

Status of Λ and $\bar{\Lambda}$ Analysis in Pb + Pb Collisions at 20 and 30 A GeV

Collaboration meeting Oct 2003
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IKF Frankfurt



- Lambda and Antilambda Production in central Pb + Pb collisions at 20 and 30 GeV
- Cut Variables
- Lambda Invariant Mass Spectra (not yet corrected!)
- pt spectra
- Anti lambda/Lambda ratio

- Outlook

- Analysis based on ROOT-mini DSTs
- 30 GeV: 30G+-30GeV-central-02J
STD+ (7% centrality)
of events: 440 000
- 20 GeV: 20GeV-Test (not yet copied to NA49 library)
STD+ (7% centrality)
of events: 51 900
- Using the standard reconstruction chain with the v0-finder (auxiliary cuts)

30 GeV

Vertex.Iflag

$$-0.1075 \text{ cm} < x_{\text{bpd}} - x_{\text{fit}} < 0.088 \text{ cm}$$

$$-0.068 \text{ cm} < y_{\text{bpd}} - y_{\text{fit}} < 0.079 \text{ cm}$$

$$-581.75 \text{ cm} < z_{\text{fit}} < -580.801 \text{ cm}$$

20 GeV

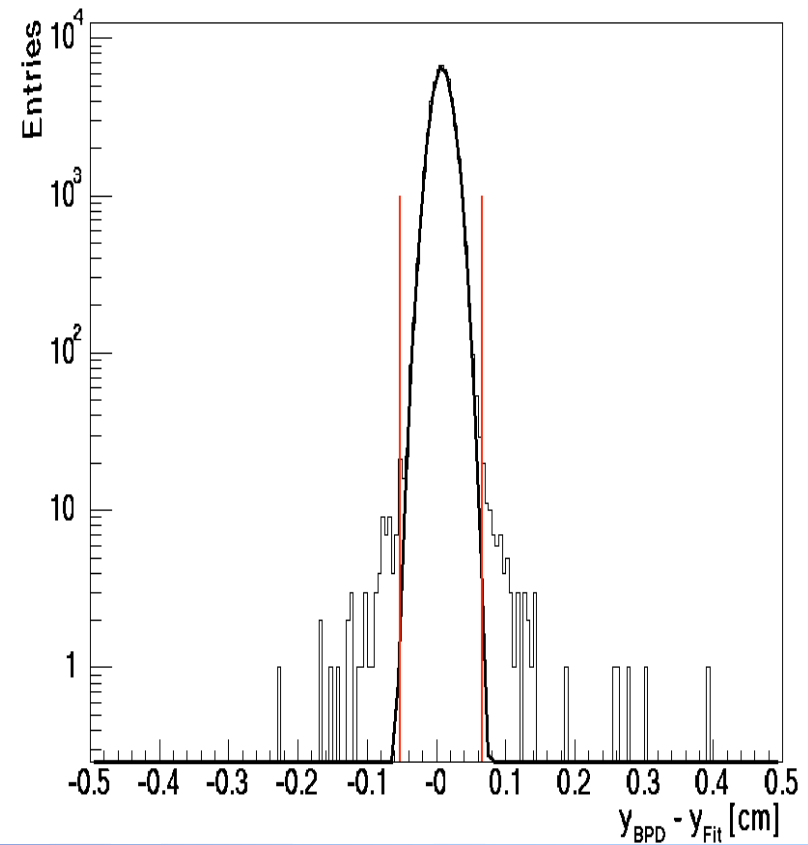
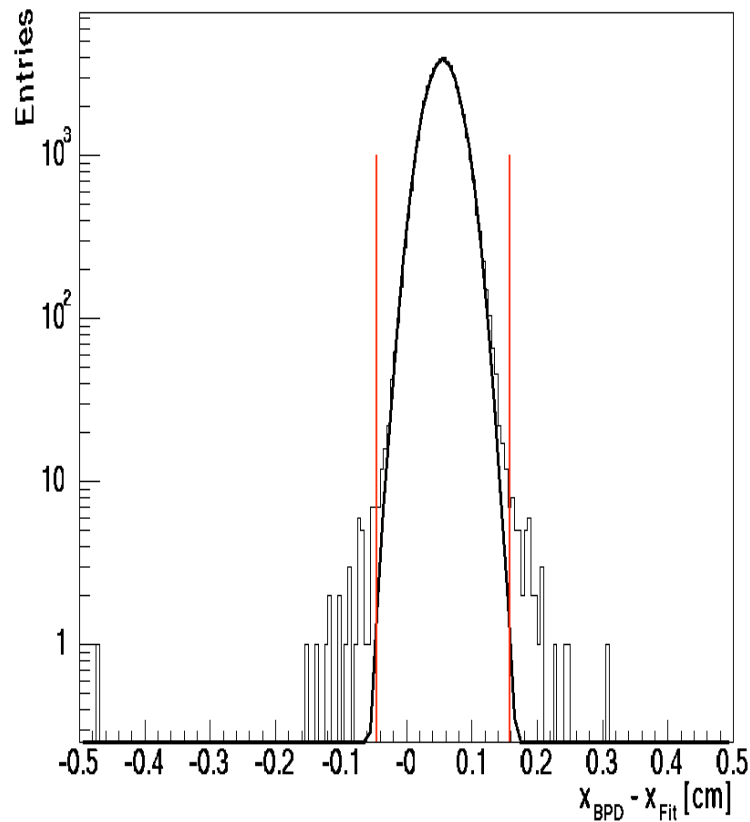
Vertex Iflag

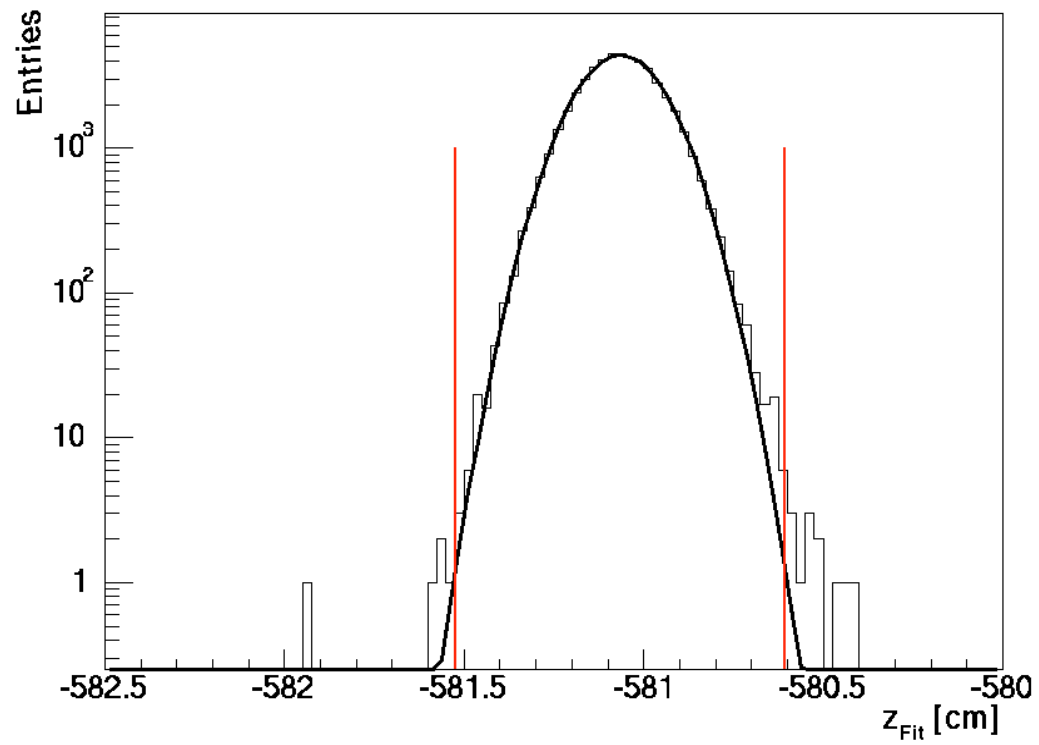
$$-0.046 \text{ cm} < x_{\text{bpd}} - x_{\text{fit}} < 0.158 \text{ cm}$$

$$-0.052 \text{ cm} < y_{\text{bpd}} - x_{\text{fit}} < 0.066 \text{ cm}$$

$$-581.525 \text{ cm} < z_{\text{fit}} < -580.605 \text{ cm}$$

Gauss fit mean:0.0556 cm σ :0.0254 **Gauss fit** mean:0.008 cm σ : 0.014



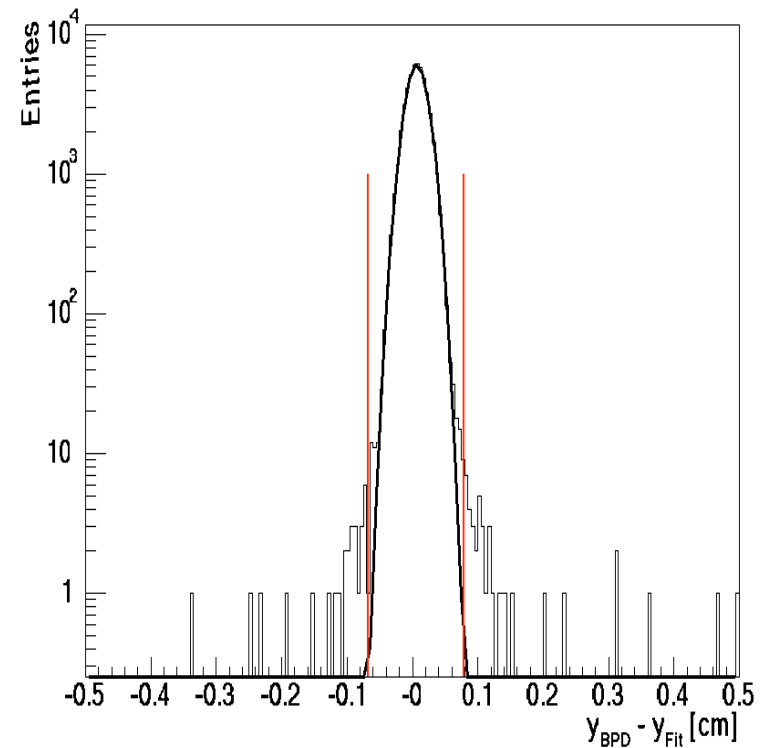
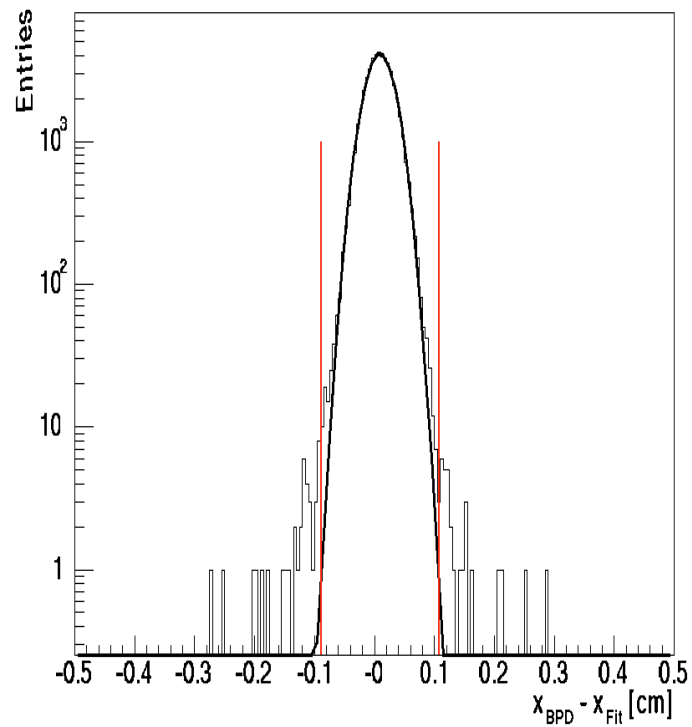


