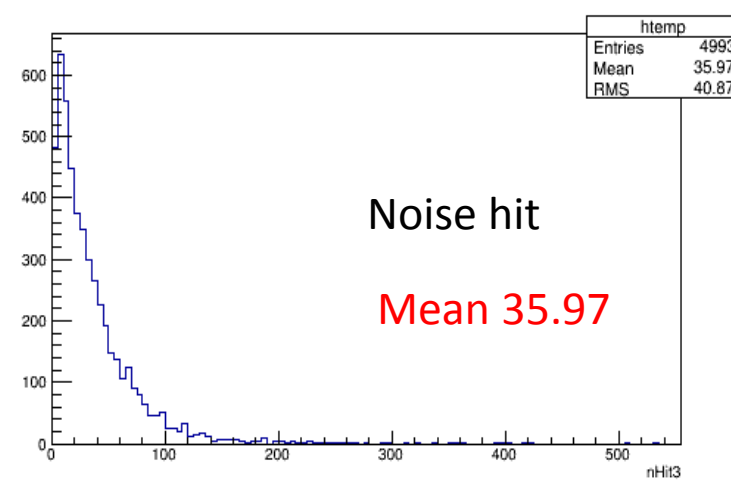(0,4000)

Noise Learning

- Cut condition by Yuan
  - Three continues hits in a layer
  - Drifttime (0,800)
  - Adc (0,4000)
- Think of low pt , implement in HOUGH
  - Don't apply for inner chamber
  - 5 continues hits in a layer
  - Drifttime (0,800)
  - Don't use adc imformation (Can't get right noise hit adc from MC)
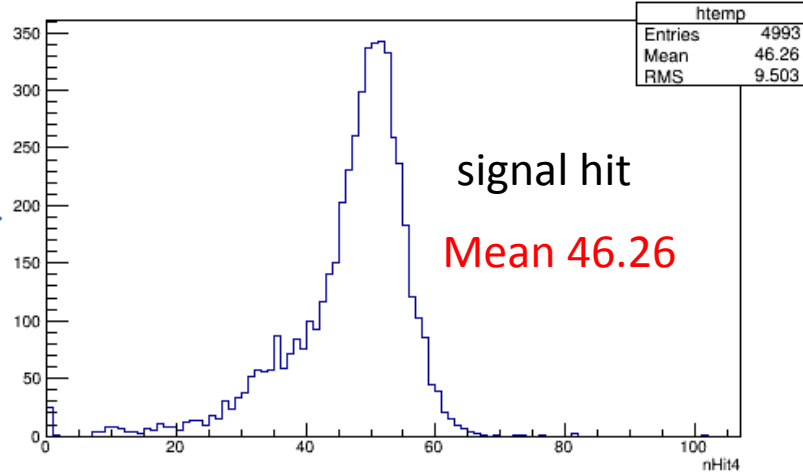
From 60MeV fixpt single track events
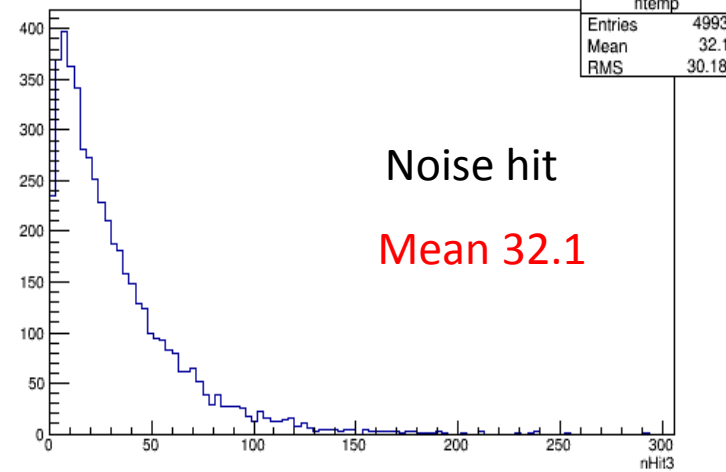5000 events

