Ecms calibration

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Outline

- Momentum correction
- Ecms check
- Λc cross section check

Data samples

- Data samples : 104 energy points from 3.85 – 4.59 GeV

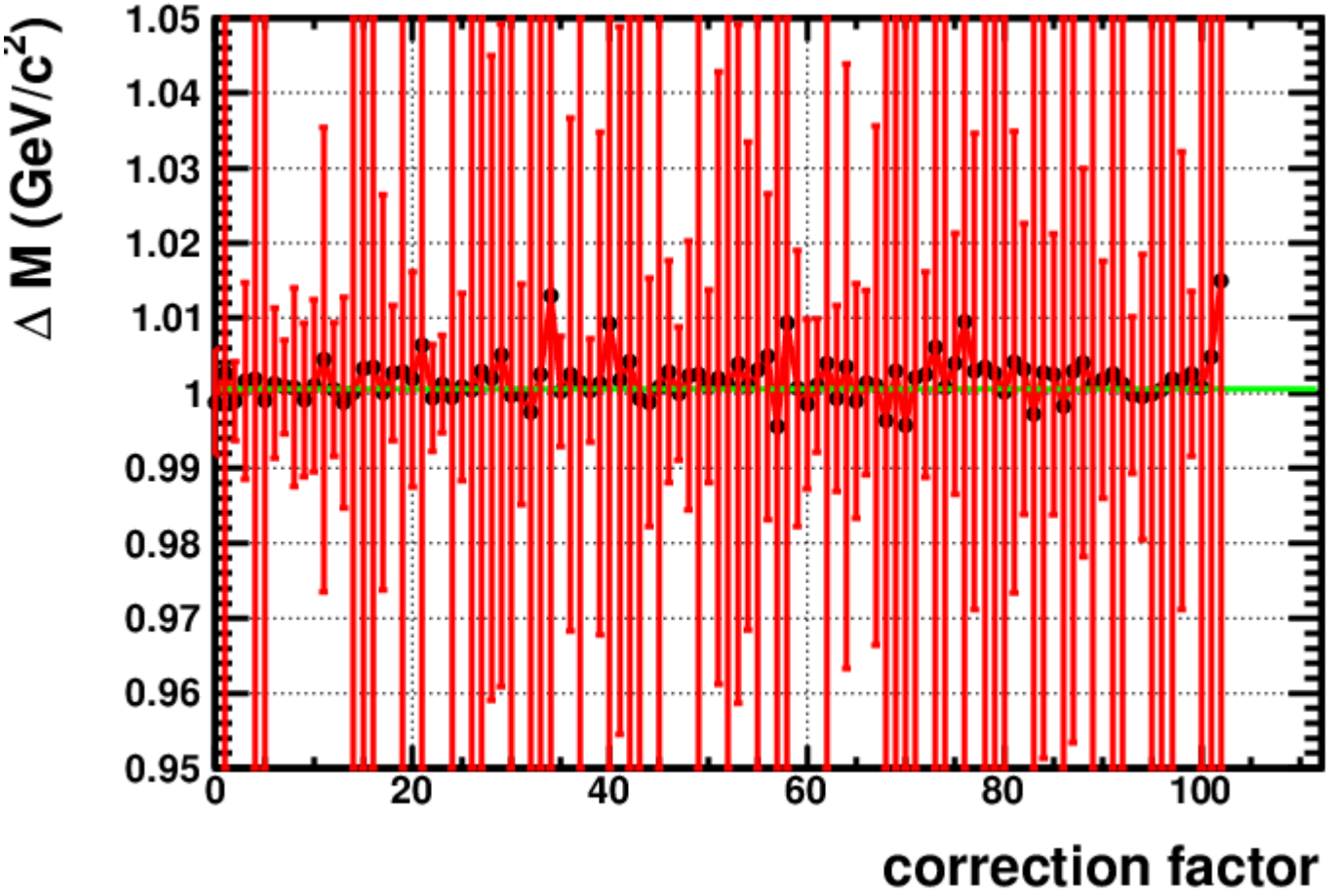
- Boss version: 664p01

Momentum correction

- Method: By fitting the invariant mass of J/psi, psi' , phi, D^0 , D^- , then comparing with PDG value, we could get the best momentum correction number

