status of analysis $\bar{p}\,p \rightarrow Y(4260) \rightarrow J/\psi\,\pi^0\pi^0 \rightarrow e^-\,e^+\,4\gamma$

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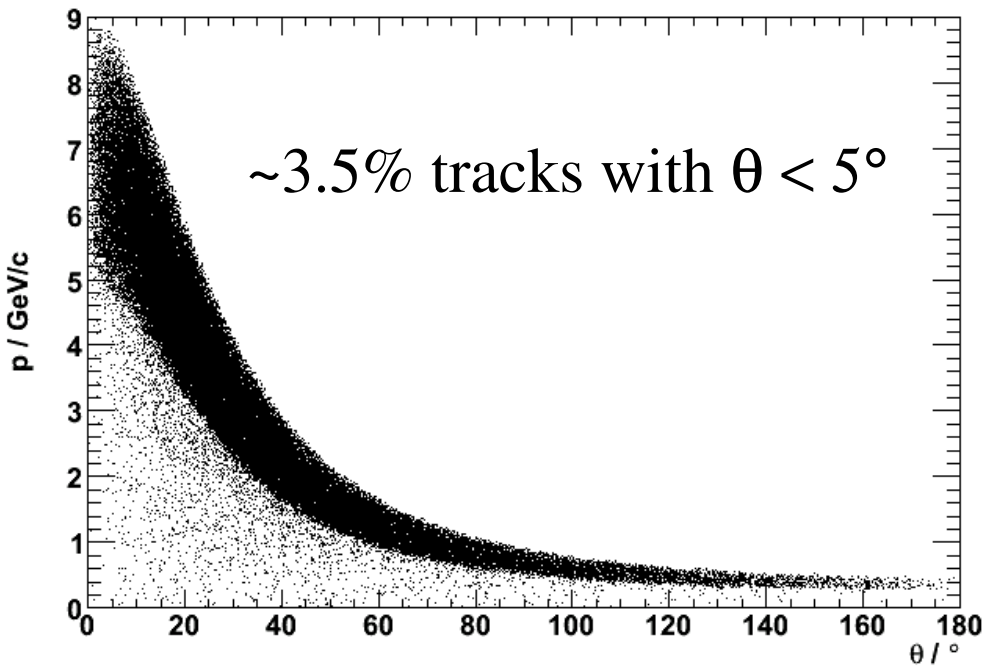
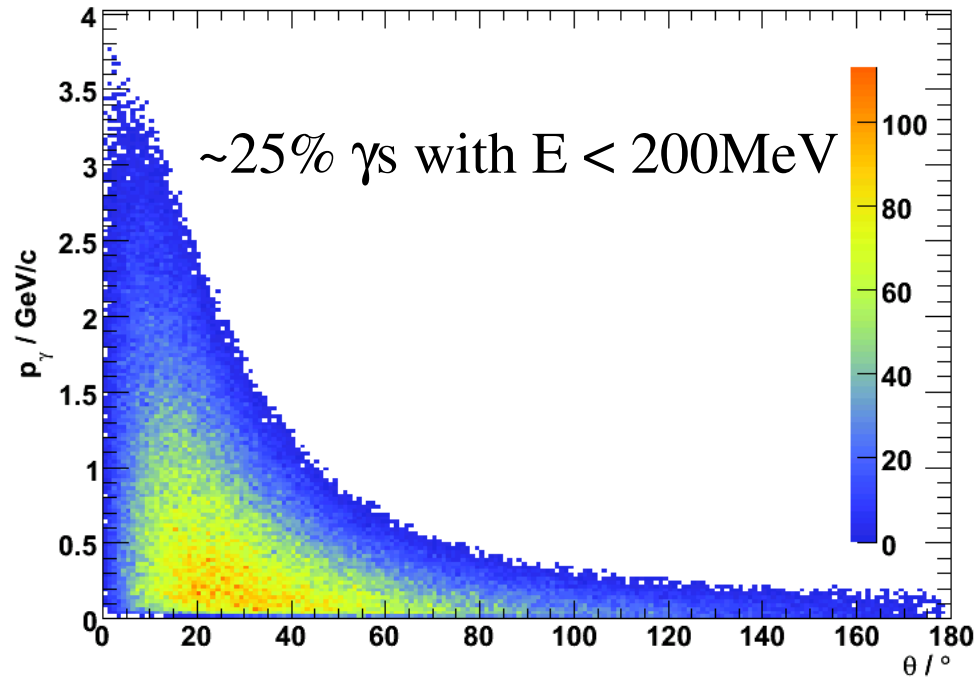
momentum distribution of generated particles for the reaction $\bar{p}\,p \rightarrow Y(4260) \rightarrow J/\psi\,\pi^0\pi^0 \rightarrow e^-\,e^+\,4\gamma$

