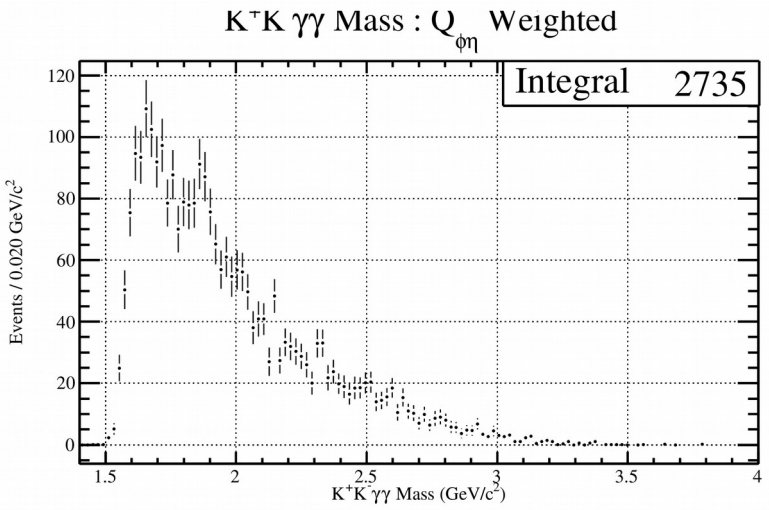
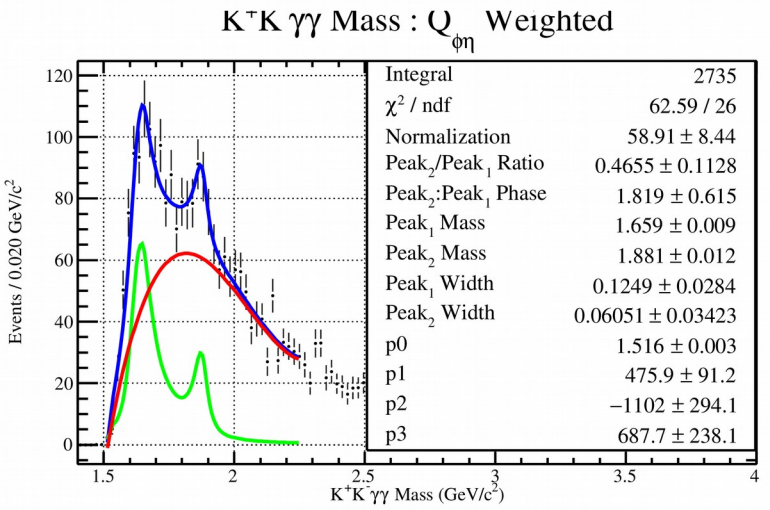
Cut Studies

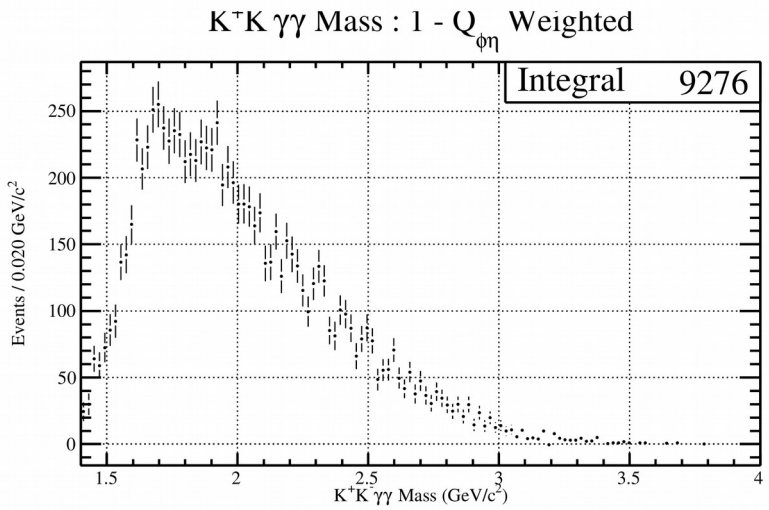
- Three Cuts Are Studied With Data:
  - Beam Energy @ 7.5 GeV
  - Angle of Eta Meson @ 18 degrees
  - N* Mass Cut @ 1.8 GeV/c^2