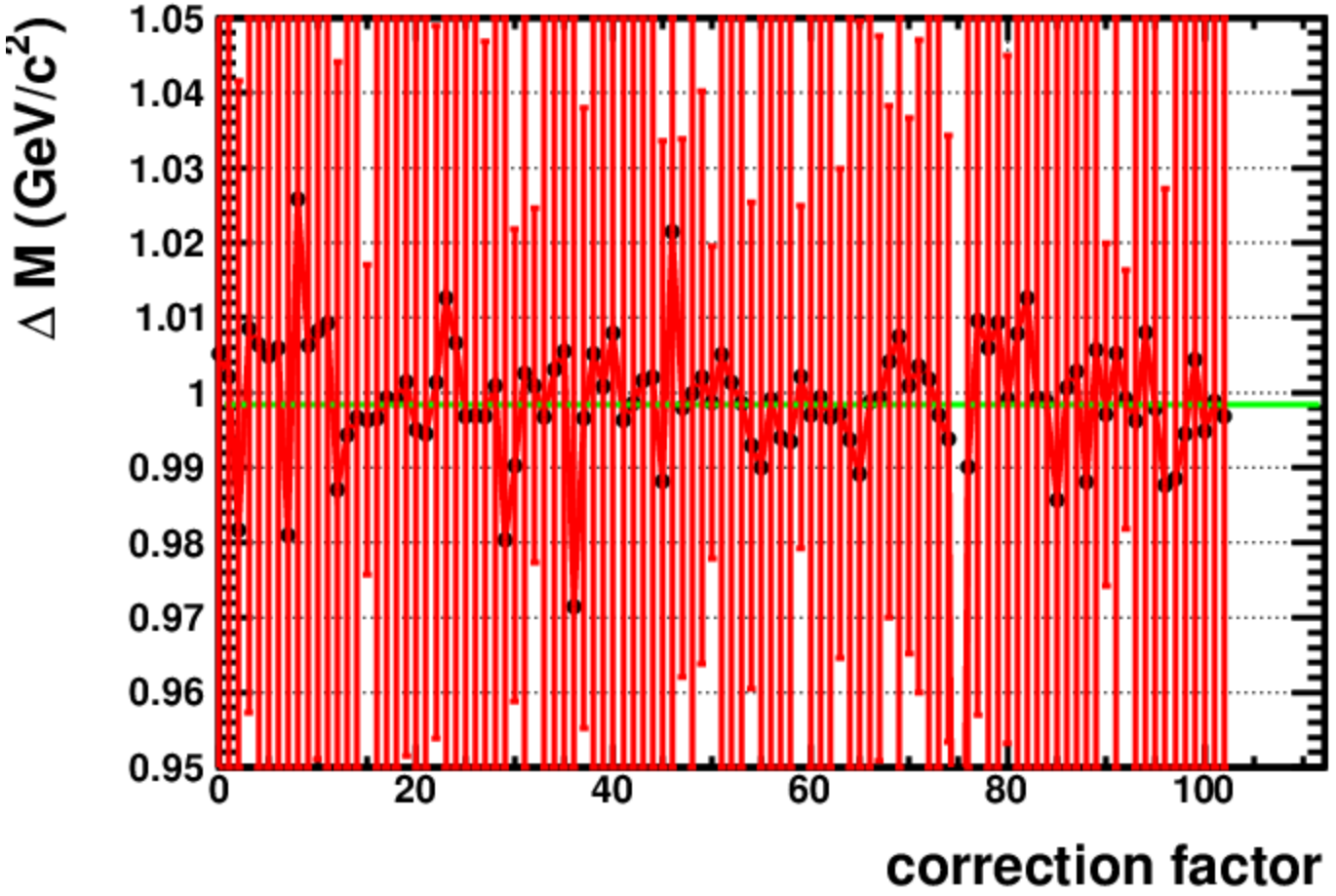
- Decay modes : J/psi -> e^+ e^-, psi' -> pi^+ pi^- J/psi, phi->K^+ K^-, D^0 -> K^- pi^+, D^- ->K^- pi^+ pi^-