$p_{\bar{p}} = 8.6819\,GeV/c$

momentum vs θ for electrons/positrons



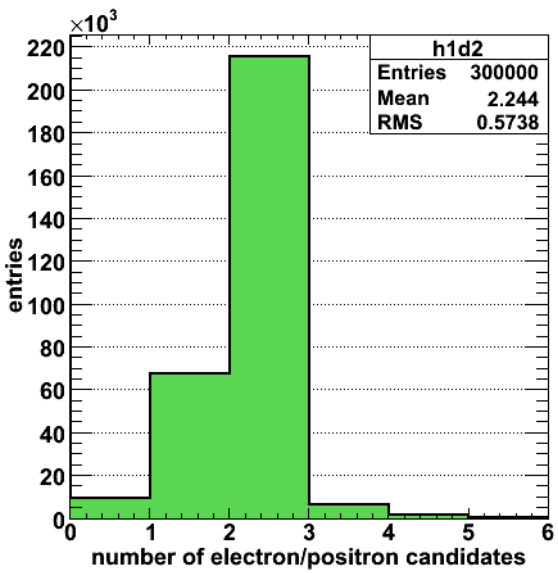
momentum vs θ for photons



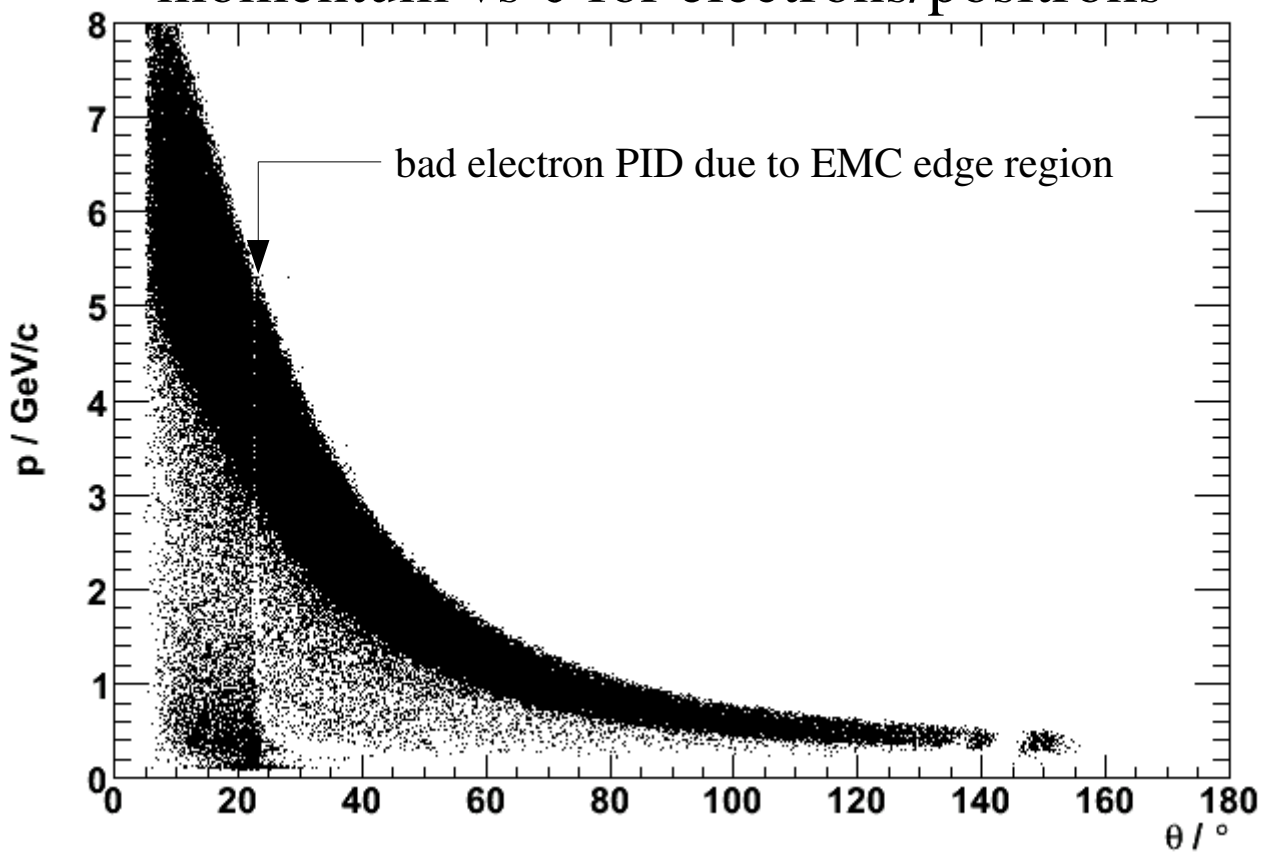
package photos is used for QED photon radiative corrections in J/ψ decays