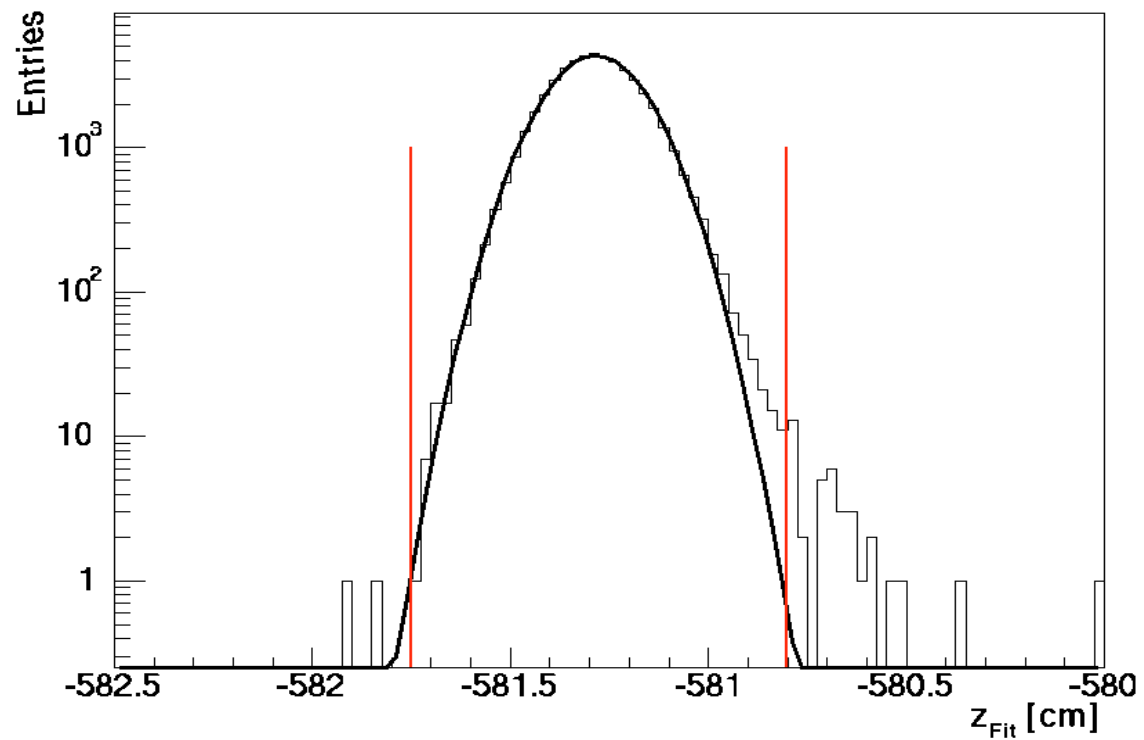
Gauss fit

mean:
-581.06 cm

σ :
0.1136

Gauss fit mean:0.0088cm σ : 0.0238 **Gauss fit** mean:0.006 cm σ :0.0163





Gauss fit

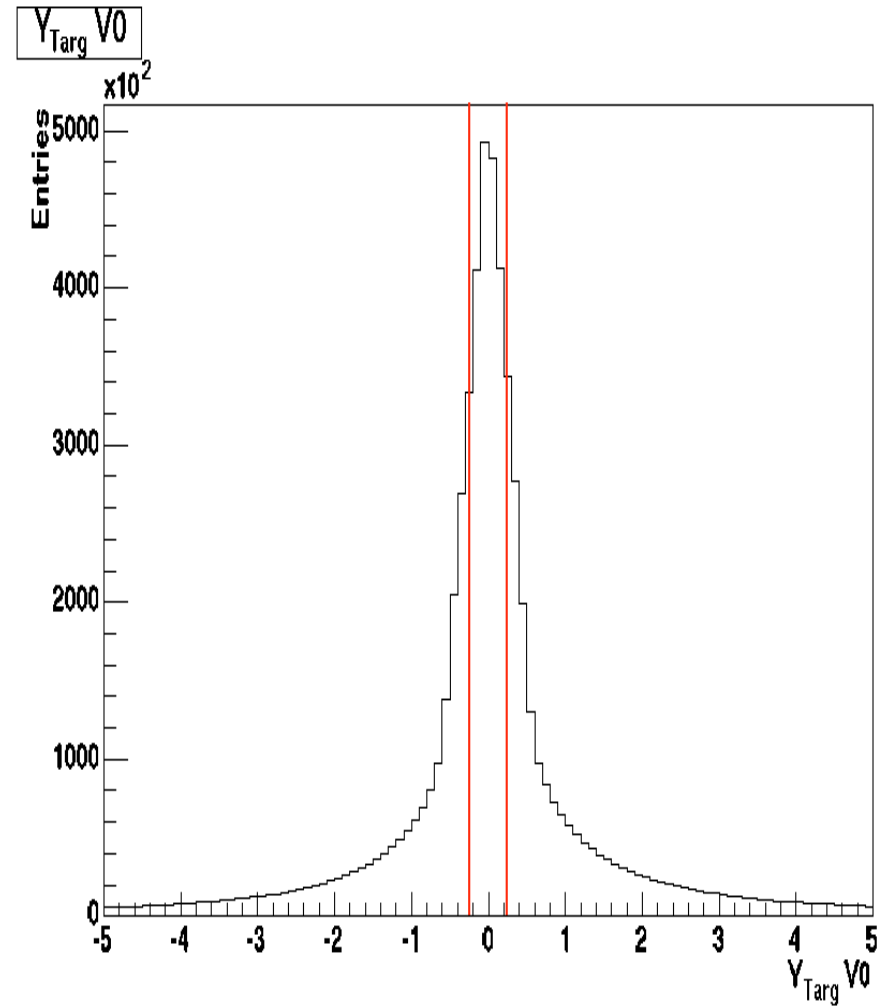
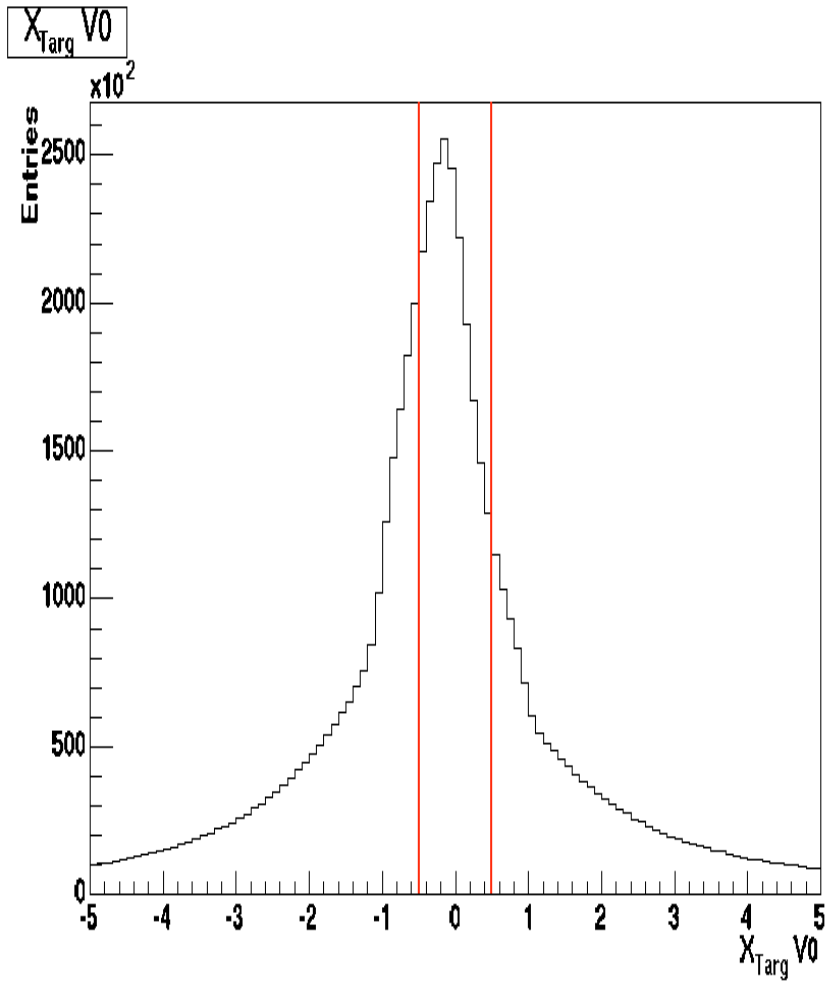
mean:
-581.28 cm σ :
0.1149

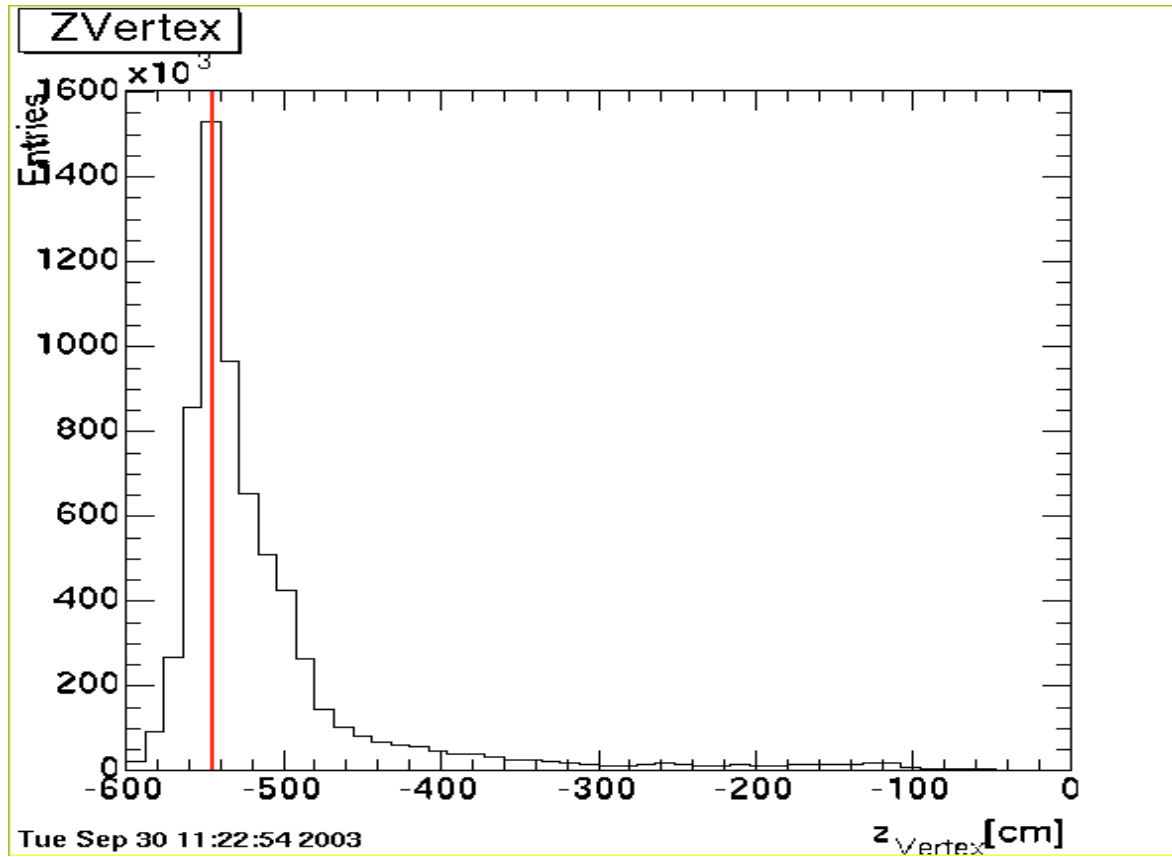
x_{target}, y_{target} and z_{vertex} (of v₀) cuts:

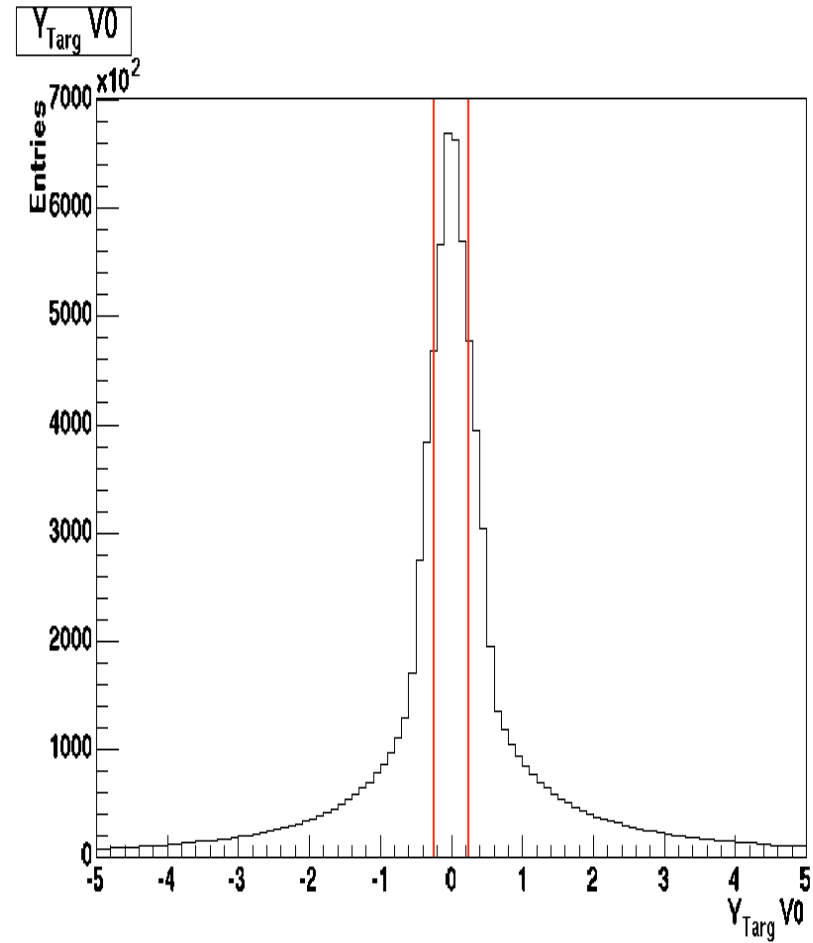
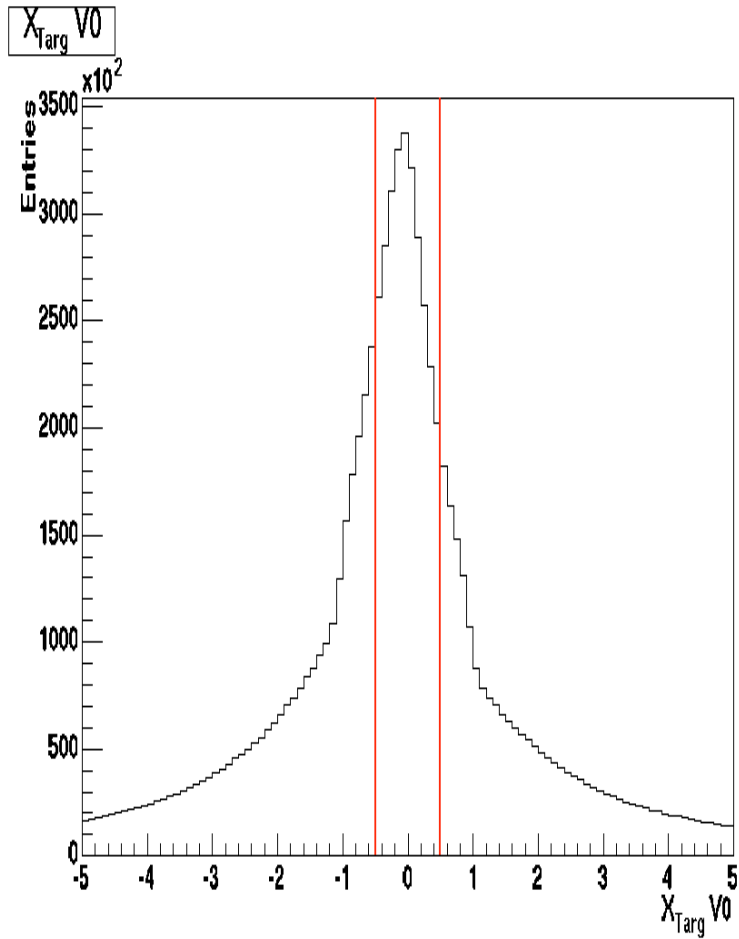
- $-0.50 \text{ cm} < x_{\text{target}} < 0.50 \text{ cm}$
- $-0.25 \text{ cm} < y_{\text{target}} < 0.25 \text{ cm}$
- $z_{\text{position of } v_0 \text{ vertex}} > -545.0 \text{ cm}$

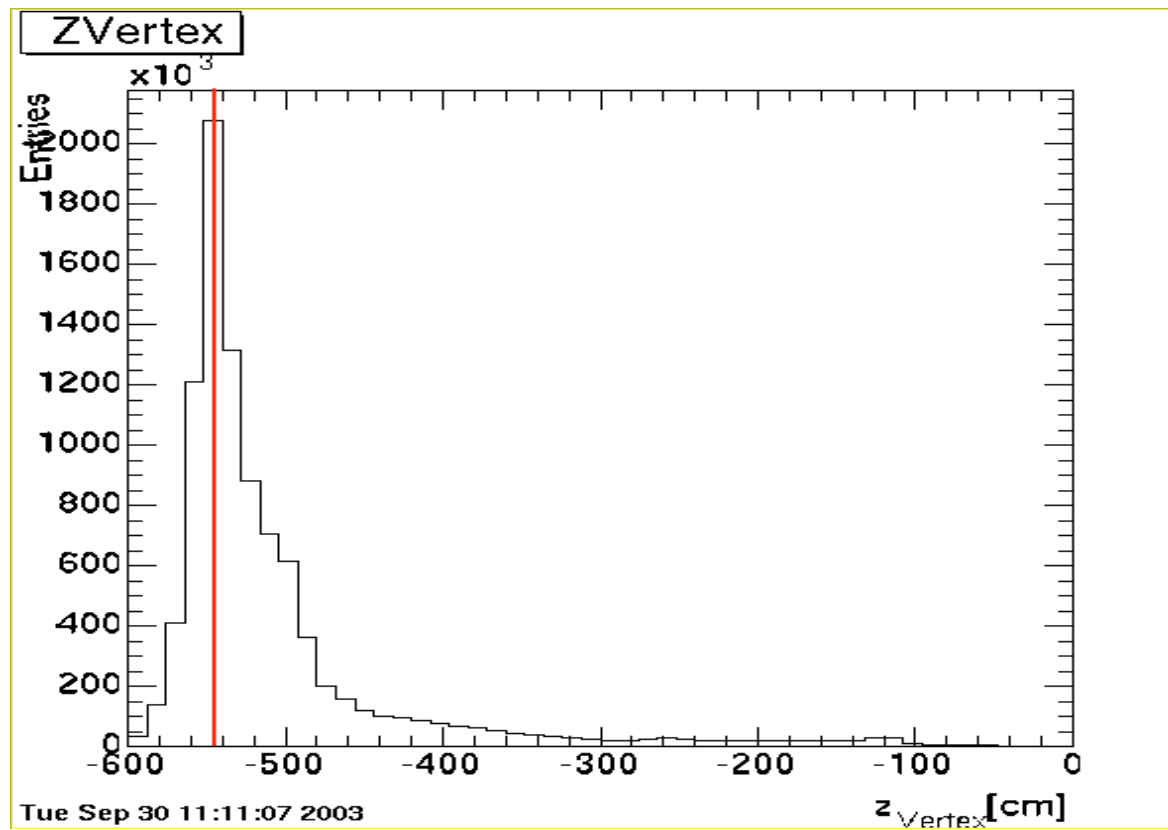
Comparison to other energies (40, 80, 158 GeV):

- $-0.50 \text{ cm} < x_{\text{target}} < 0.50 \text{ cm}$
- $-0.25 \text{ cm} < y_{\text{target}} < 0.2 \text{ cm}$
- $z_{\text{position of } v_0 \text{ vertex}} > -550.0 \text{ cm}$





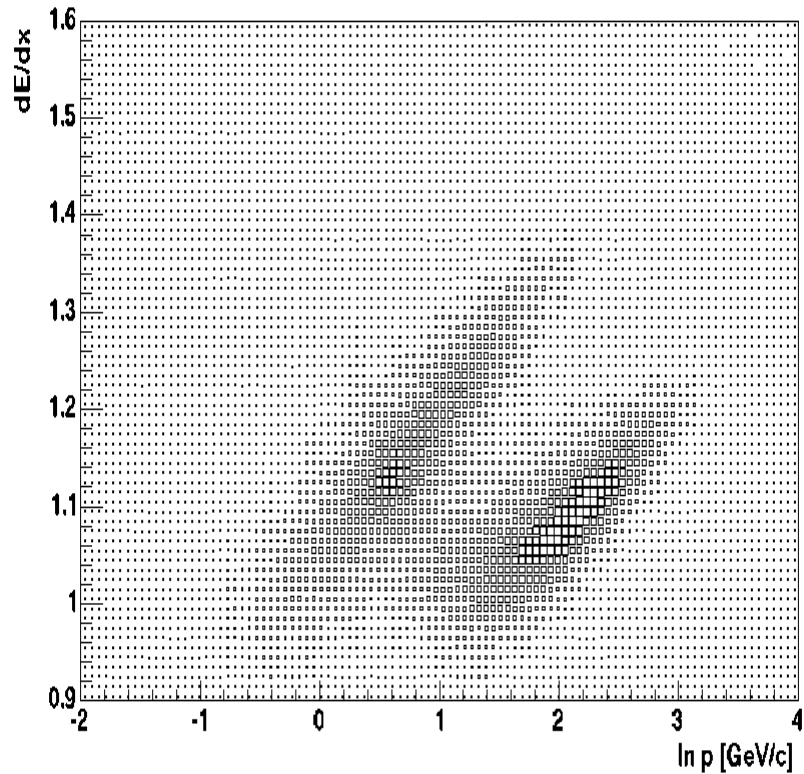




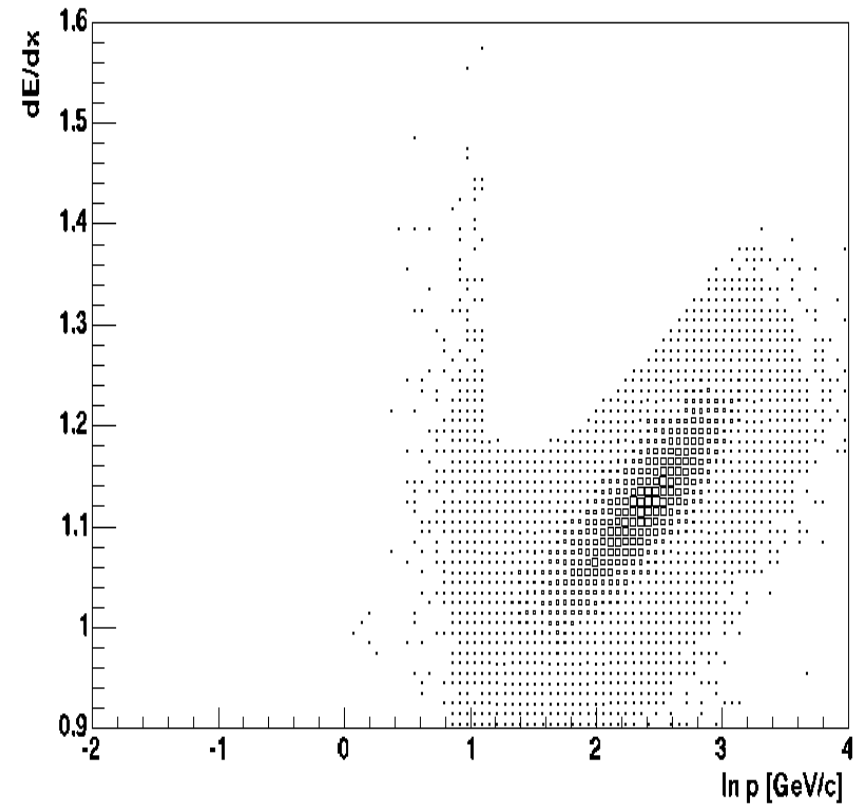
- dE/dx cut (3.5σ)
- Lifetime of Lambda $0.3 < \tau/\tau_0 < 5$
- $-0.9 < \cos \Theta < 1.0$
- Pion momentum $> 0.7 \text{ GeV}/c$
- Exclude the mass of the K_0 s ($=493.677 \text{ MeV}$)

see therefore the dE/dx plots and the Armenteros Podolanski Plot (alpha versus p_t Armenteros) before and after cuts:

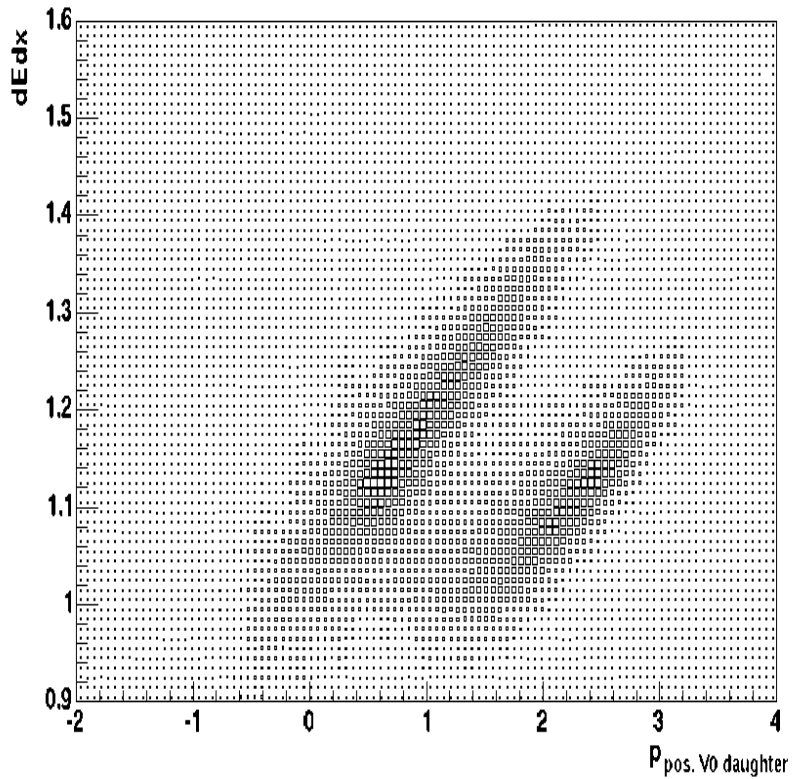
dEdx vs p pos. V0 daughter



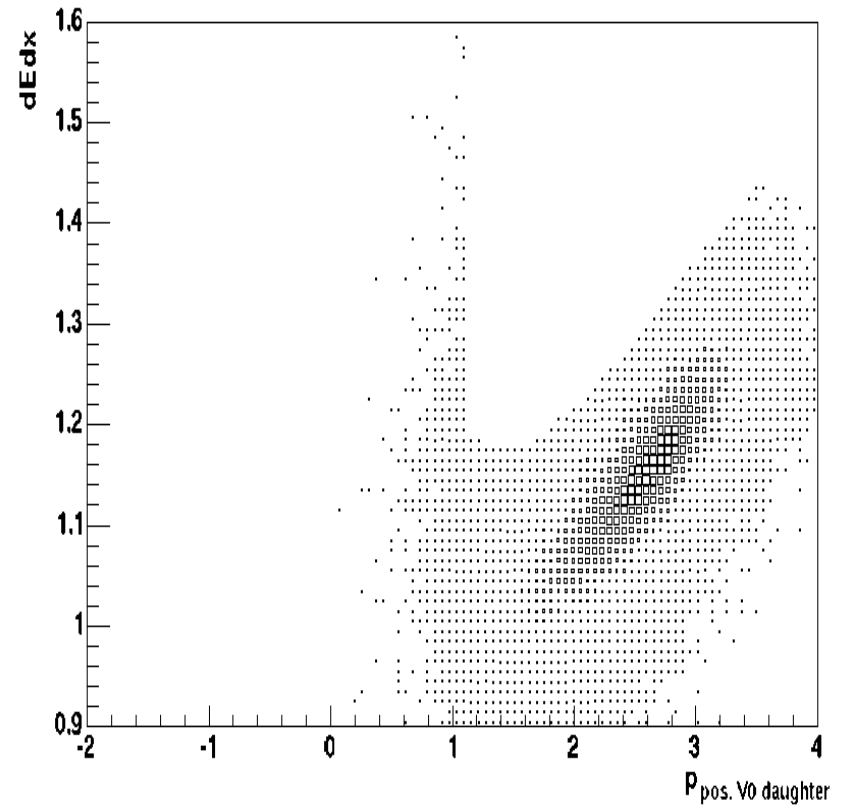
dEdx vs p pos. Λ daughter



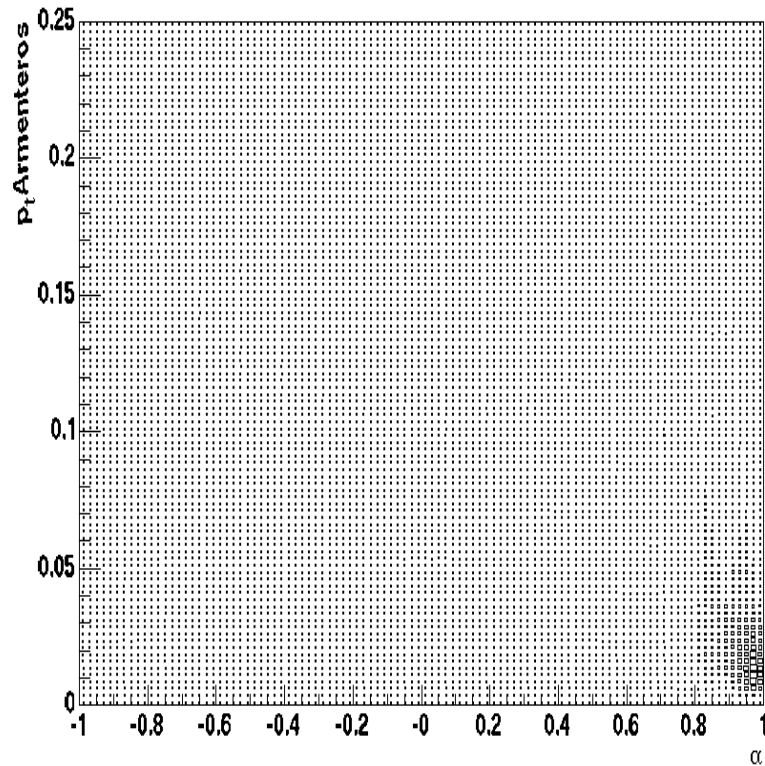
dEdx vs p pos. V0 daughter



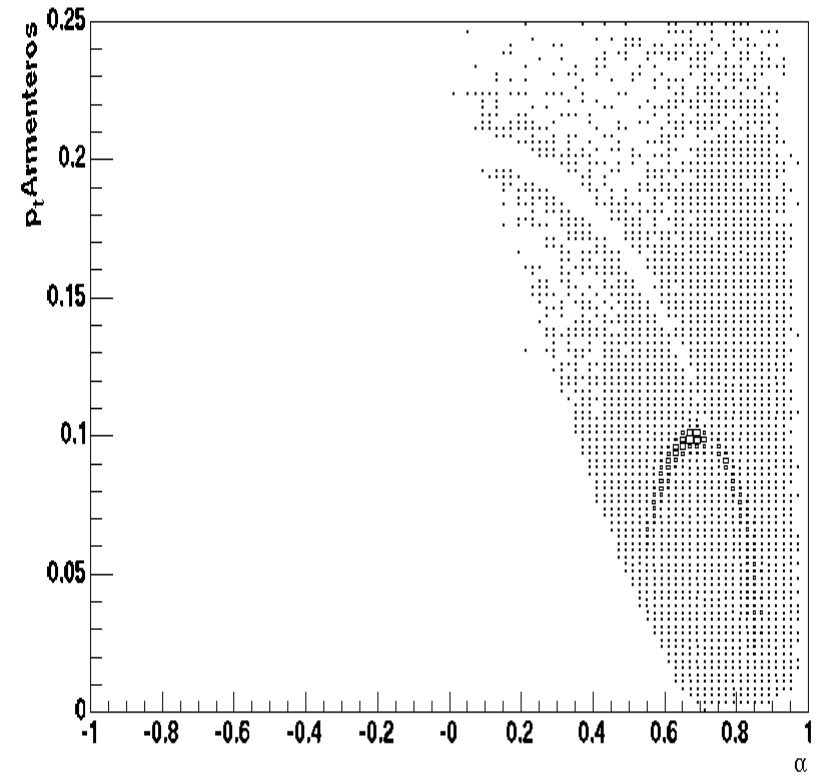
dEdx vs p pos. Λ daughter



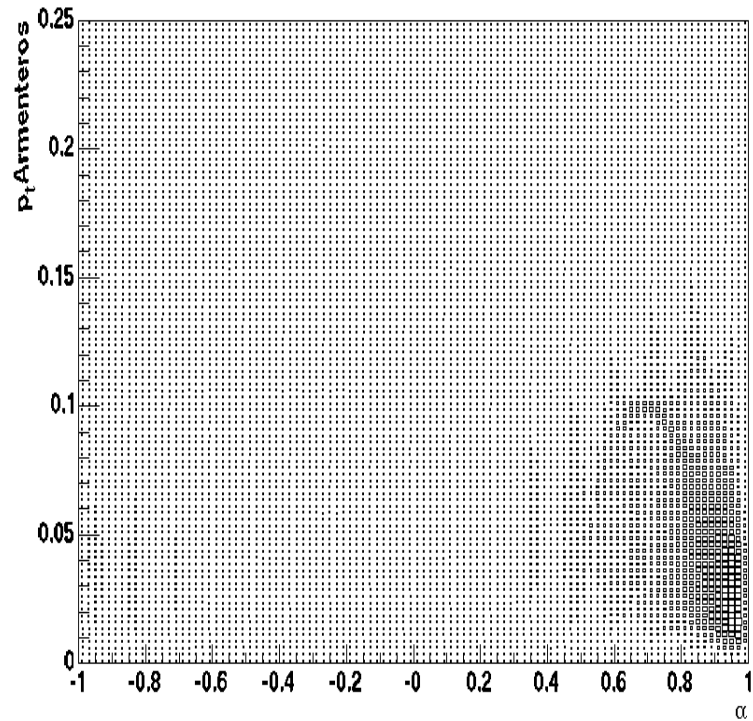
Armenteros pvs α V0



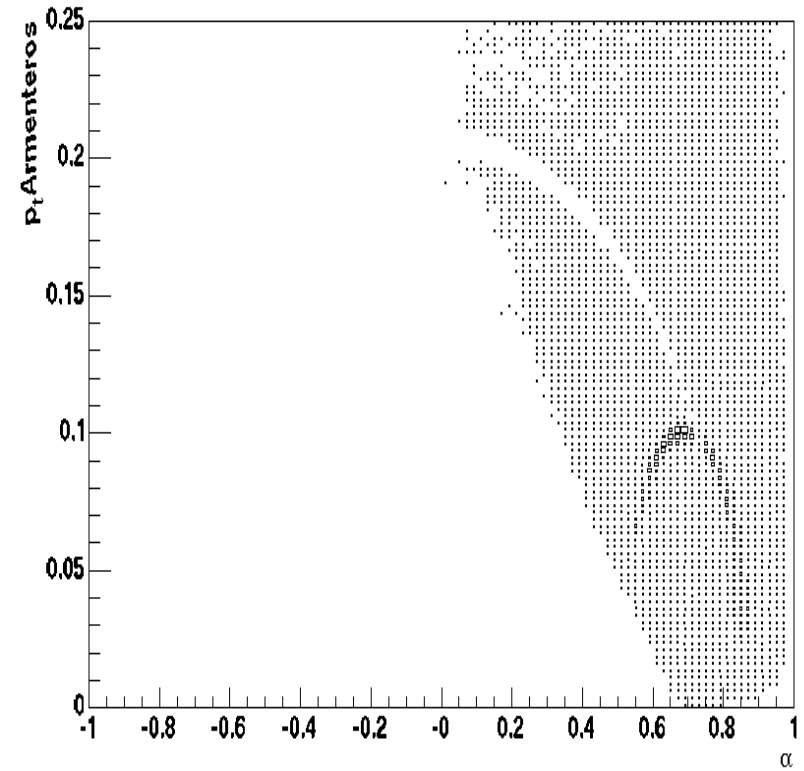