Hit distribution of 5000 events

htemp	
Entries	4993
Mean	46.26
RMS	9.501

Before cut noise
hit method

signal hit

Mean 46.26

Hit distribution of 5000 events

htemp	
Entries	4993
Mean	35.97
RMS	40.87

Noise hit

Mean 35.97

Hit distribution of 5000 events

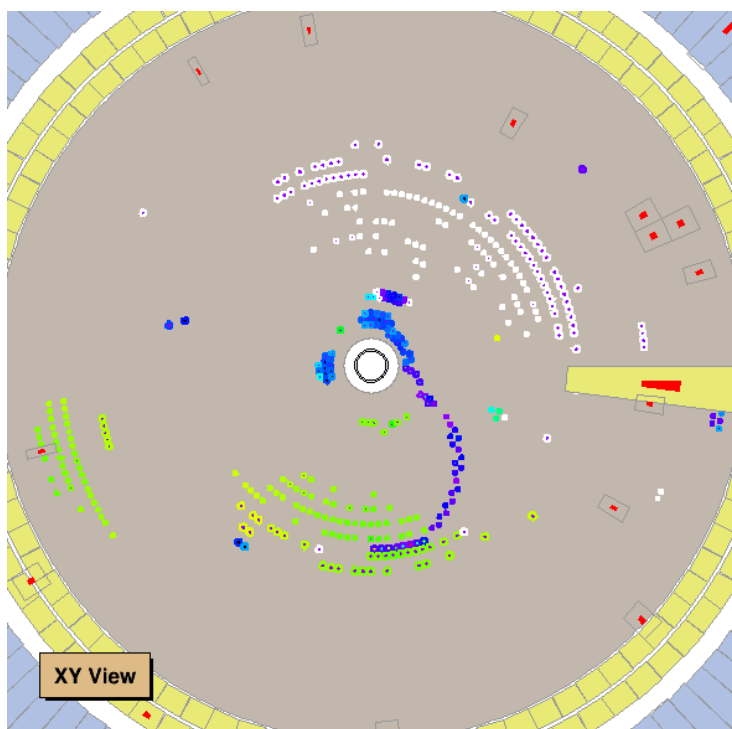| htemp	
Entries	4993
Mean	46.26
RMS	9.503

After cut noise hit
method

signal hit

Mean 46.26

Hit distribution of 5000 events

htemp	
Entries	4993
Mean	32.1
RMS	30.18

Noise hit
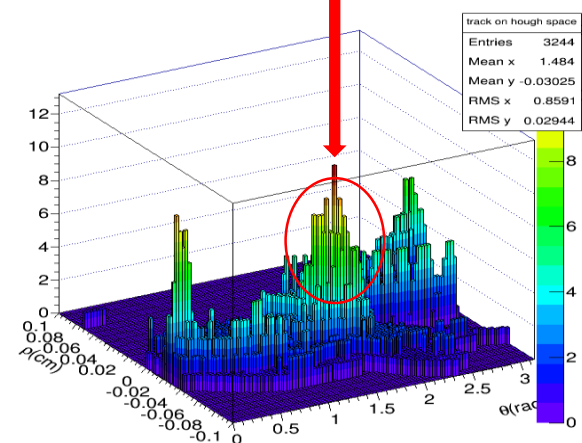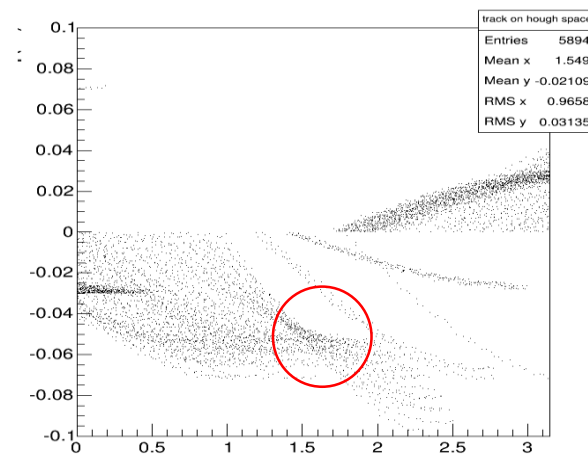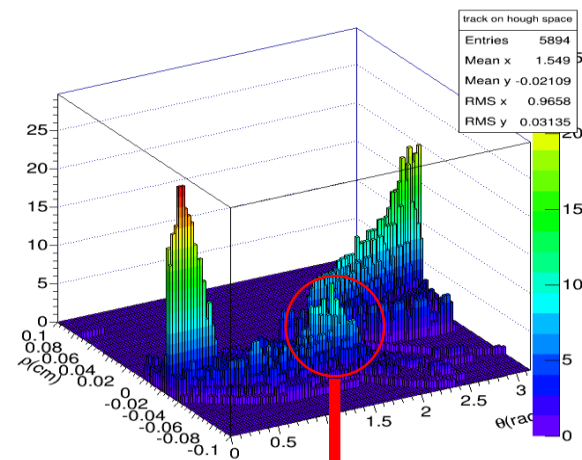
Mean 32.1