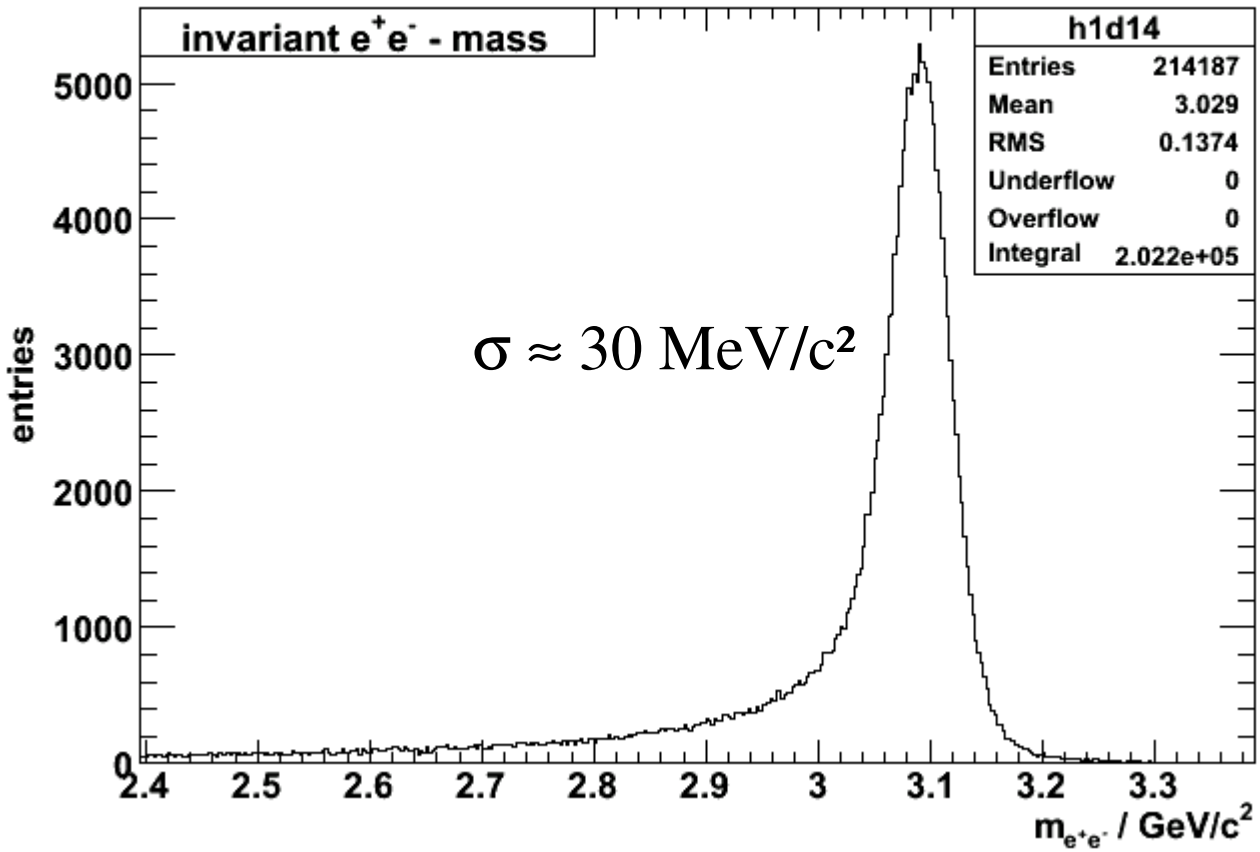
For efficiency studies 300K $\bar{p}\,p \rightarrow J/\psi\,\pi^0\pi^0 \rightarrow e^-\,e^+\,4\gamma$- events @ $\sqrt{s}=4.26\,GeV$ (phasespace distributed) simulated