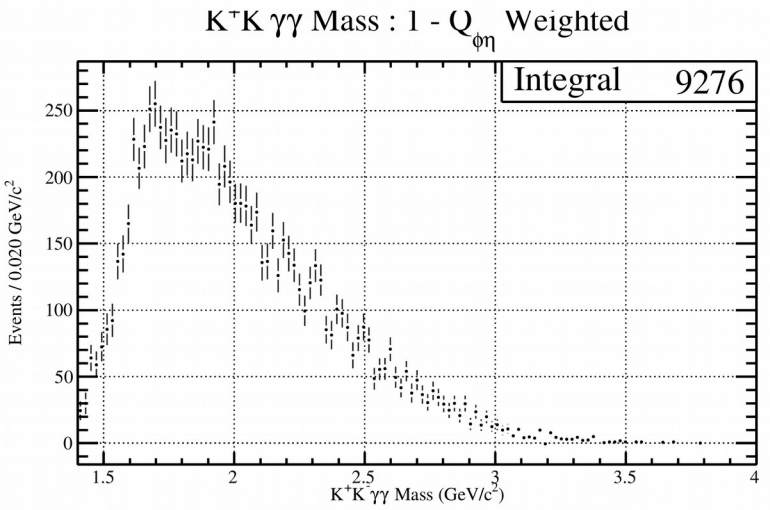
- I look at PhiEta and N* Invariant Mass Plots

All Data

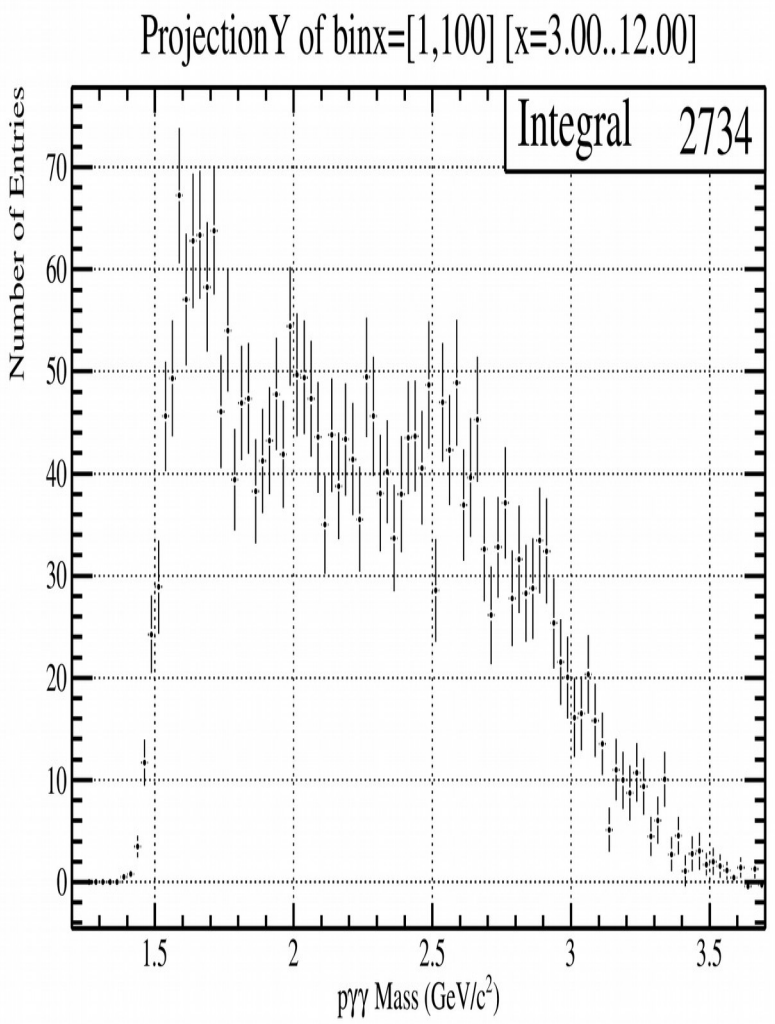

$K^+K^-\gamma\gamma$ Mass : $Q_{\phi\eta}$ Weighted
Integral 2735
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