Armenteros pvs α Λ



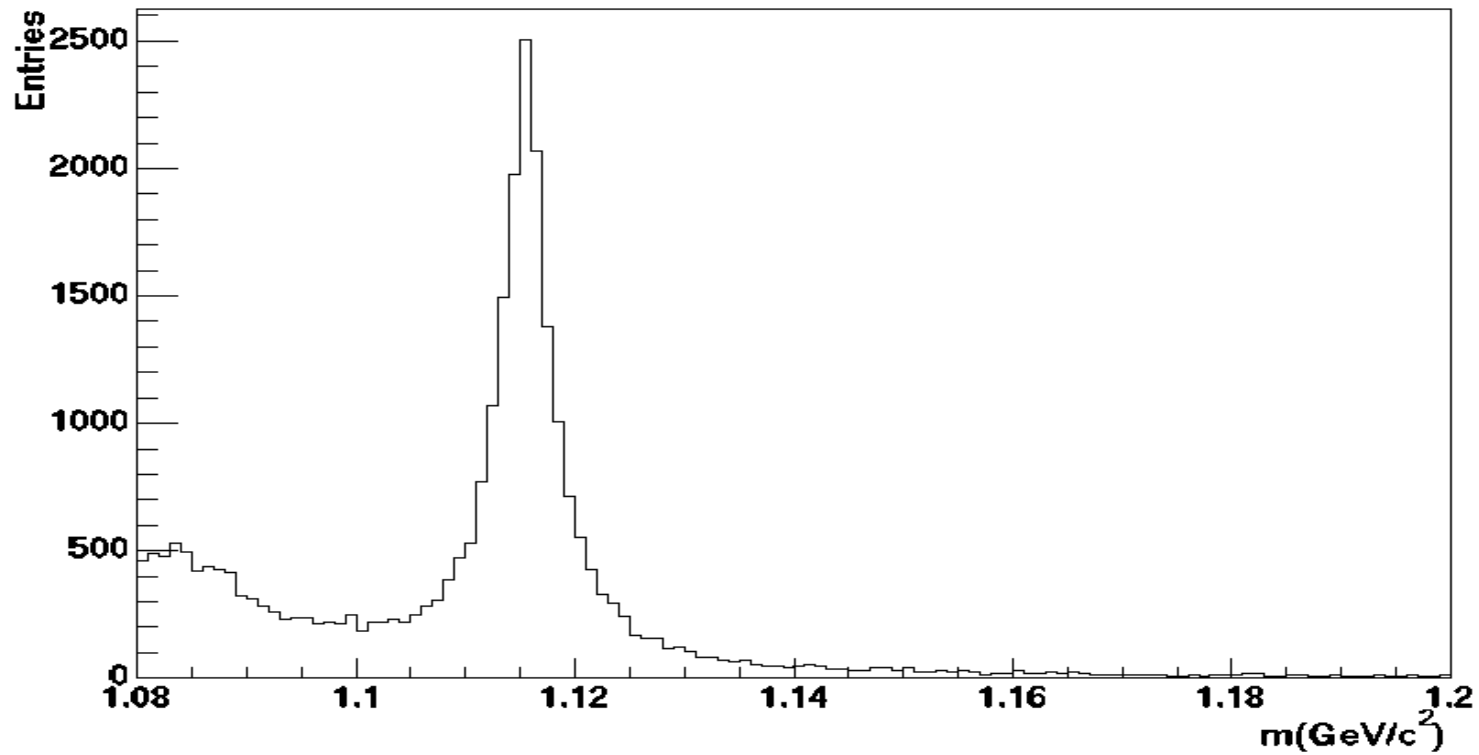
Armenteros pvs α V0



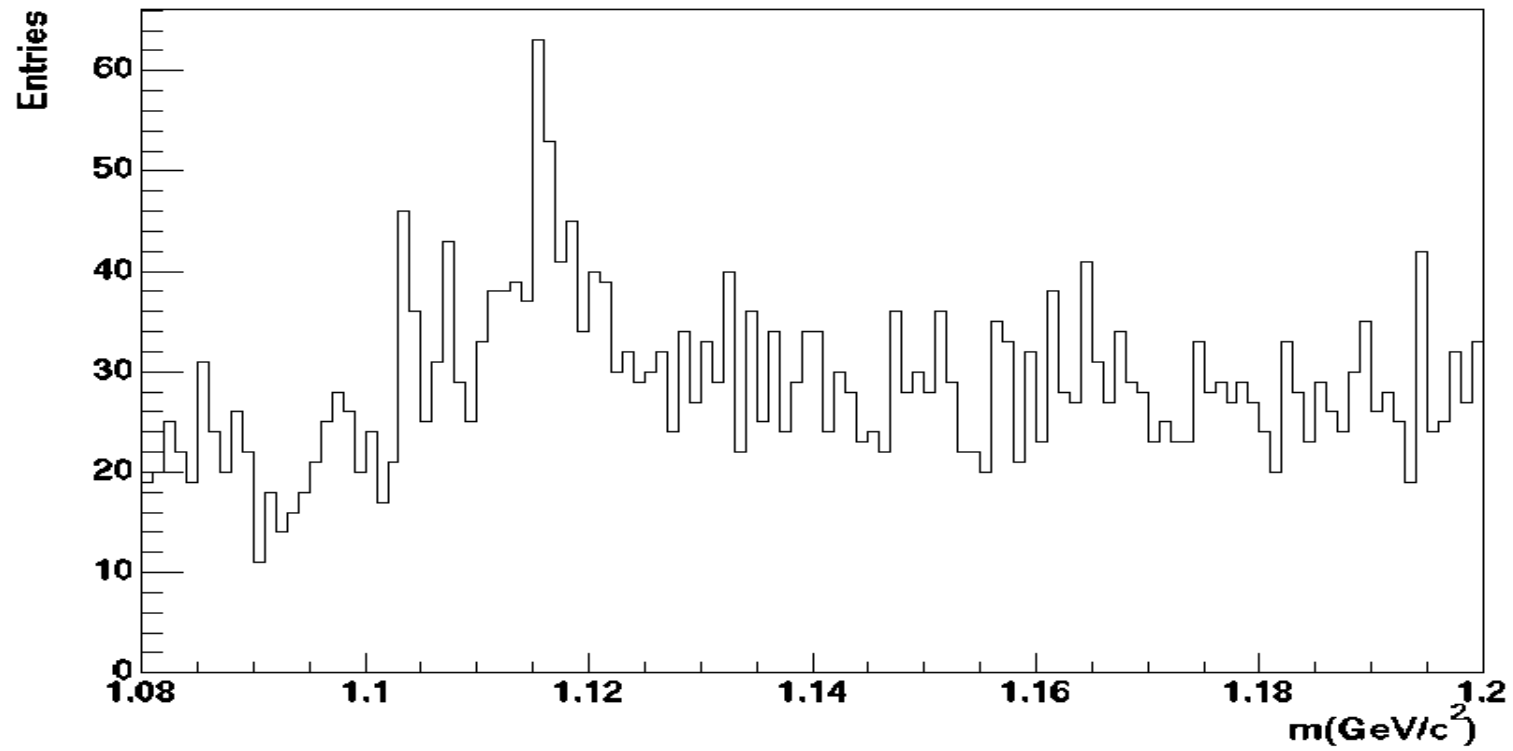
Armenteros pvs α Λ



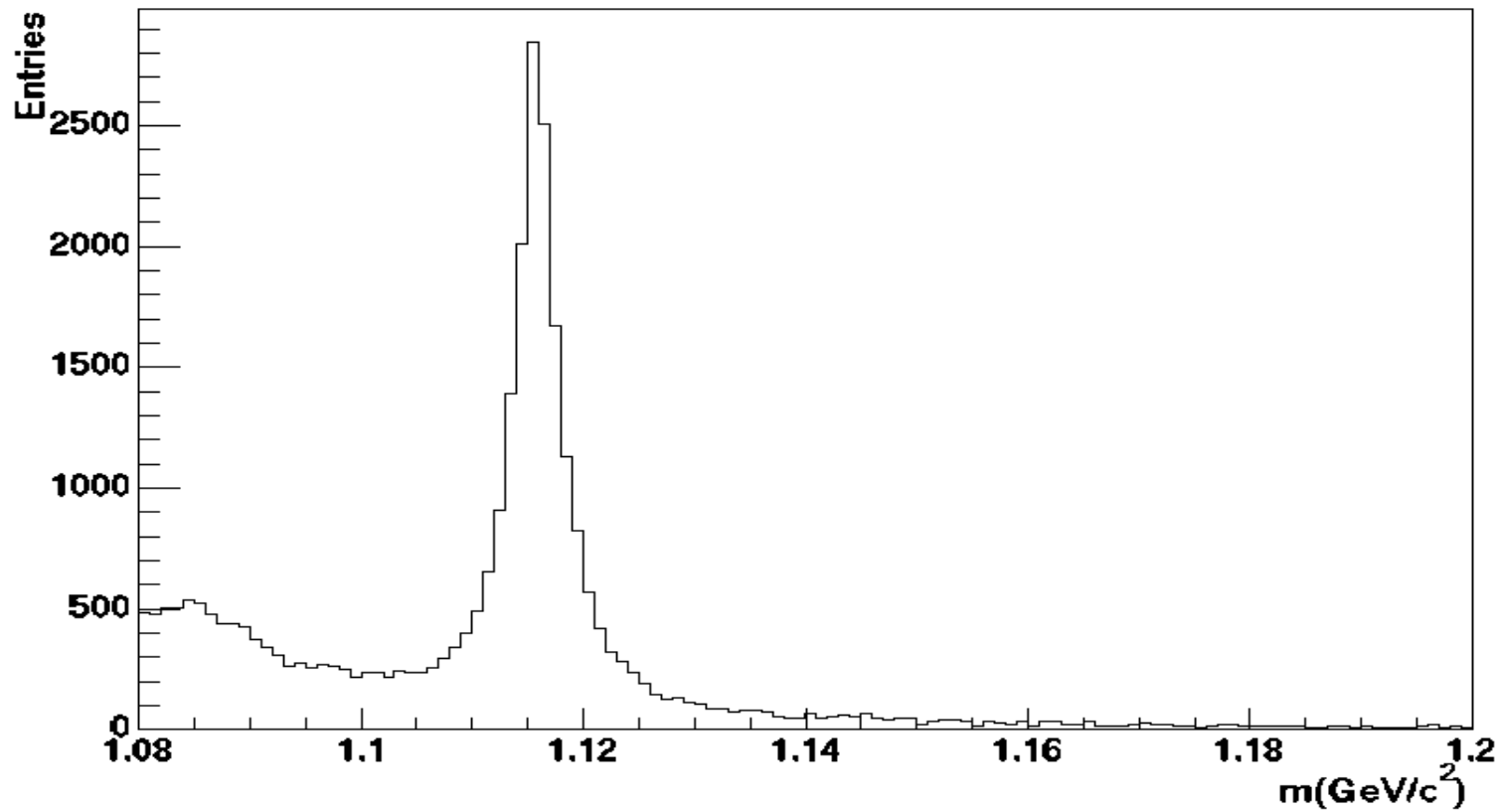
LamInvMmidrap



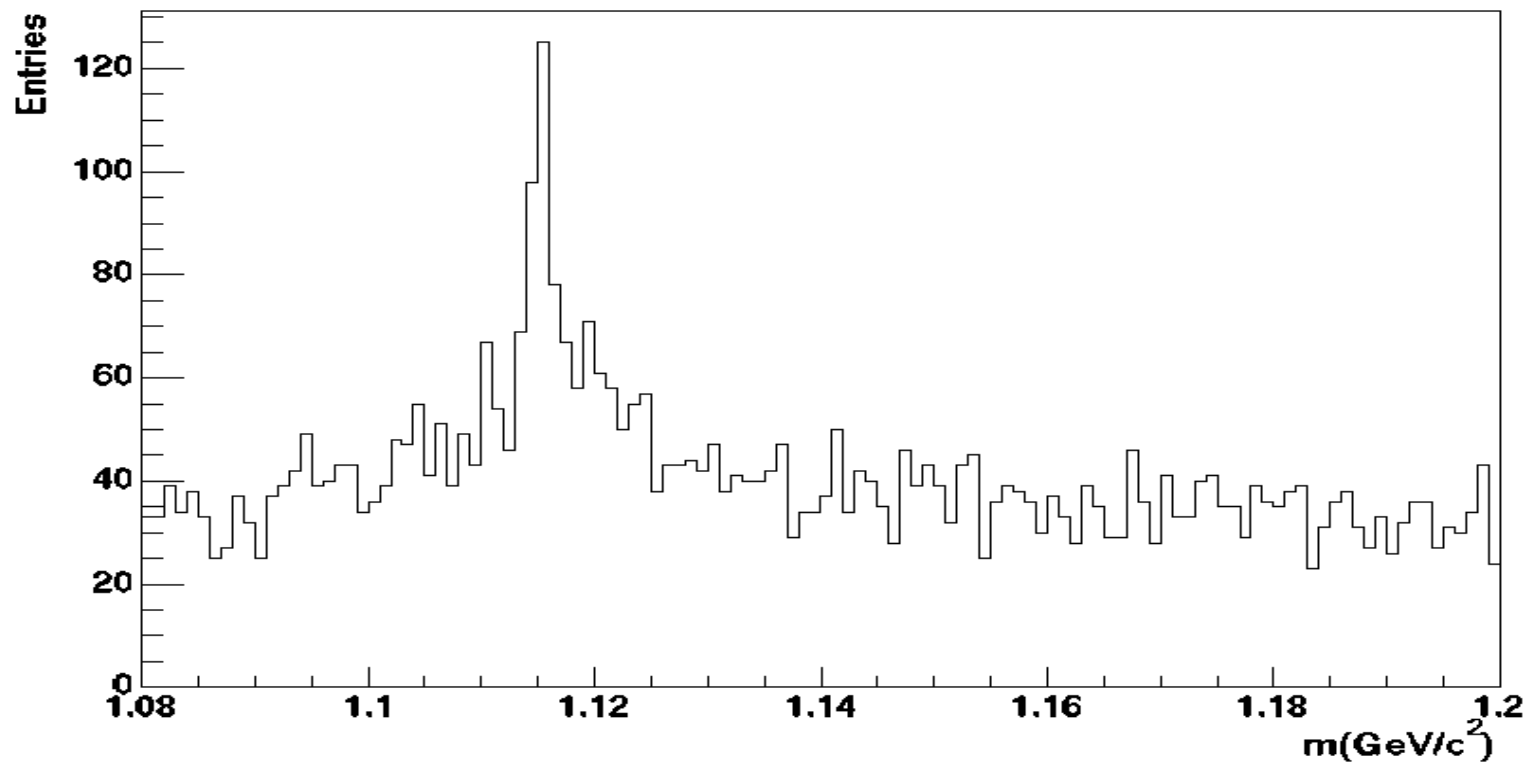
LabInvMmidrap



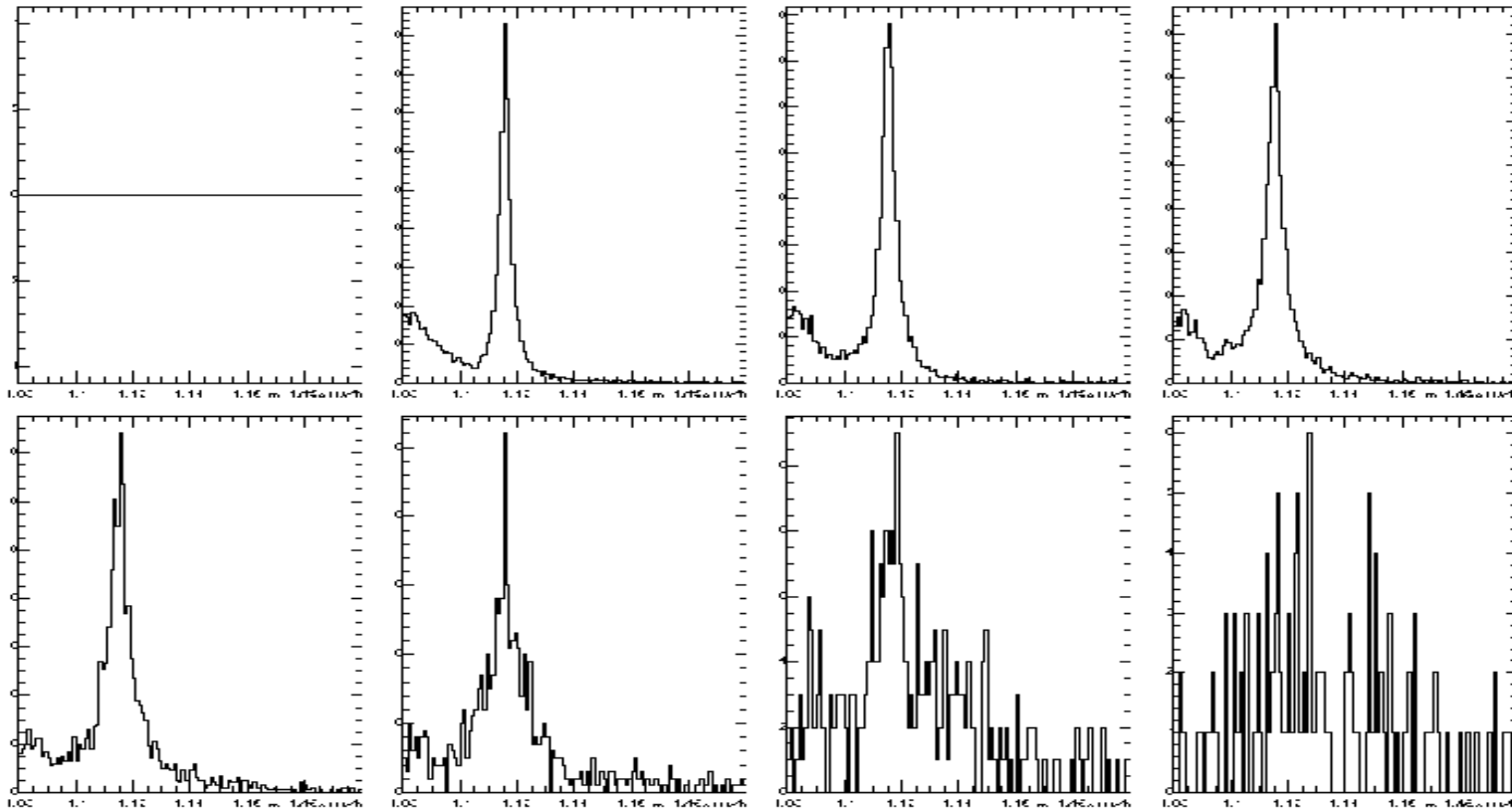
LamInvMmidrap



LabInvMmidrap



0.0-0.3 GeV/c 0.3-0.6 GeV/c 0.6-0.9 GeV/c 0.9-1.2 GeV/c