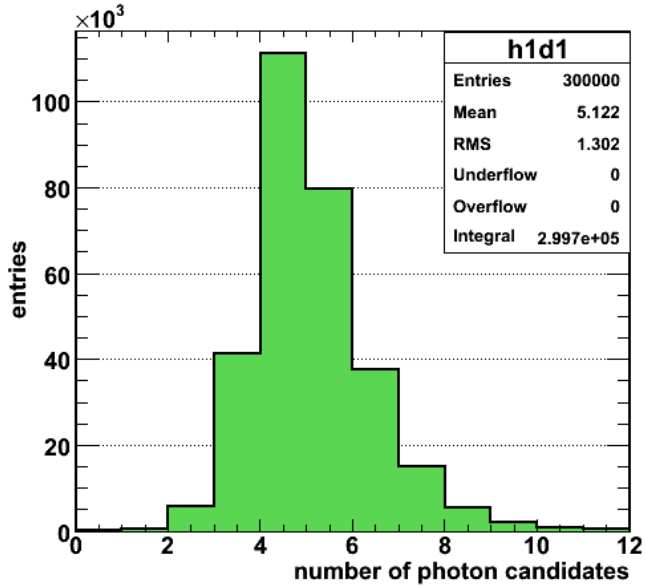
- only tracking detectors in target spectrometer (Mvd,Stt,Dch) are used in track reconstruction
- ElectronCombinedLHLoose list is used for electrons / positrons (see Bertrams talk)