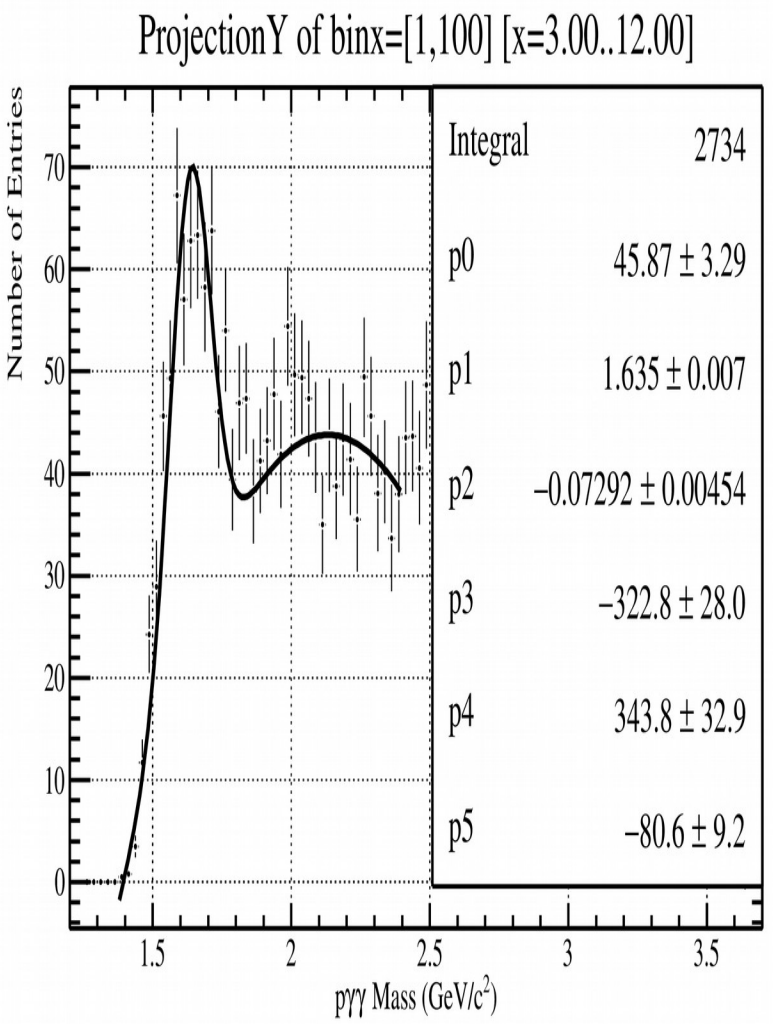

$K^+K^-\gamma\gamma$ Mass : $Q_{\phi\eta}$ Weighted
Integral 2735
χ^2 / ndf 62.59 / 26
Normalization 58.91 ± 8.44
$Peak_2/Peak_1$ Ratio 0.4655 ± 0.1128
$Peak_2$:$Peak_1$ Phase 1.819 ± 0.615
$Peak_1$ Mass 1.659 ± 0.009
$Peak_2$ Mass 1.881 ± 0.012
$Peak_1$ Width 0.1249 ± 0.0284
$Peak_2$ Width 0.06051 ± 0.03423
p0 1.516 ± 0.003
p1 475.9 ± 91.2
p2 −1102 ± 294.1
p3 687.7 ± 238.1
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)


$K^+K^-\gamma\gamma$ Mass : 1 - $Q_{\phi\eta}$ Weighted
Integral 9276
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