J/psi -> e^+ e^-



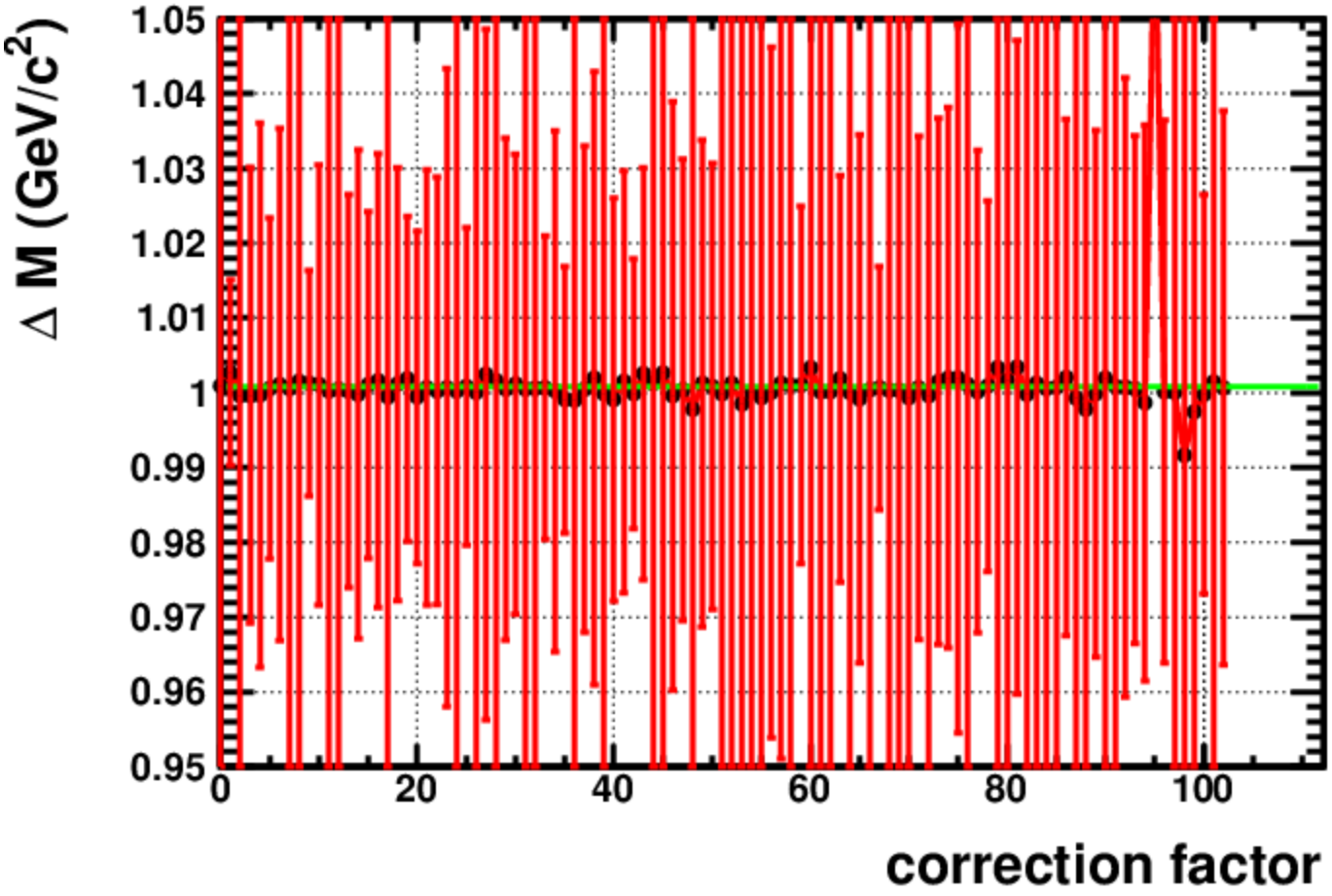
1.0005 ± 0.0016

phi->K^+ K^-



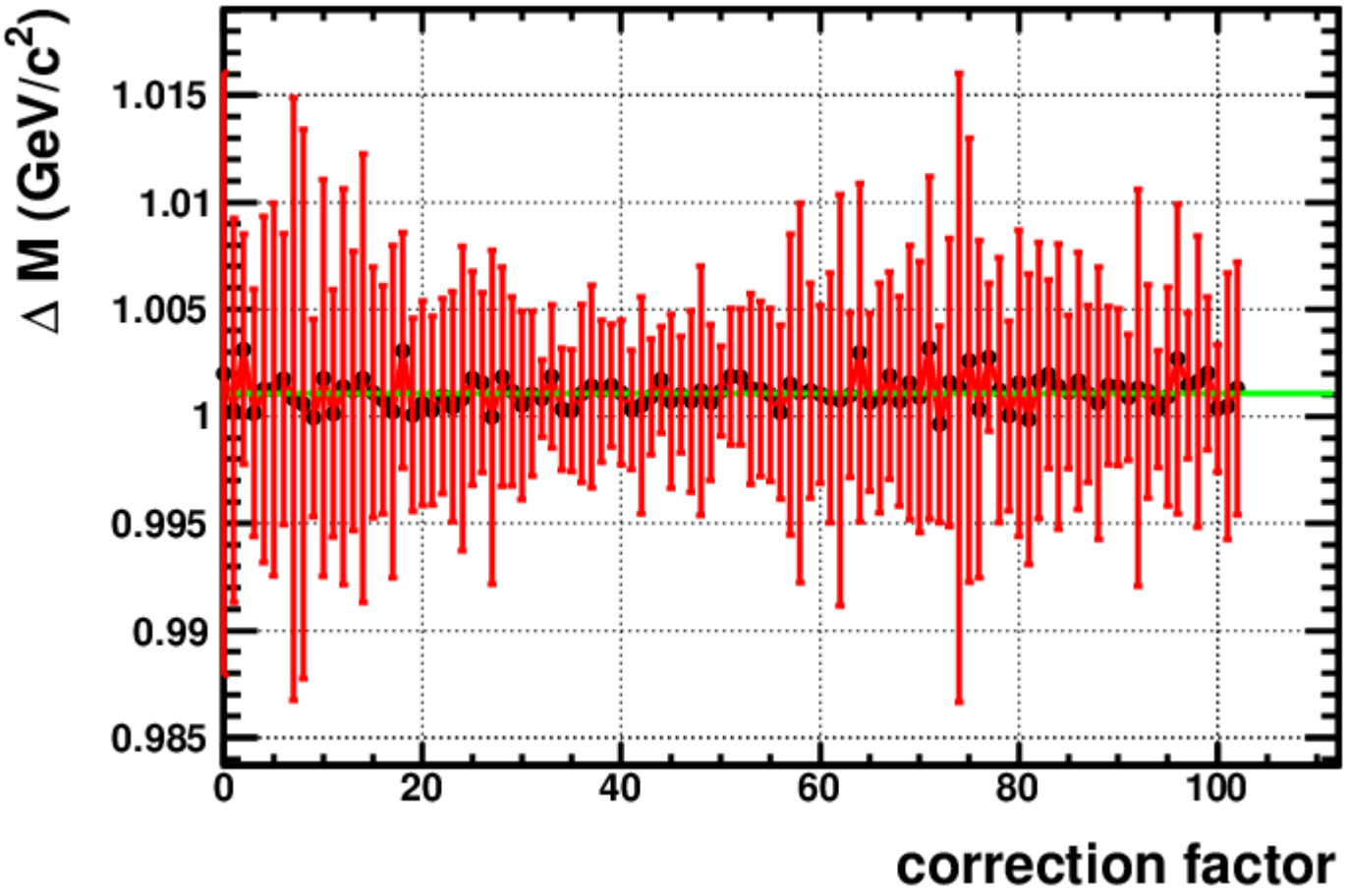
0.9984 ± 0.0054

psi’ -> pi^+ pi^- J/psi



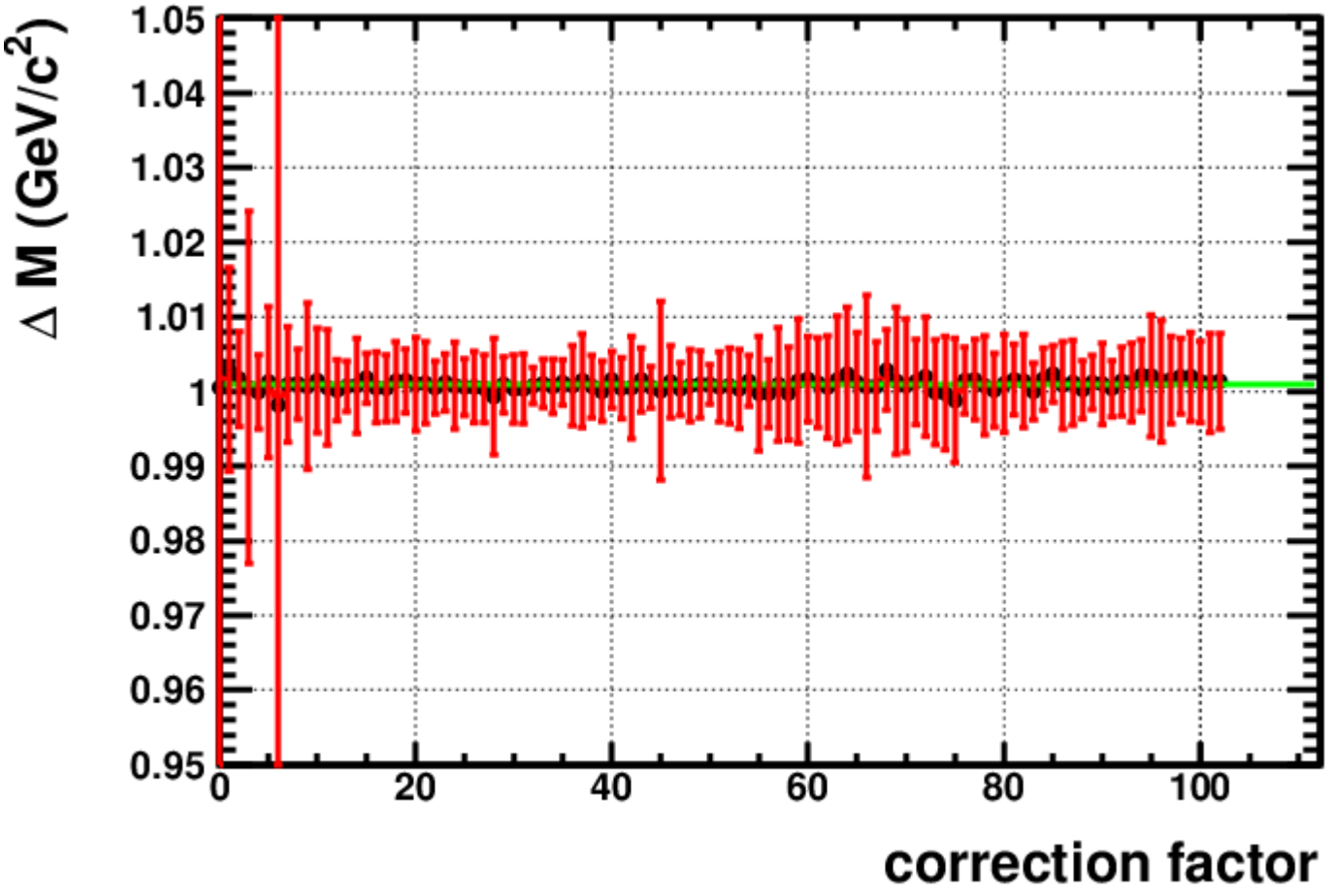