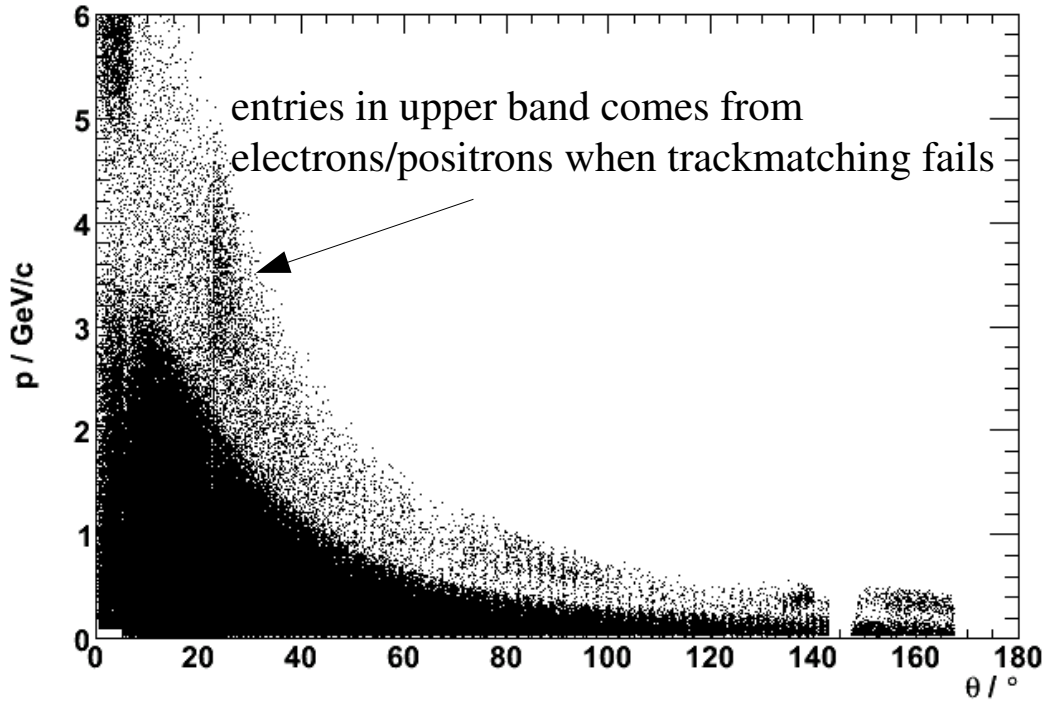
momentum vs θ for electrons/positrons



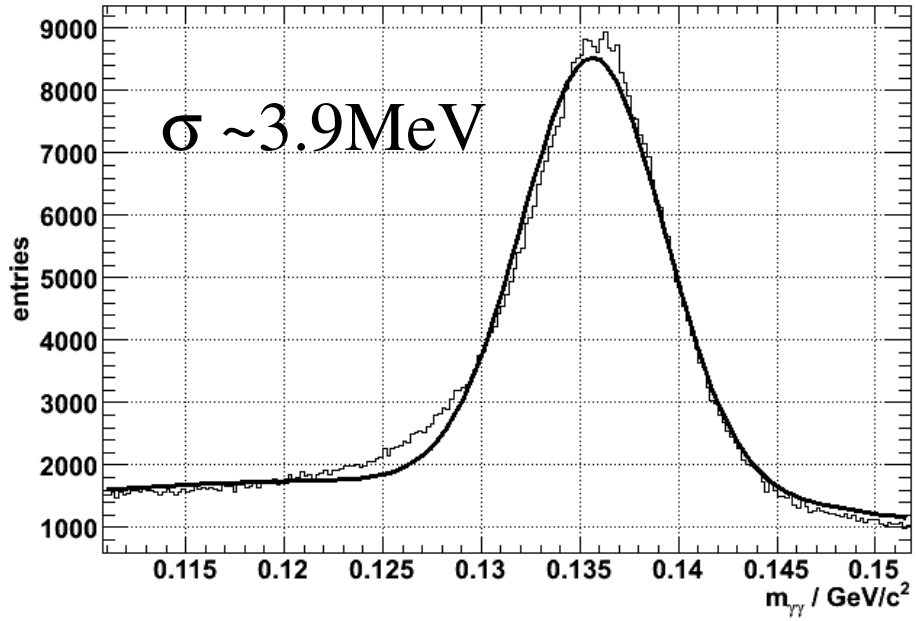

invariant e+e- - mass
h1d14
Entries 214187
Mean 3.029
RMS 0.1374
Underflow 0
Overflow 0
Integral 2.022e+05
σ ≈ 30 MeV/c²
entries
5000
4000
3000
2000
1000
0
2.4
2.5
2.6
2.7
2.8
2.9
3
3.1
3.2
3.3
m_e+e- / GeV/c²



momentum vs θ for reconstructed photons



invariant γγ - mass

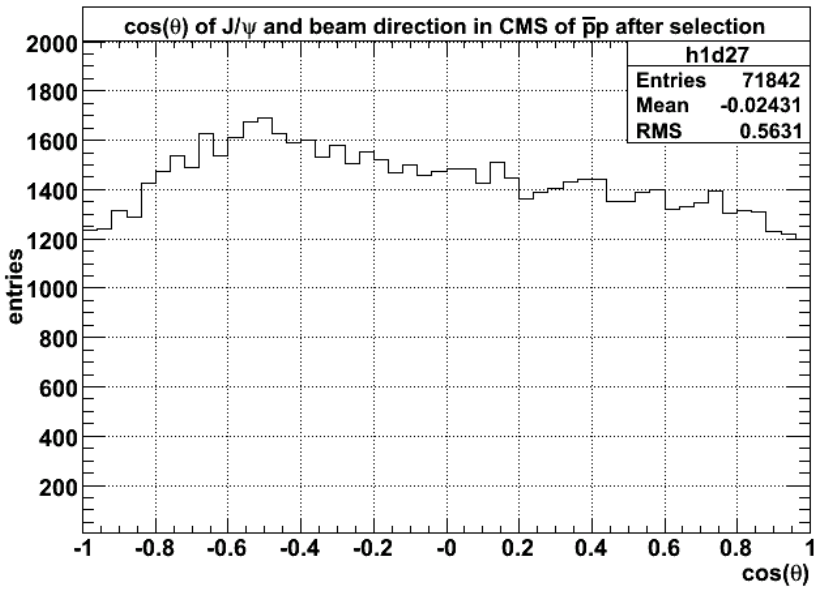


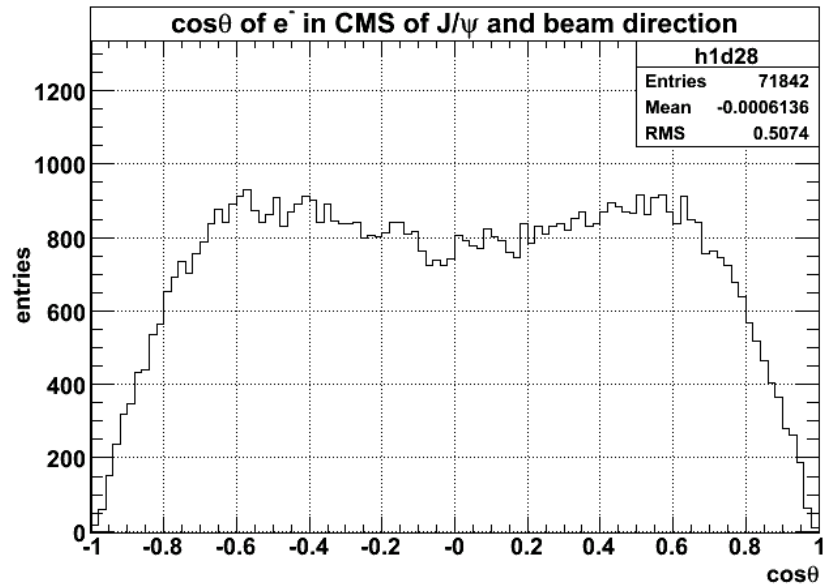
applied cuts:

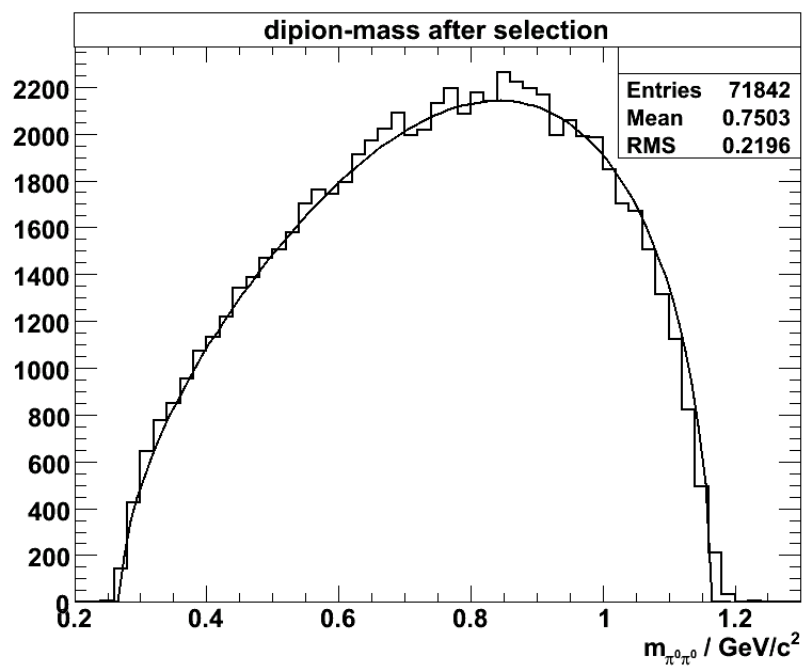
- exactly 2 reconstructed charged tracks
- 3.0 GeV/c² < J/ψ -mass < 3.15 GeV/c²
- J/Ψ vertexing confidential level > 0.01
- 0.12 GeV/c² < π°-mass < 0.15 GeV/c²
- angle between dipion and J/ψ in CM of pp > 177°
- 4.11 GeV/c² < reconstructed Y(4260)-mass < 4.41 GeV/c²
- -0.2 GeV/c < px of Y(4260) < 0.2 GeV/c
- -0.2 GeV/c < py of Y(4260) < 0.2 GeV/c
- 8.48 GeV/c < pz of Y(4260) < 8.88 GeV/c
- choose best(nearest to $\sqrt{s}$) Y(4260) candidate
  if there are more than one candidate in one event

→ 24 % selection efficiency

angular and dipionmass distribution for phasespace distributed events





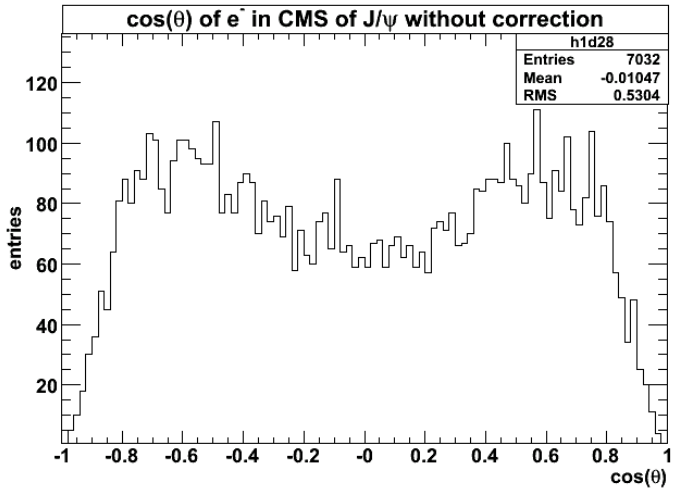


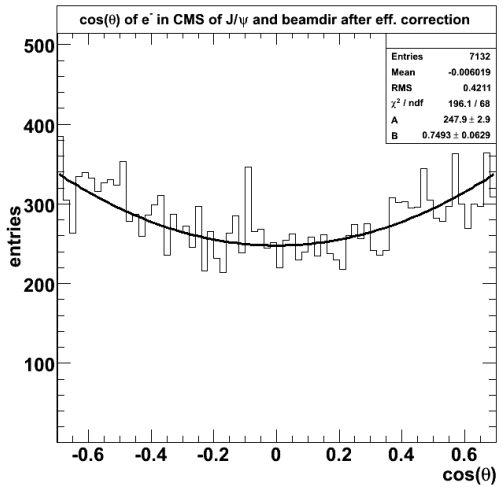
30K simulated events pp->Y(4260)->J/Psi π° π°