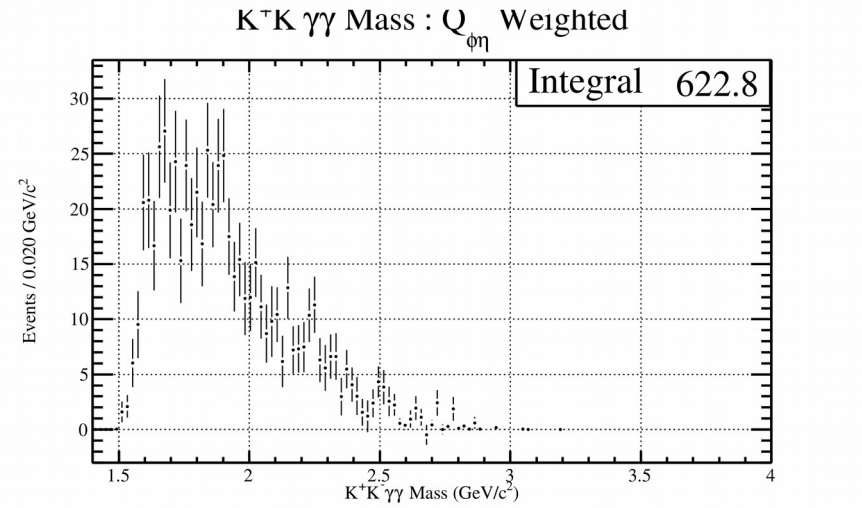

$K^+K^-\gamma\gamma$ Mass : 1 - $Q_{\phi\eta}$ Weighted
Integral 9276
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

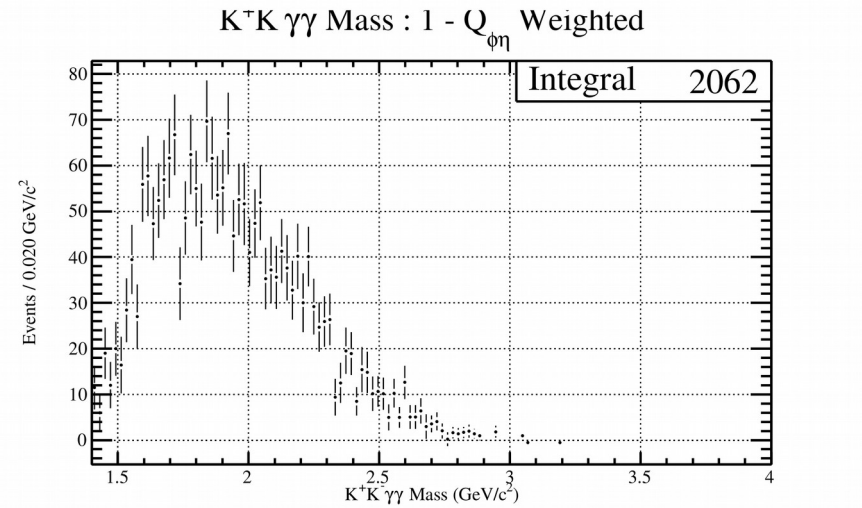
All Data


ProjectionY of binx=[1,100] [x=3.00..12.00]
Integral 2734
Number of Entries
pγγ Mass (GeV/c²)