1.0008 ± 0.0036

$D^0 \rightarrow K^- \pi^+$



1.0011 ± 0.0004

$D^- \to K^- \pi^+ \pi^-$



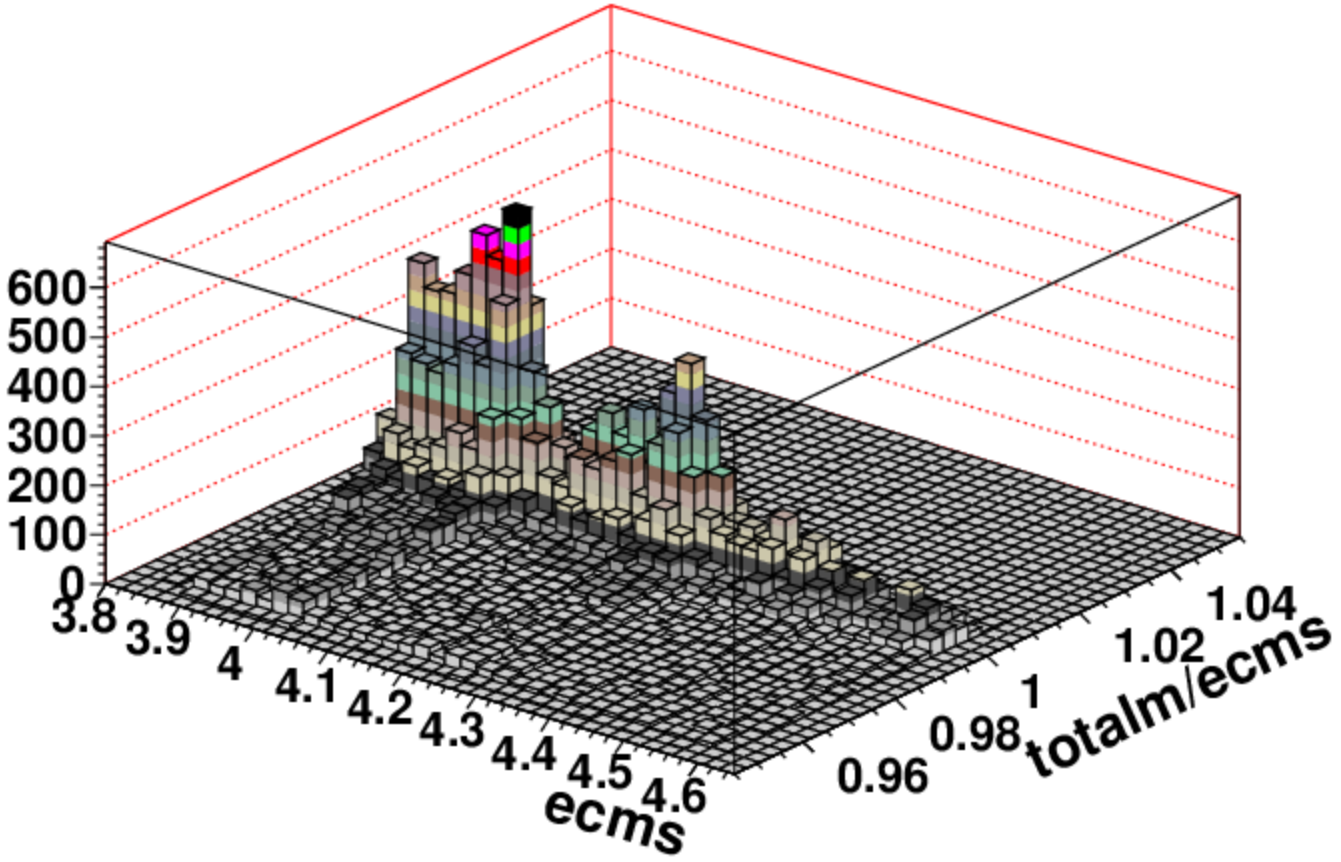
1.0009 ± 0.0005

Ecms check

- $e^+ e^- \rightarrow pi^+ pi^- pi^+ pi^- pi^+ pi^-$ used to reconstruct the ecms,

- Momentum of pions are corrected by the above parameters: 1.001

Ecms of 6pi


600
500
400
300
200
100
0
3.8
3.9
4
4.1
4.2
4.3
4.4
4.5
4.6
ecms
0.96
0.98
1
1.02
1.04
totalm/ecms