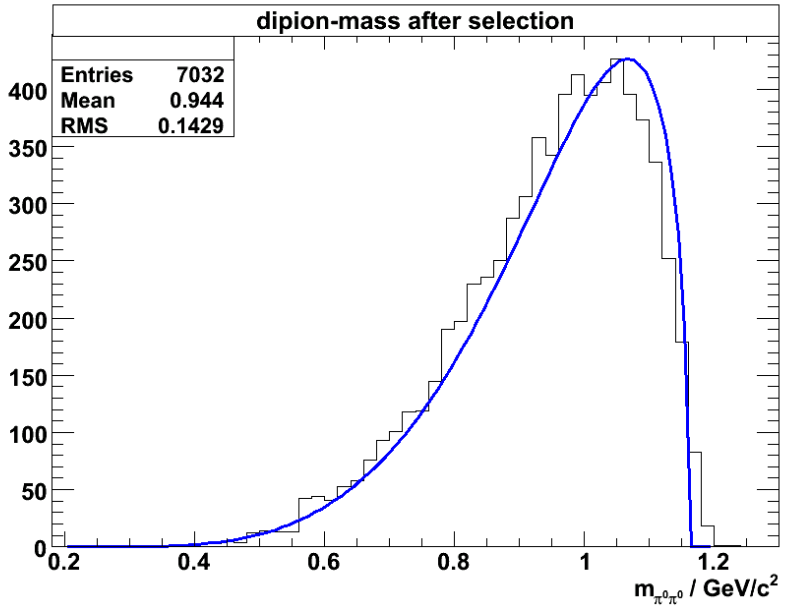
cos(θ) of e- in cms of J/ψ and beamdirection: $1 + 0.7 * \cos^2(\theta)$

ψ(2S)-like dipion mass distribution

→ selection efficiency ~23.5% (for phasespace ~24%)

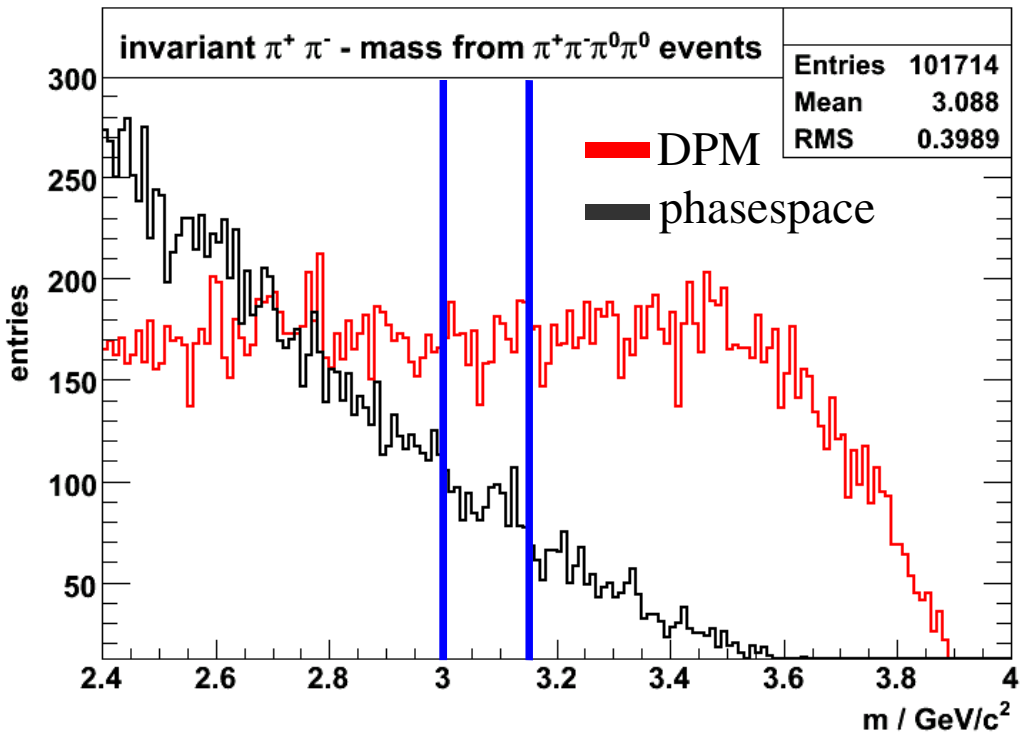






background channel: $\bar{p}\,p \rightarrow \pi^+\ \pi^-\ \pi^0 \pi^0 \quad @\sqrt{s} = 4.26\,GeV$