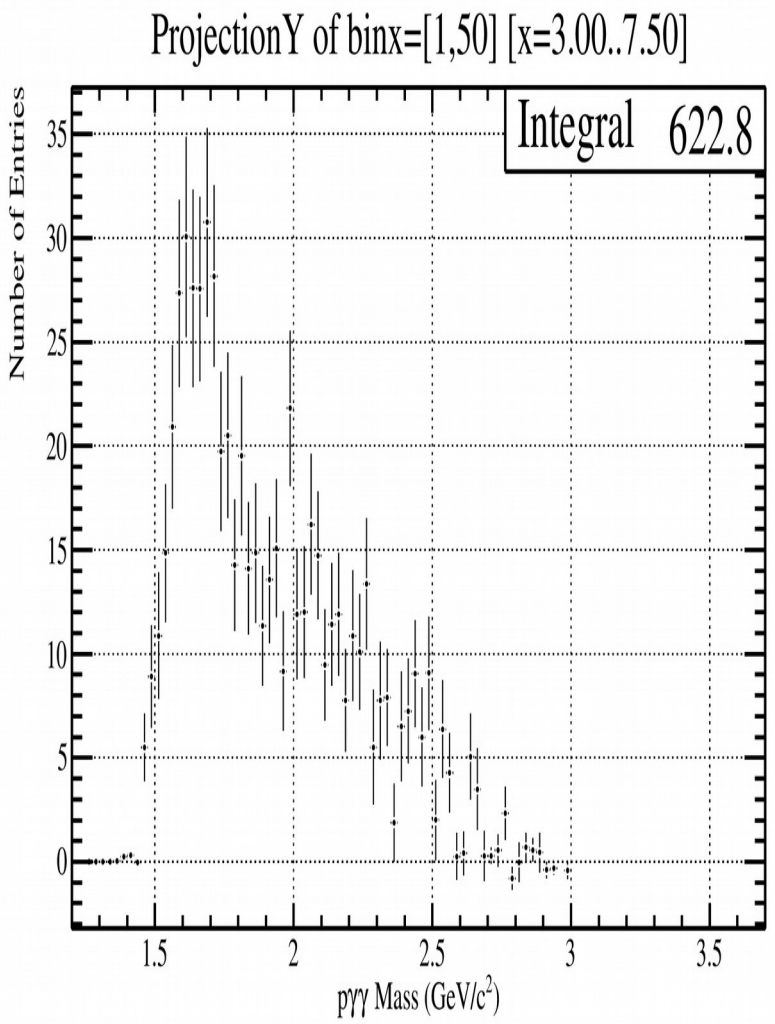

ProjectionY of binx=[1,100] [x=3.00..12.00]
Integral 2734
p0 45.87 ± 3.29
p1 1.635 ± 0.007
p2 −0.07292 ± 0.00454
p3 −322.8 ± 28.0
p4 343.8 ± 32.9
p5 −80.6 ± 9.2
Number of Entries
pγγ Mass (GeV/c²)