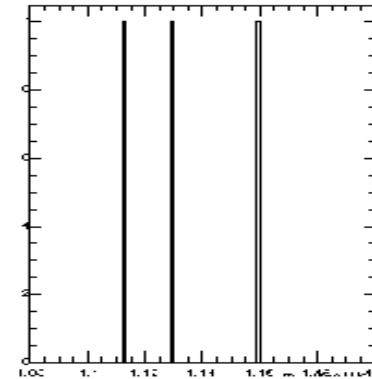
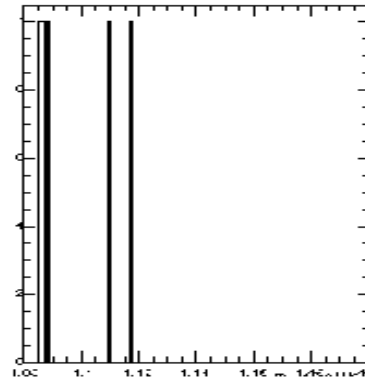
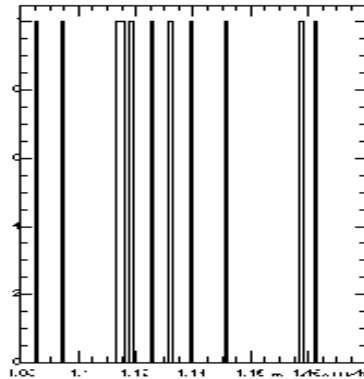
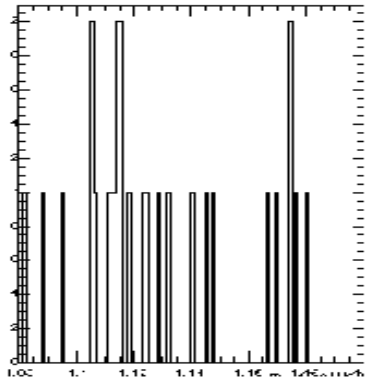
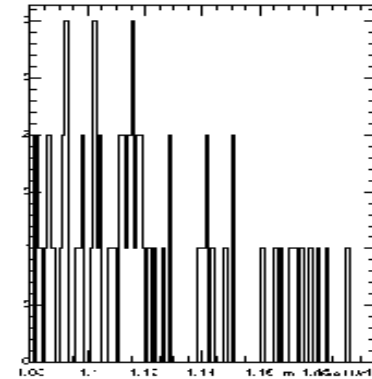
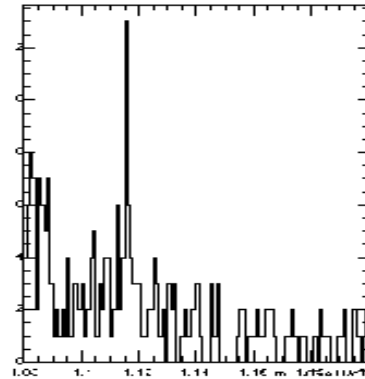
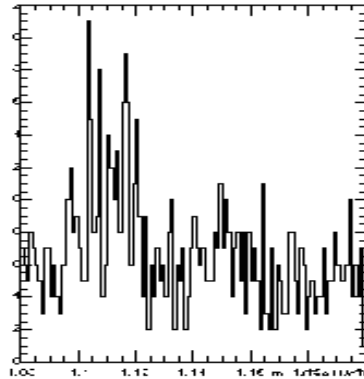
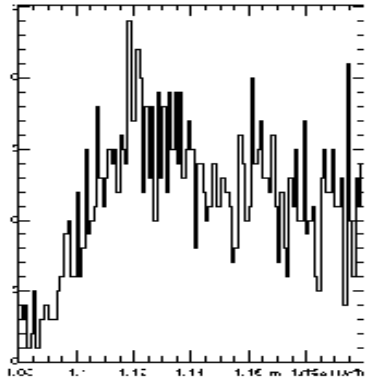
1.2-1.5 GeV/c 1.5-1.8 GeV/c 2.1-2.4 GeV/c 2.4-2.7 GeV/c