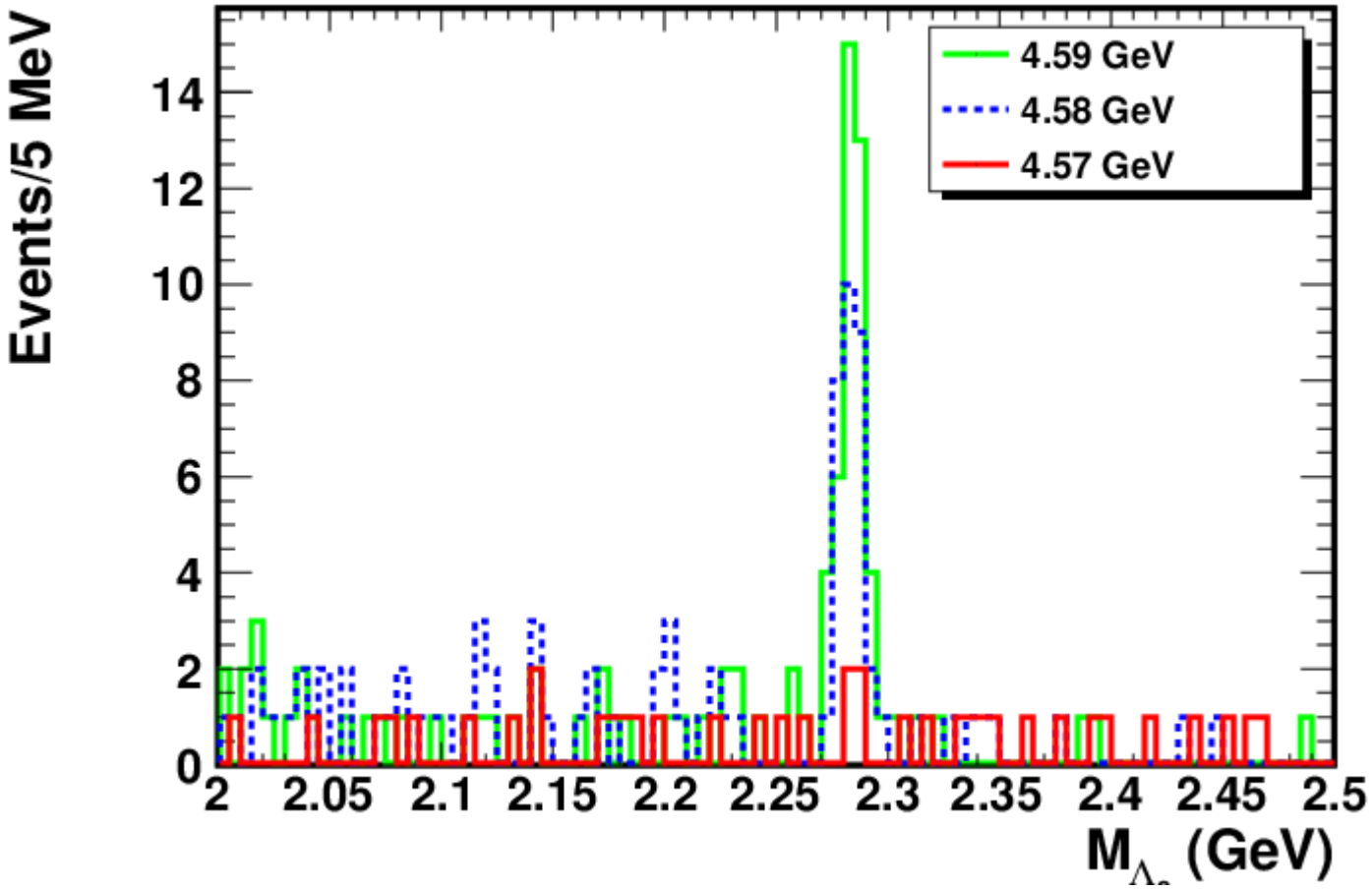
Λc Check

- As the PDG value shows, the threshold of e+ e- -> Λc Λc bar is 4.57292 GeV

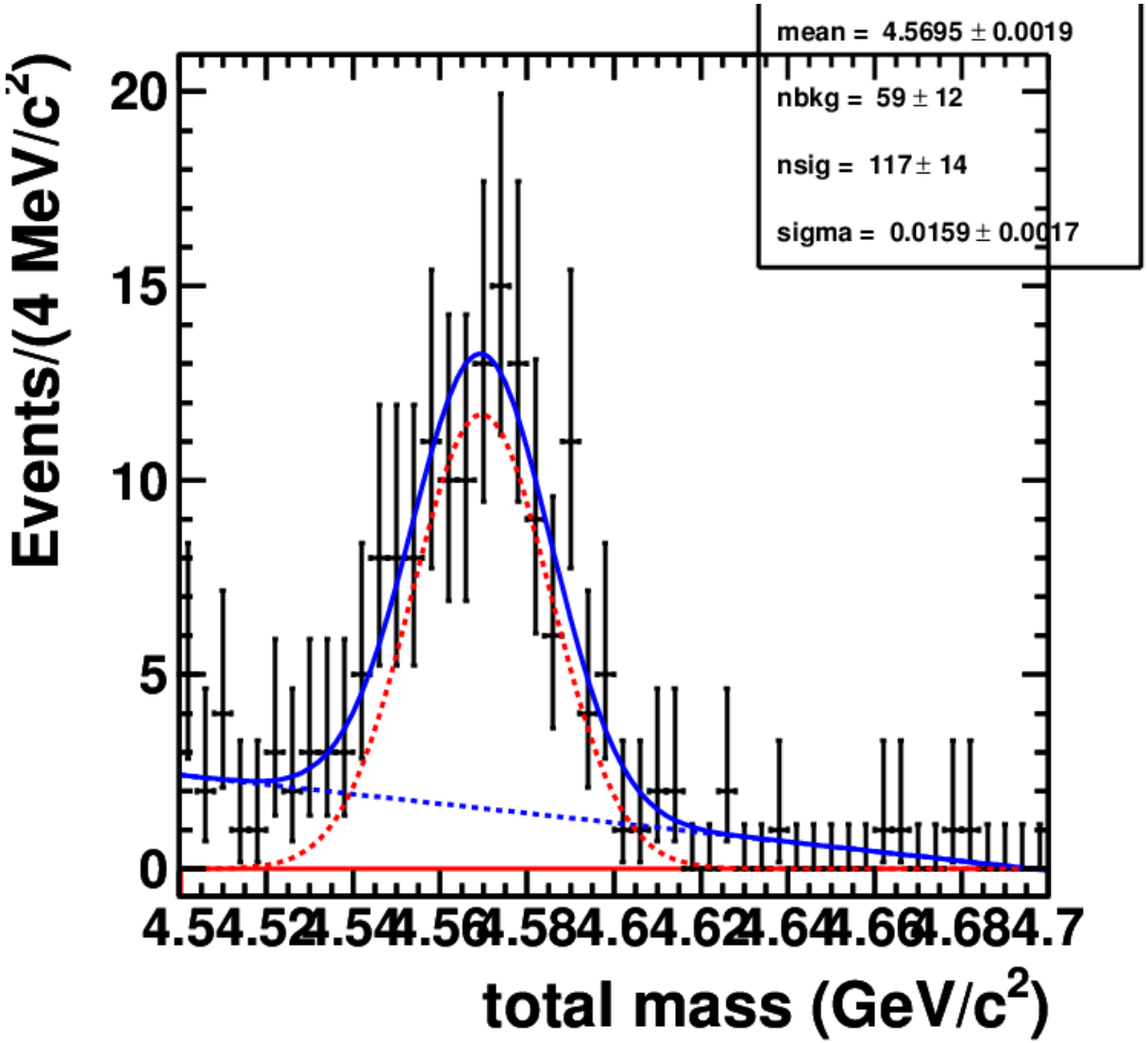
- BESIII took data at 4.57, 4.58, and 4.59GeV. So by the checking the production of Λc pair, could examine the Ecms.