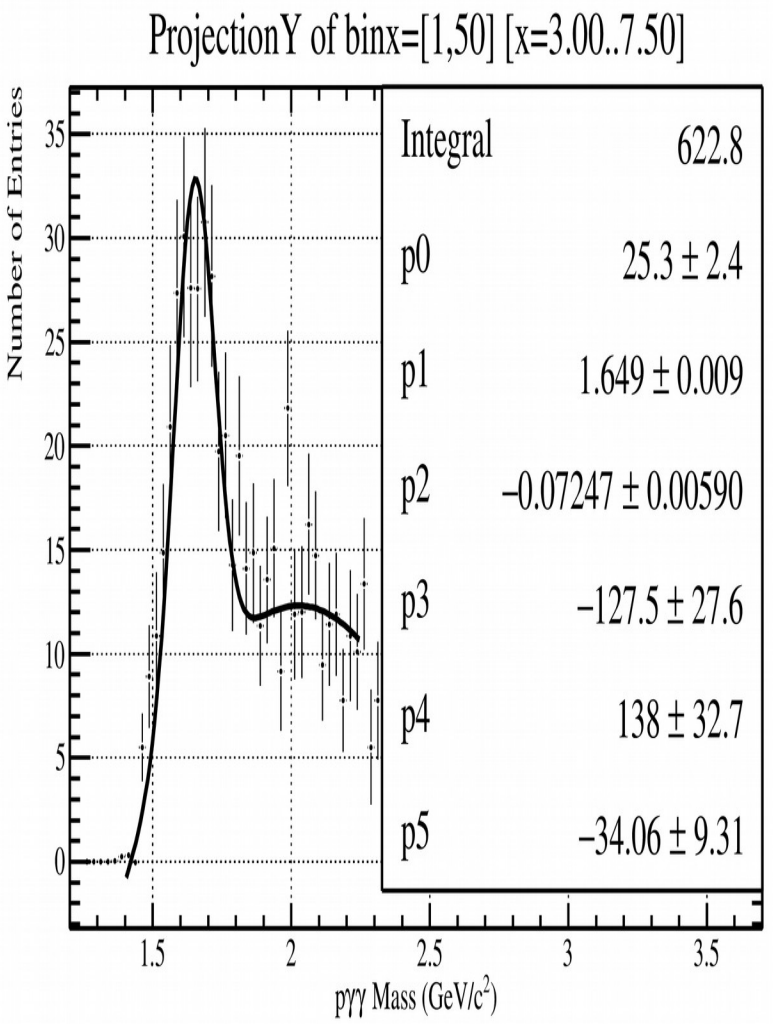
Beam E < 7.5 GeV


$K^+K^-\gamma\gamma$ Mass : $Q_{\phi\eta}$ Weighted
Integral 622.8
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

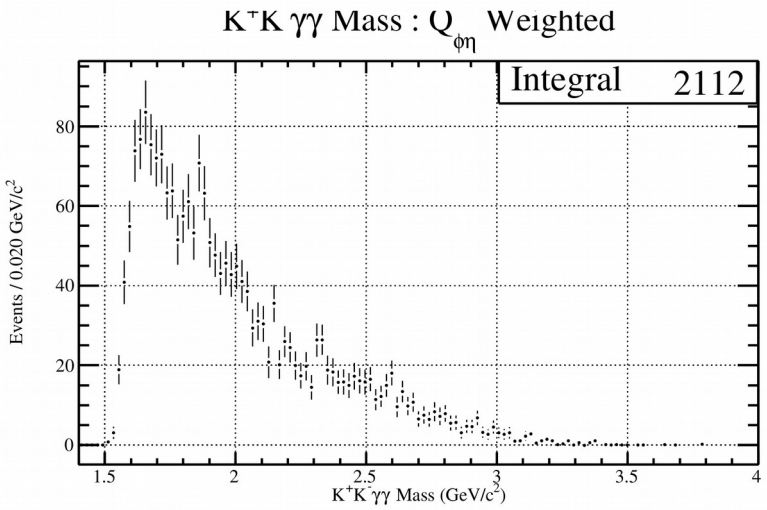

$K^+K^-\gamma\gamma$ Mass : 1 - $Q_{\phi\eta}$ Weighted
Integral 2062
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