0.0-0.3 GeV/c

0.3-0.6 GeV/c

0.6-0.9 GeV/c

0.9-1.2 GeV/c



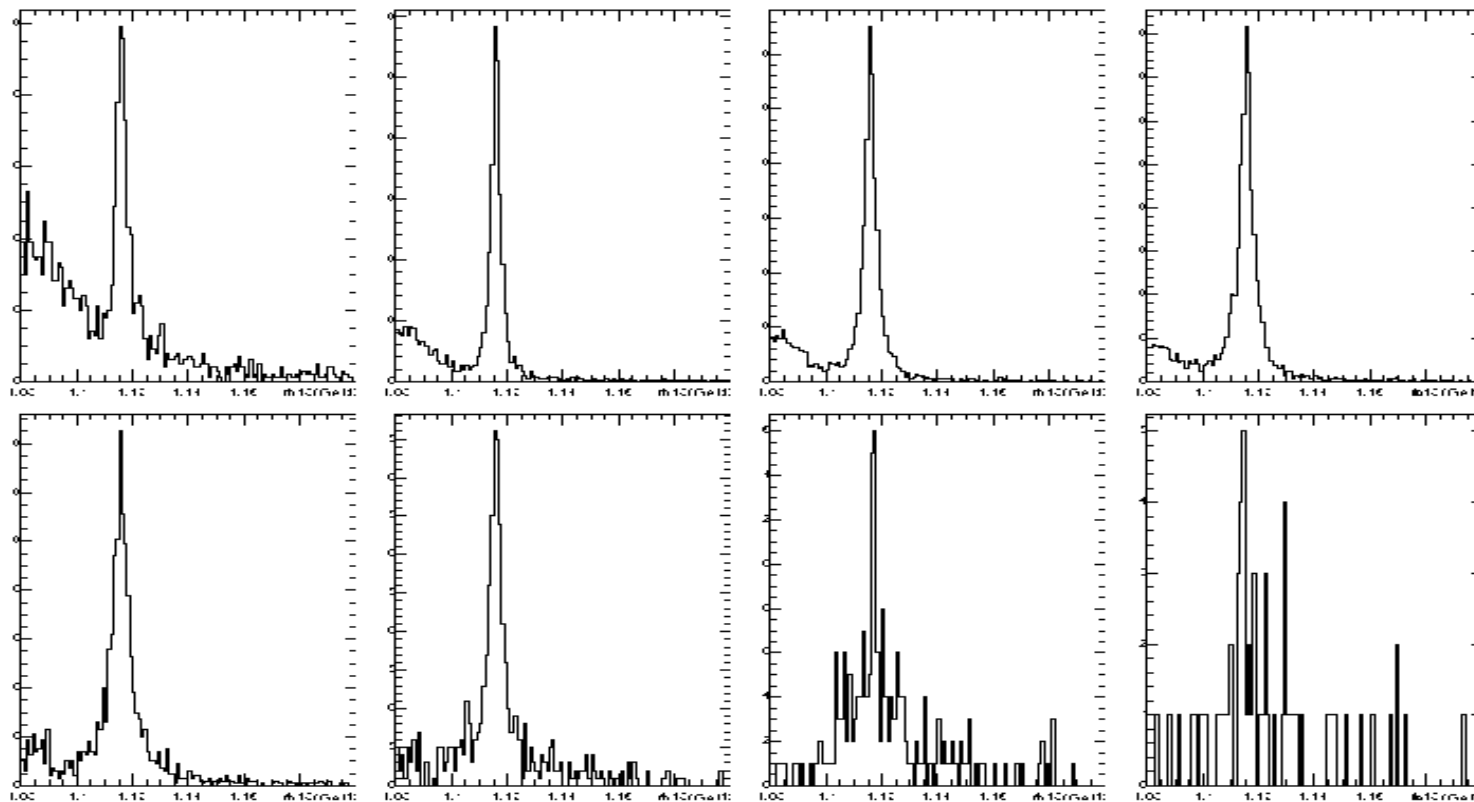
1.2-1.5 GeV/c

1.5-1.8 GeV/c

2.1-2.4 GeV/c

2.4-2.7 GeV/c

0.0-0.3 GeV/c 0.3-0.6 GeV/c 0.6-0.9 GeV/c 0.9-1.2 GeV/c



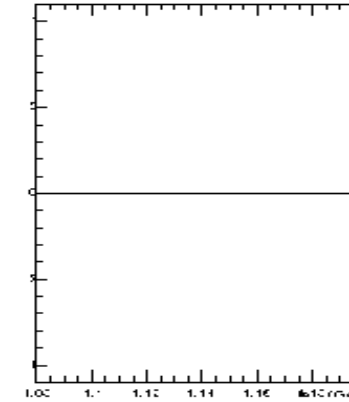
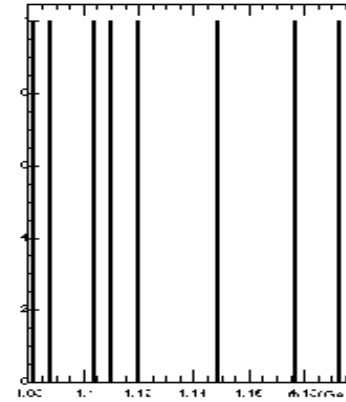
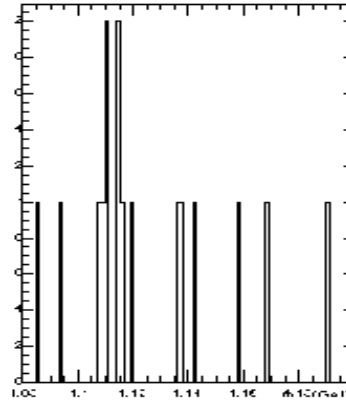
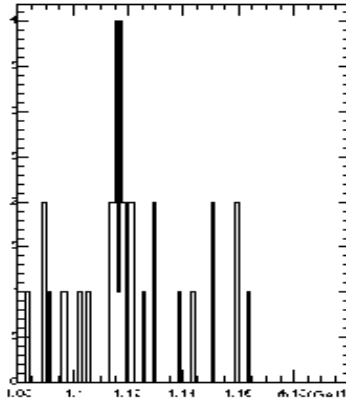
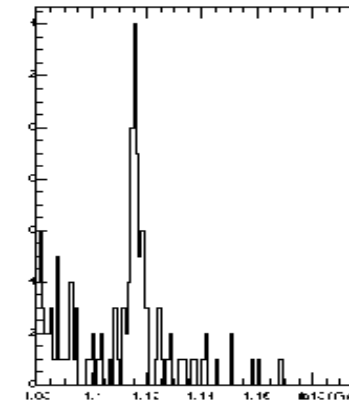
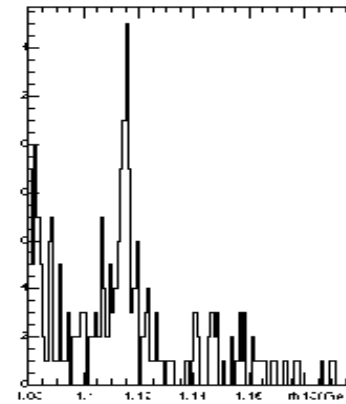
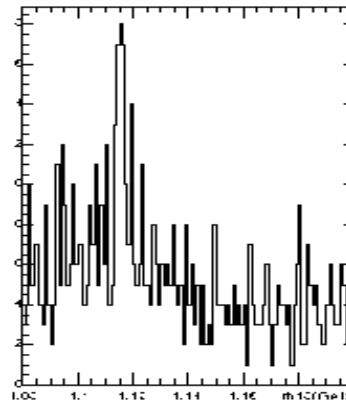
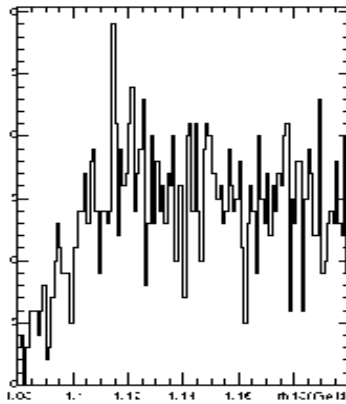
1.2-1.5 GeV/c 1.5-1.8 GeV/c 2.1-2.4 GeV/c 2.4-2.7 GeV/c