- The Λc is reconstructed by proton, K- pi+.

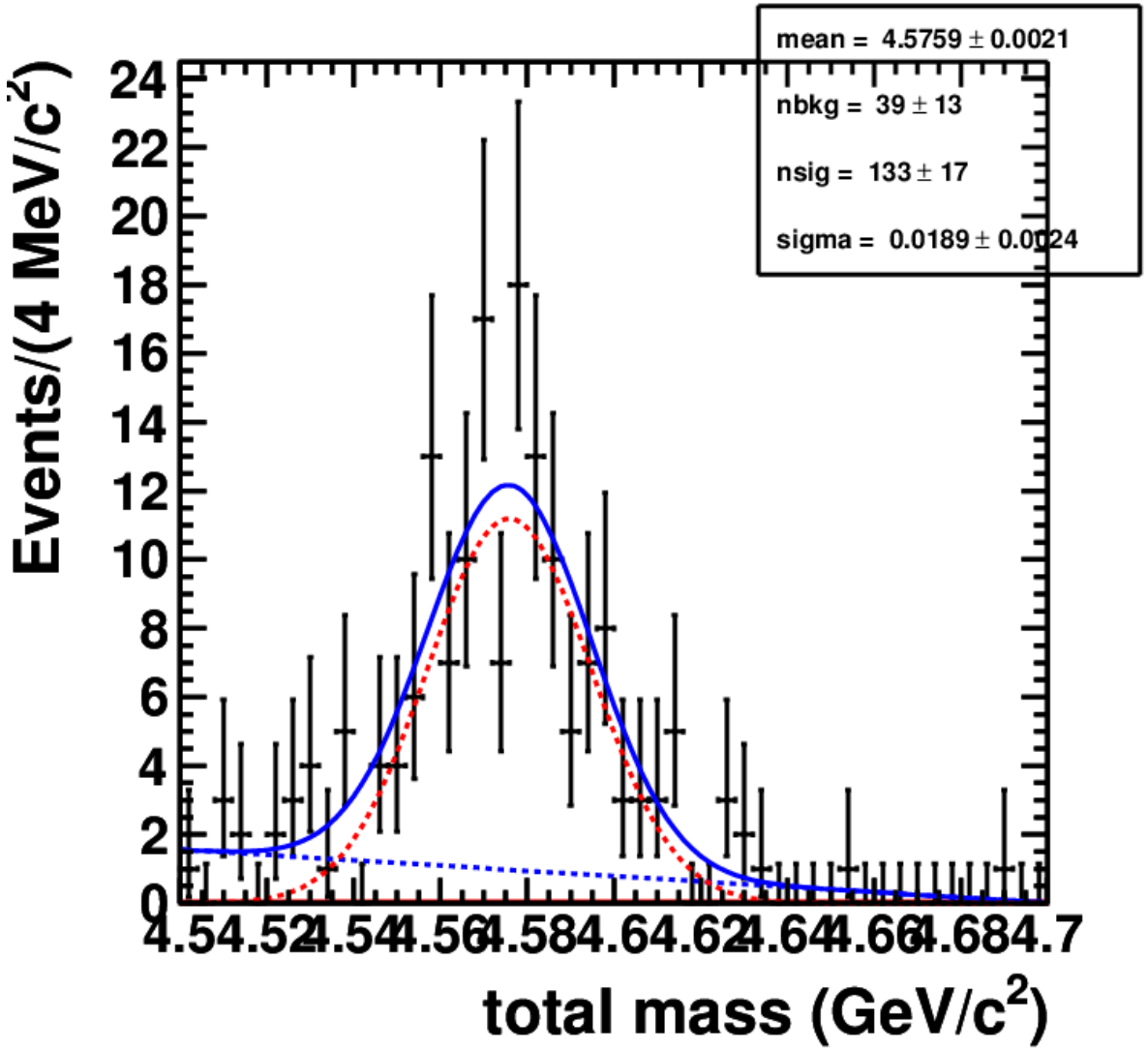
The invariant mass of Λc



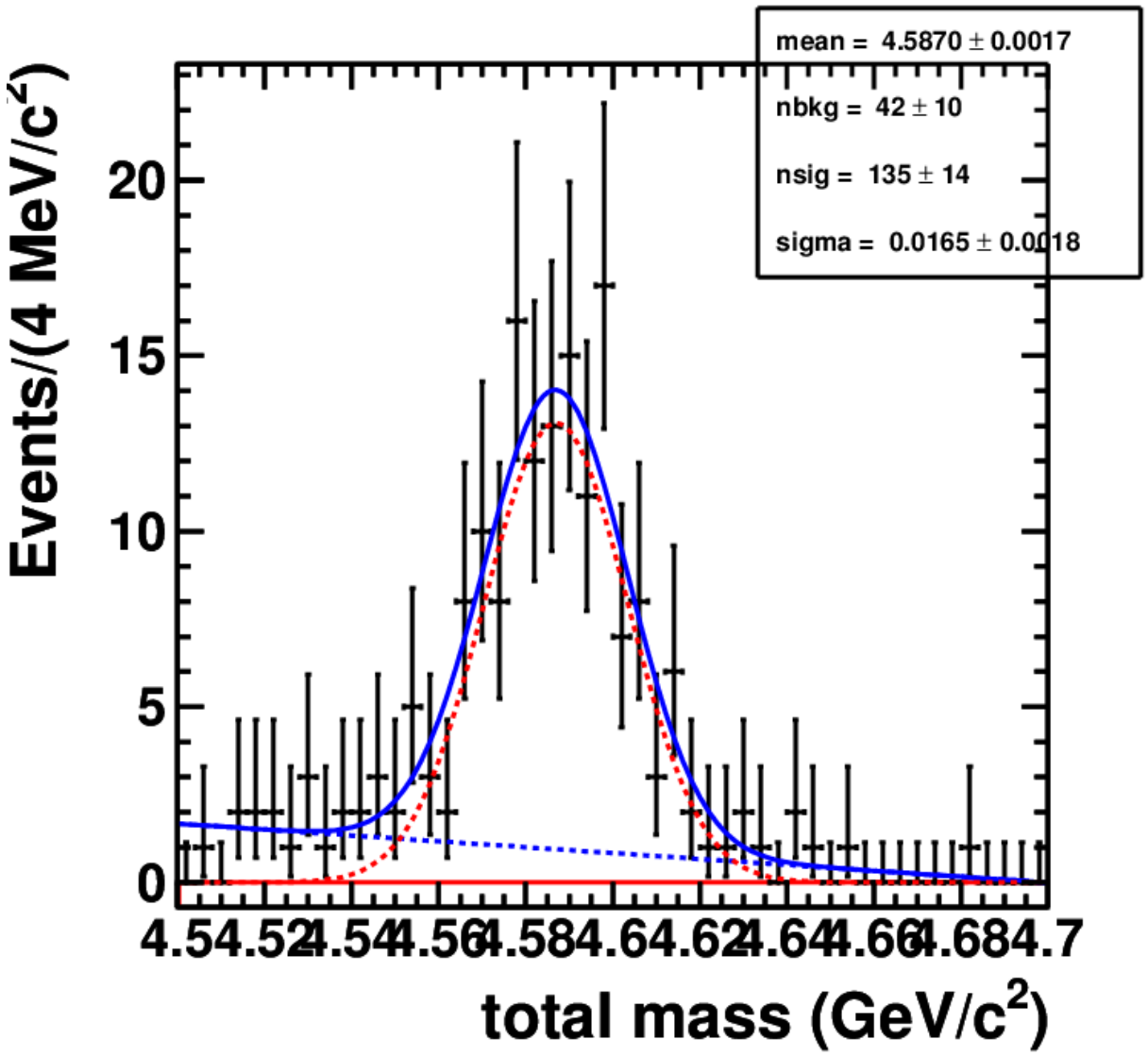
4.57GeV


mean = 4.5695 ± 0.0019
nbkg = 59 ± 12
nsig = 117 ± 14
sigma = 0.0159 ± 0.0017
Events/(4 MeV/c²)
20
15
10
5
0
4.5
4.52
4.54
4.56
4.58
4.6
4.62
4.64
4.66
4.68
4.7
total mass (GeV/c²)

4.58 GeV


mean = 4.5759 ± 0.0021
nbkg = 39 ± 13
nsig = 133 ± 17
sigma = 0.0189 ± 0.0024
Events/(4 MeV/c²)
total mass (GeV/c²)
0
2
4
6
8
10
12
14
16
18
20
22
24
4.54
4.58
4.64
4.7

4.59GeV


mean = 4.5870 ± 0.0017
nbkg = 42 ± 10
nsig = 135 ± 14
sigma = 0.0165 ± 0.0018
Events/(4 MeV/c²)
0
5
10
15
20
4.54
4.56
4.58
4.6
4.62
4.64
4.66
4.68
4.7
total mass (GeV/c²)