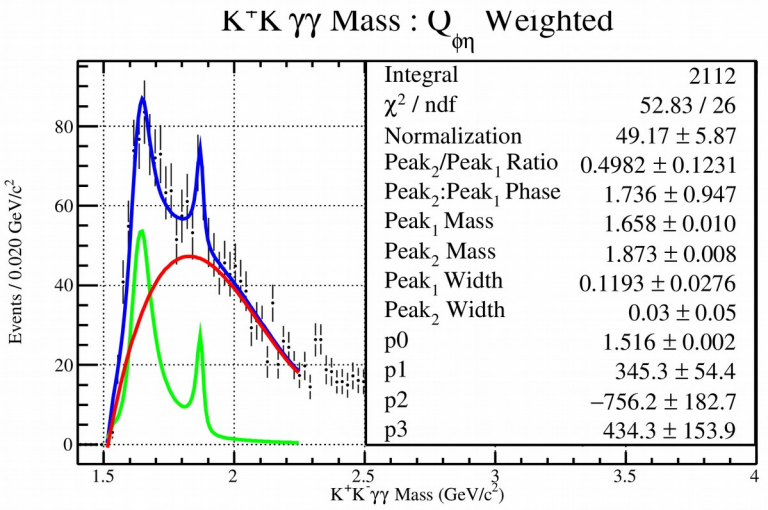
Beam E < 7.5 GeV

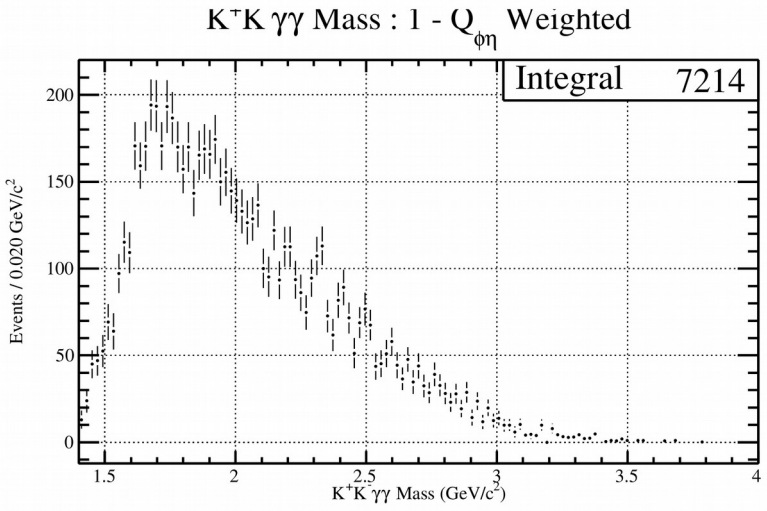

ProjectionY of binx=[1,50] [x=3.00..7.50]
Integral 622.8
Number of Entries
pγγ Mass (GeV/c²)

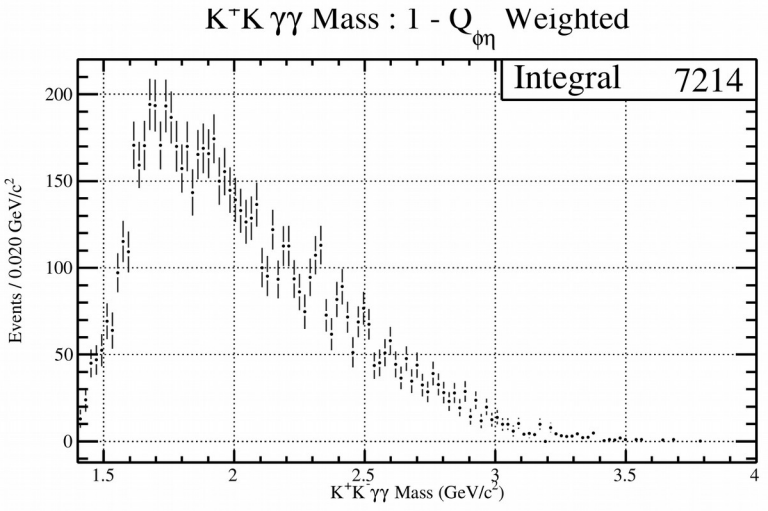

ProjectionY of binx=[1,50] [x=3.00..7.50]
Integral 622.8
p0 25.3 ± 2.4
p1 1.649 ± 0.009
p2 −0.07247 ± 0.00590
p3 −127.5 ± 27.6
p4 138 ± 32.7
p5 −34.06 ± 9.31
Number of Entries
pγγ Mass (GeV/c²)