0.0-0.3 GeV/c

0.3-0.6 GeV/c

0.6-0.9 GeV/c

0.9-1.2 GeV/c

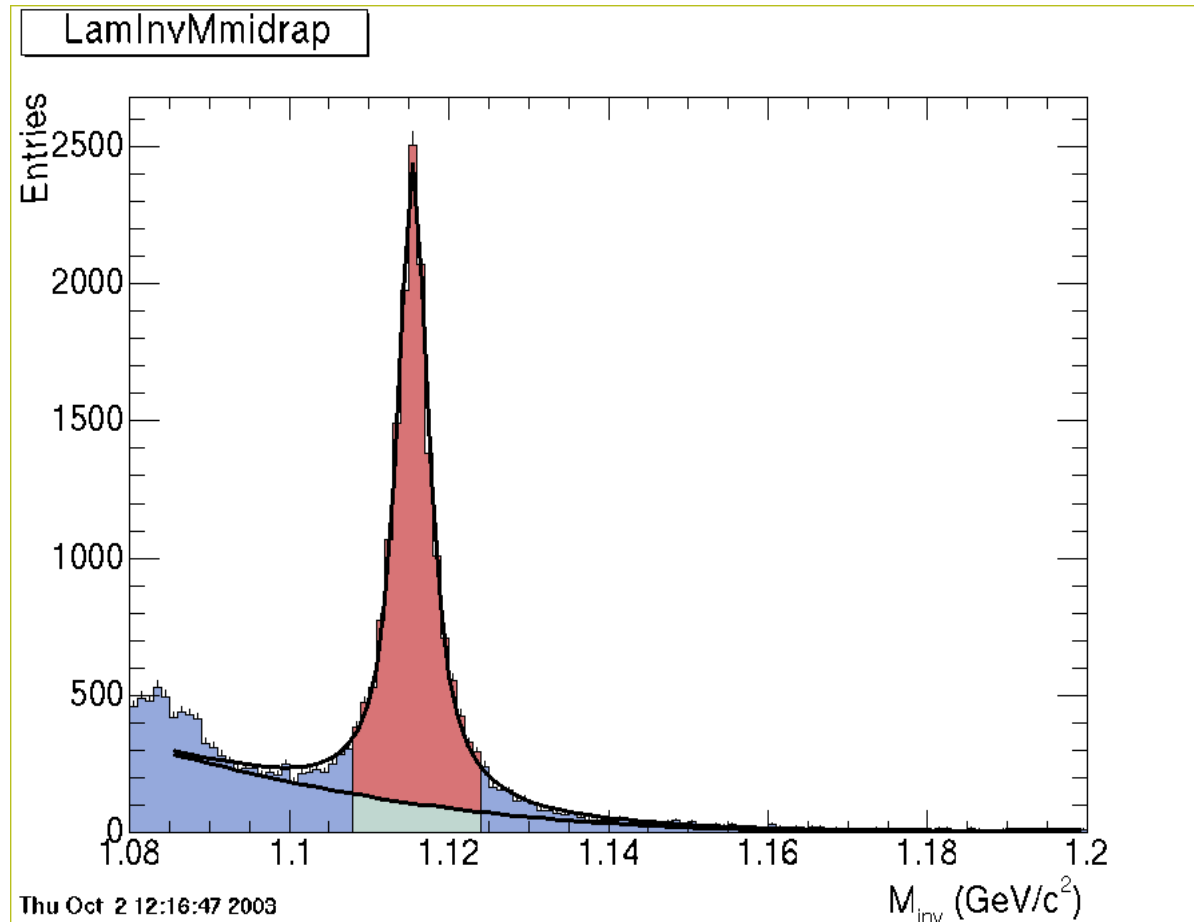


1.2-1.5 GeV/c

1.5-1.8 GeV/c

2.1-2.4 GeV/c

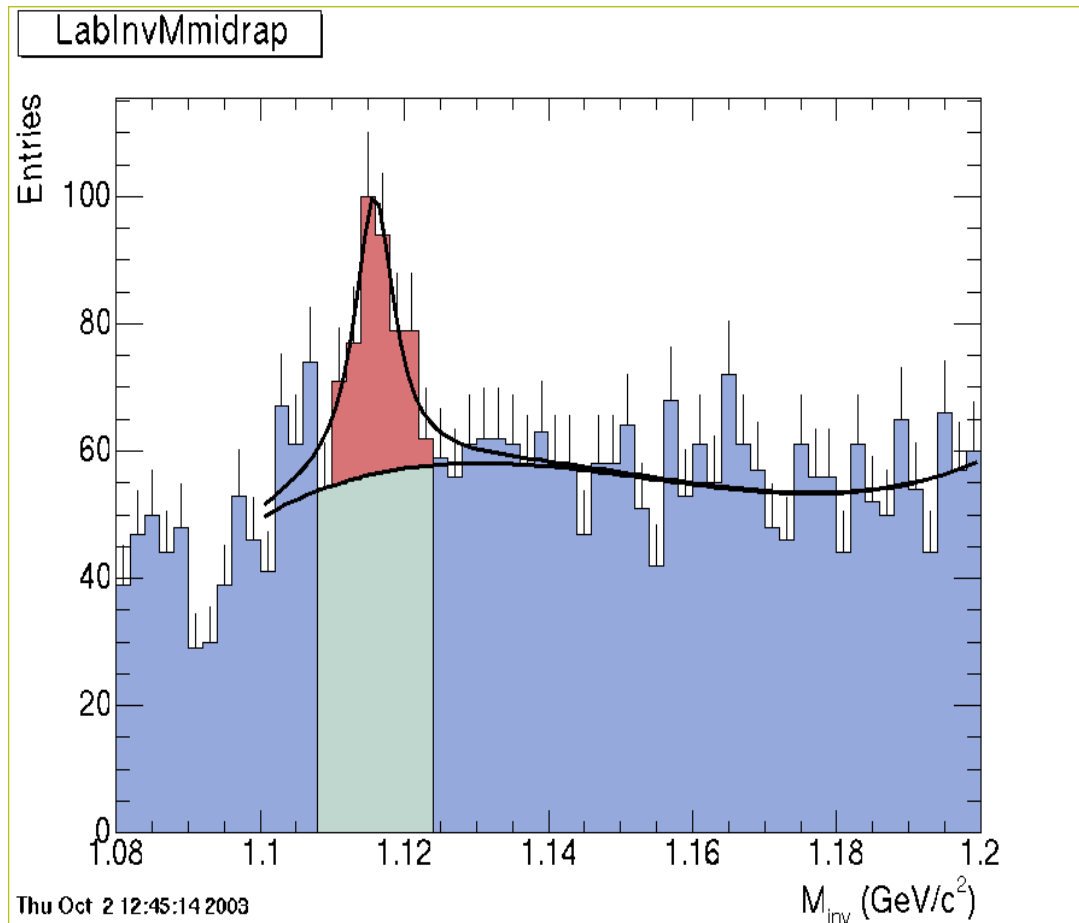
2.4-2.7 GeV/c



Peak Position:
1.115683 GeV

Width of Peak
fit: Lambda
Mass
 ± 0.015 GeV

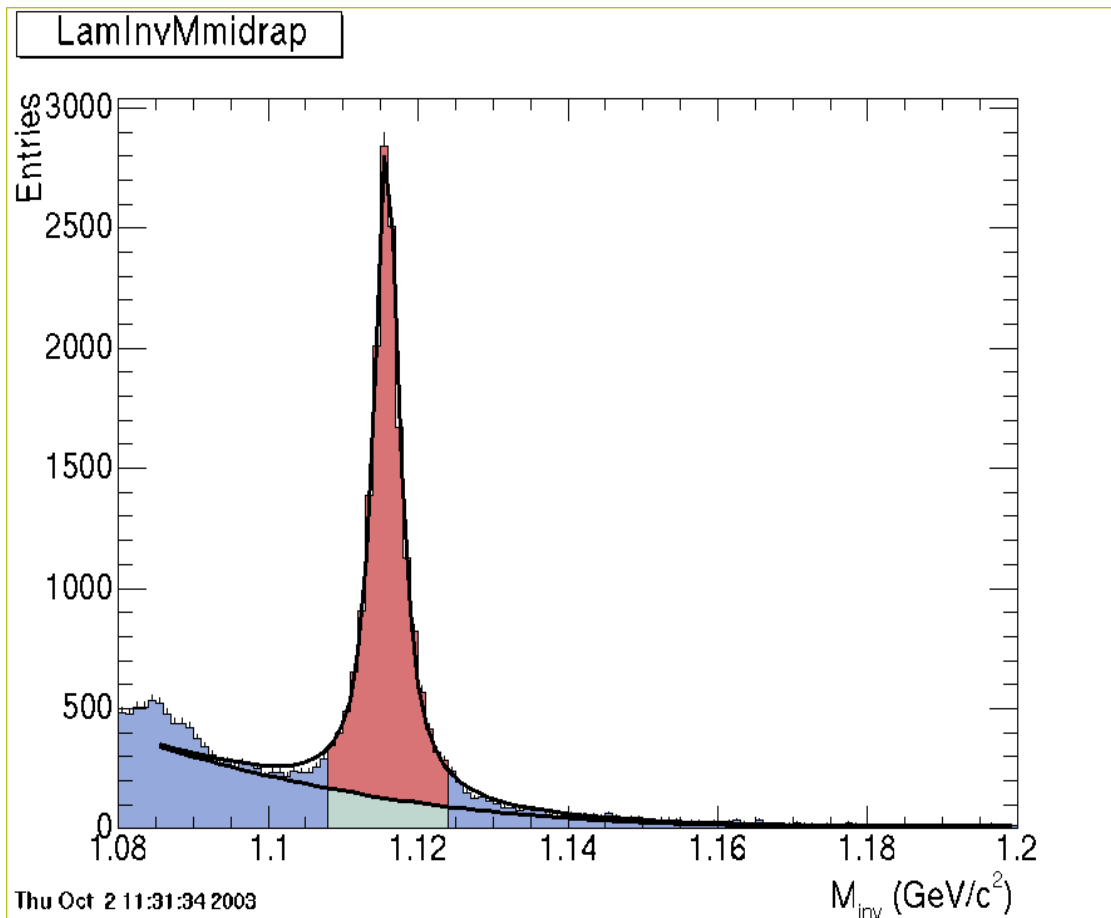
Signal content:
14261.4 events



Peak Position:
1.115683 GeV

Width of Peak fit:
Lambda Mass
 ± 0.015 GeV

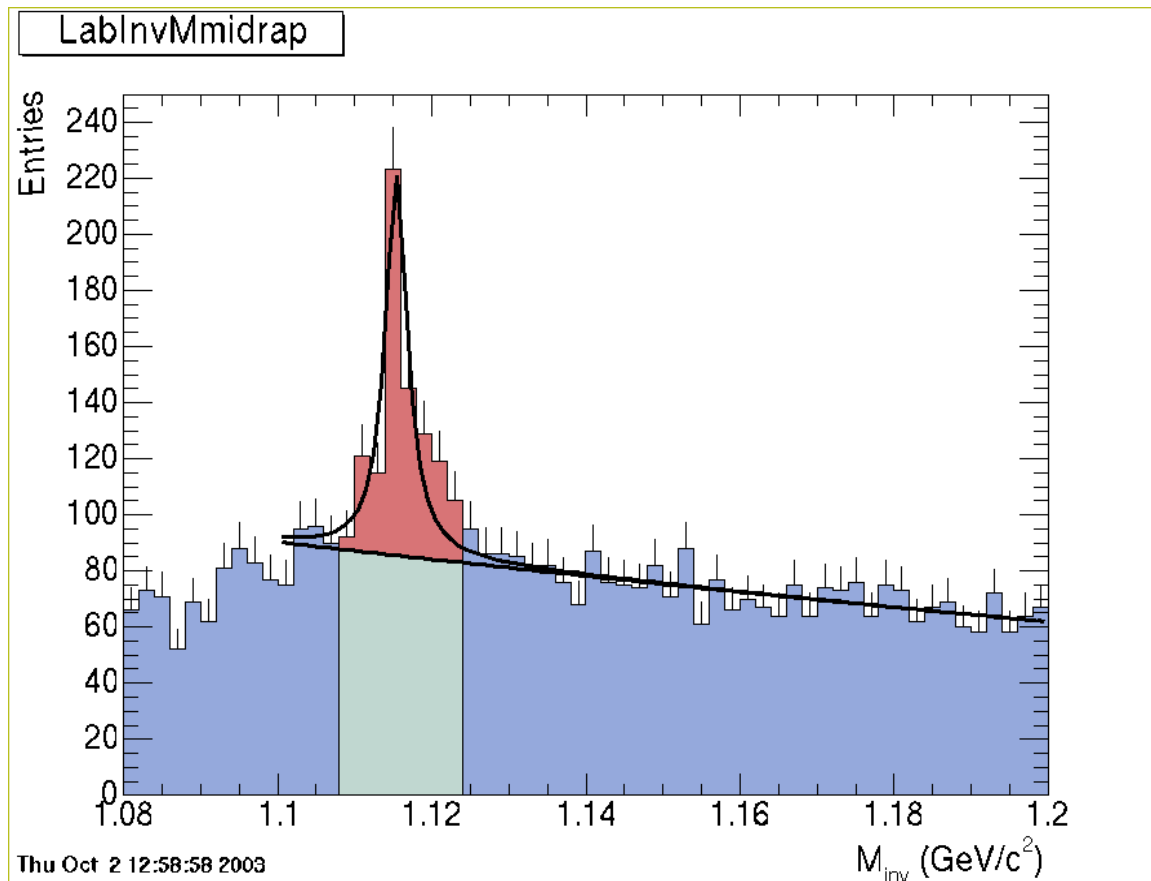
Signal content:
166.3 events



Peak Position:
1.115683 GeV

Width of Peak
fit: Lambda Mass
 ± 0.015 GeV

Signal content:
14722.1 events

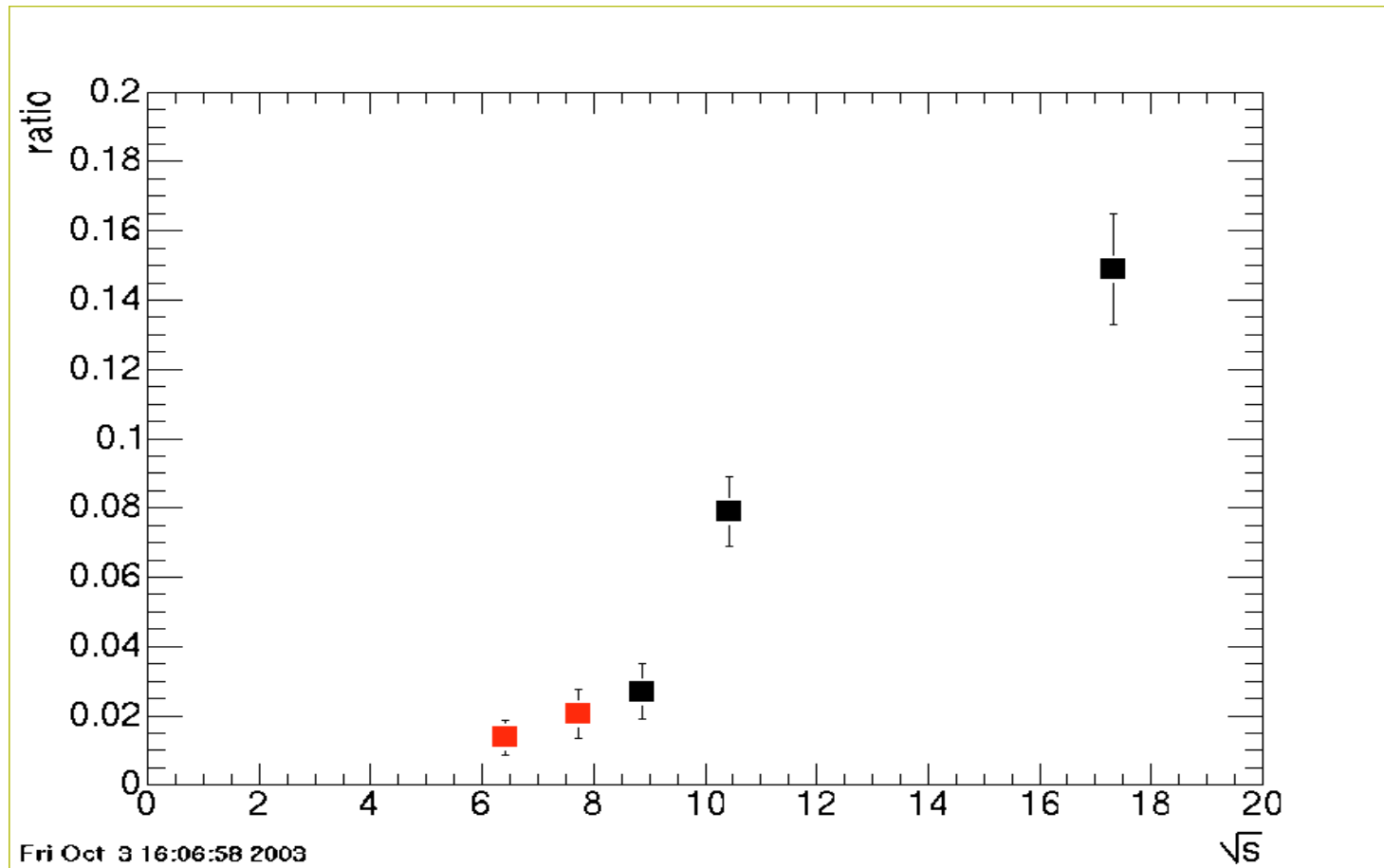


Peak Position:
1.115683 GeV

Width of Peak fit:
Lambda Mass
 ± 0.015 GeV

Signal content:
365.9 events

□ λ and Antilambda ratio for all energies



- Simulation
- Embedding in real events
- Final efficiency (QM 04)
 - Final spectra (QM04)
 - Final yields (QM04)