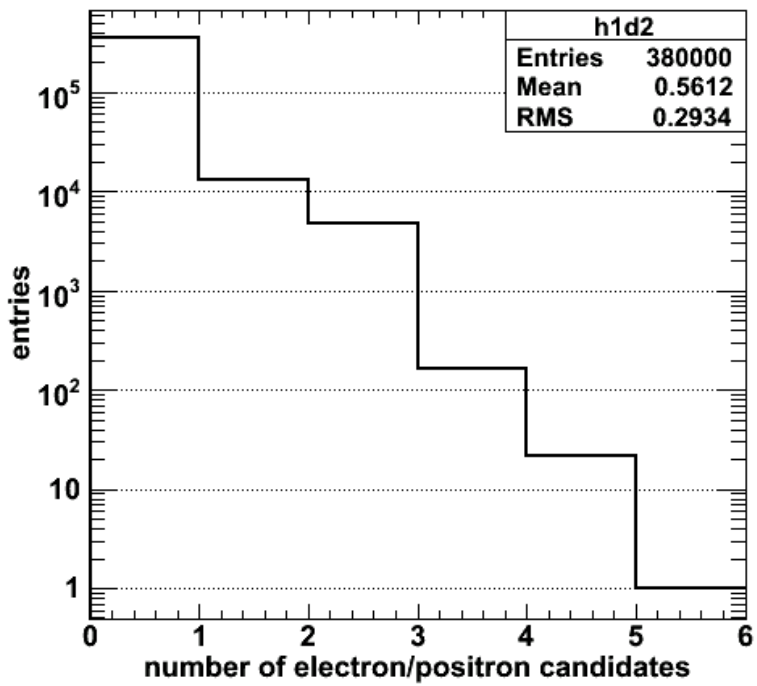
in 10^8 events from DPM event generator 10^5 $\pi^+\ \pi^-\ \pi^0 \pi^0$ events are found ~ 50 μb

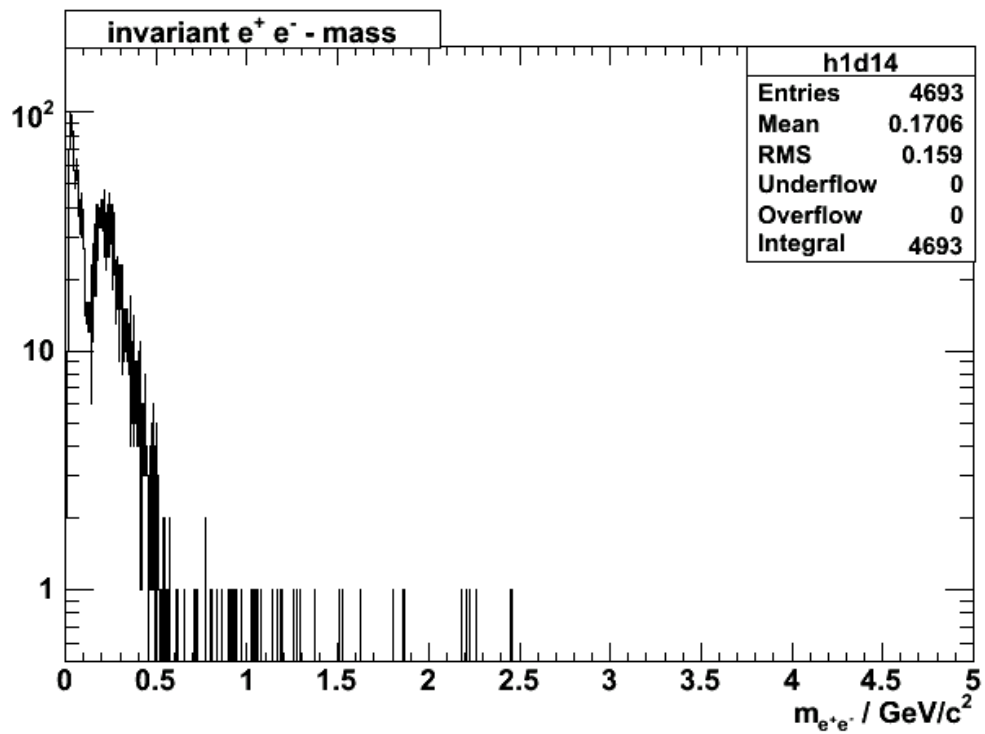


DPM event generator:
2560 events in 3.0 < m < 3.15

phasespace distribution:
1353 events in 3.0 < m < 3.15

result for 380K simulated $\bar{p}\,p \rightarrow \pi^{+}\ \pi^{-}\ \pi^{0}\pi^{0}$ (phasespace distributed) events





0 events pass the selection

next things to do:

- background studies with more statistic
- study of influence of EMC parameters (energy thesholds) for this channel
- electron/positron in FS region
- kinematic fit