After cutting noise method , noise hit ratio of every events drop about 3.9 hits
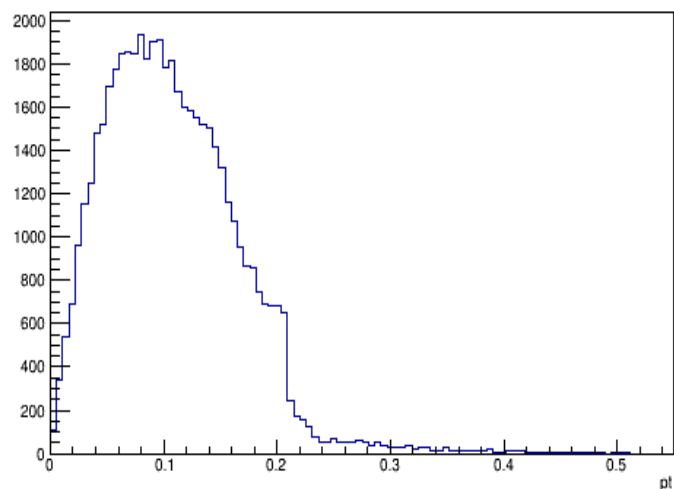
Efficiency of 60MeV : 70.5% -> 70.8%
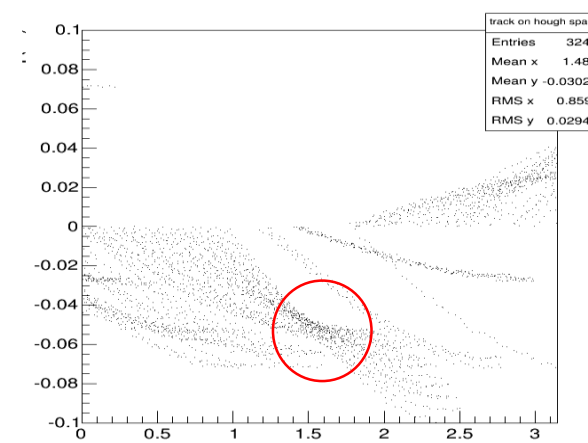
This method is useful for some special events , not performs good significantly for tracking
Don't going on to learn this method
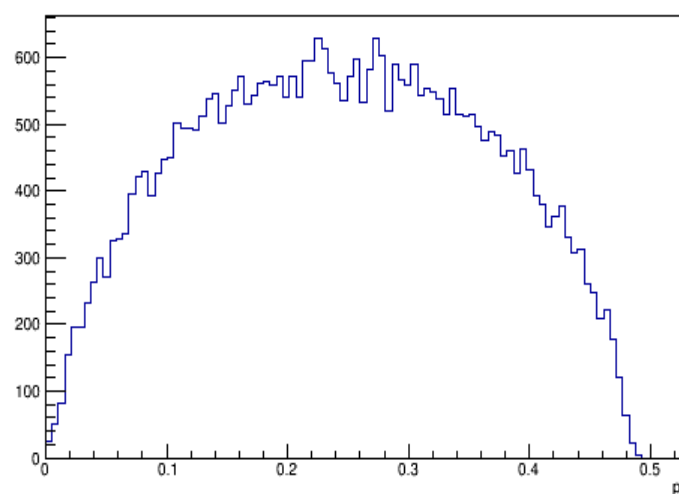
Preliminary performance check by

psi(2S)-->Omega- Omega+, Omega-->K Lambda, Lambda-->proton pi

By prof.Zhang
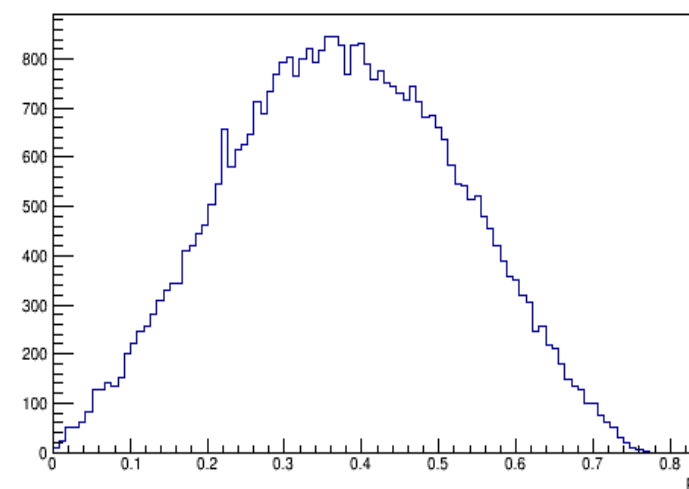
pt distribution of π (from MC)   pt distribution of k (from MC)   pt distribution of p (from MC)

From MC truth

After HOUGH , double-tag efficiency increased 5%

- On doing :
- learn TSF package
  - Fix Runge kutta fitting for low pt
  - Try to Implement method conformal transform(TSF ,including drift distance) , maybe useful for multi-turn tracks
- Inclusive MC pipijpsi is producing