Beam E > 7.5 GeV

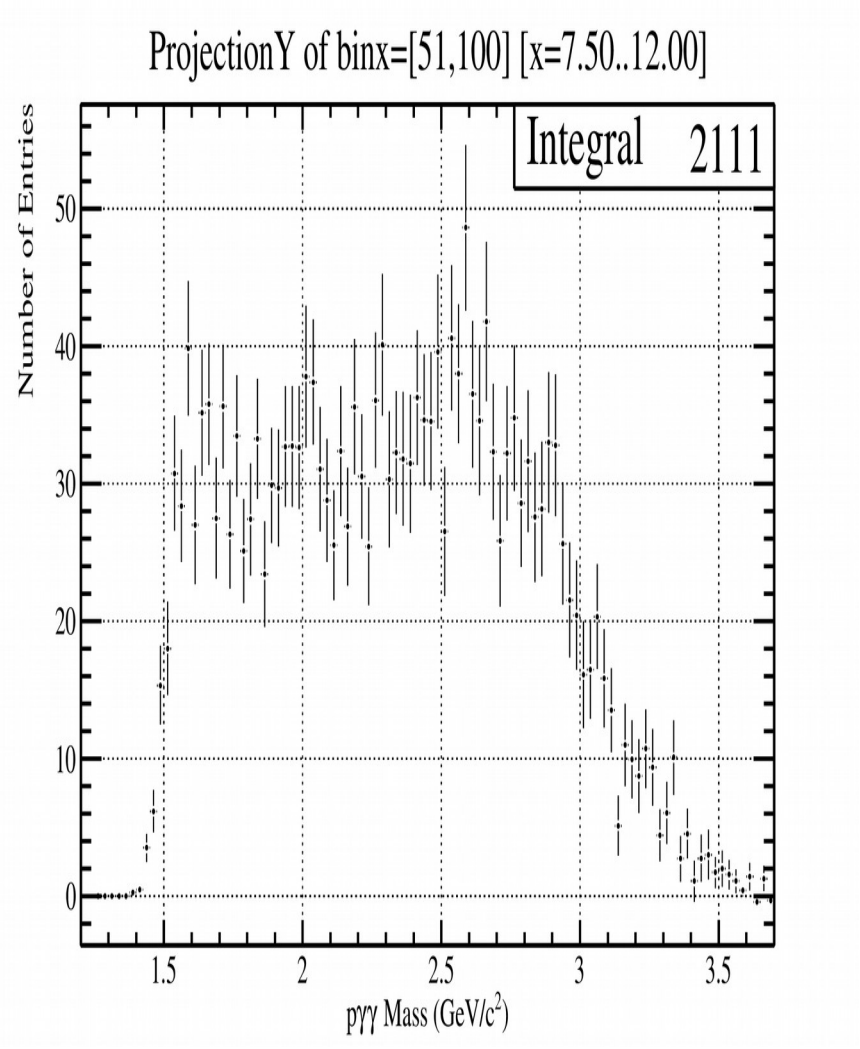

$K^+K^-\gamma\gamma$ Mass : $Q_{\phi\eta}$ Weighted
Integral 2112
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)


$K^+K^-\gamma\gamma$ Mass : $Q_{\phi\eta}$ Weighted
Integral 2112
χ^2 / ndf 52.83 / 26
Normalization 49.17 ± 5.87
$Peak_2/Peak_1$ Ratio 0.4982 ± 0.1231
$Peak_2$:$Peak_1$ Phase 1.736 ± 0.947
$Peak_1$ Mass 1.658 ± 0.010
$Peak_2$ Mass 1.873 ± 0.008
$Peak_1$ Width 0.1193 ± 0.0276
$Peak_2$ Width 0.03 ± 0.05
p0 1.516 ± 0.002
p1 345.3 ± 54.4
p2 −756.2 ± 182.7
p3 434.3 ± 153.9
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

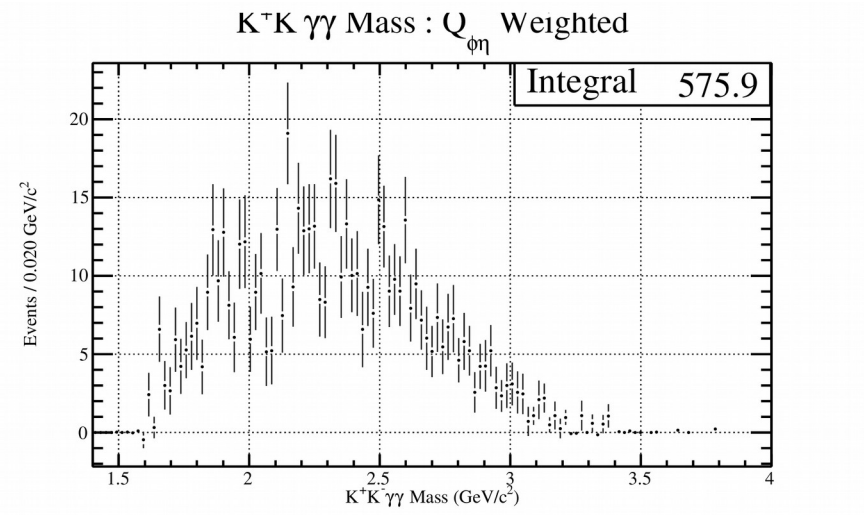

$K^+K^-\gamma\gamma$ Mass : 1 - $Q_{\phi\eta}$ Weighted
Integral 7214
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

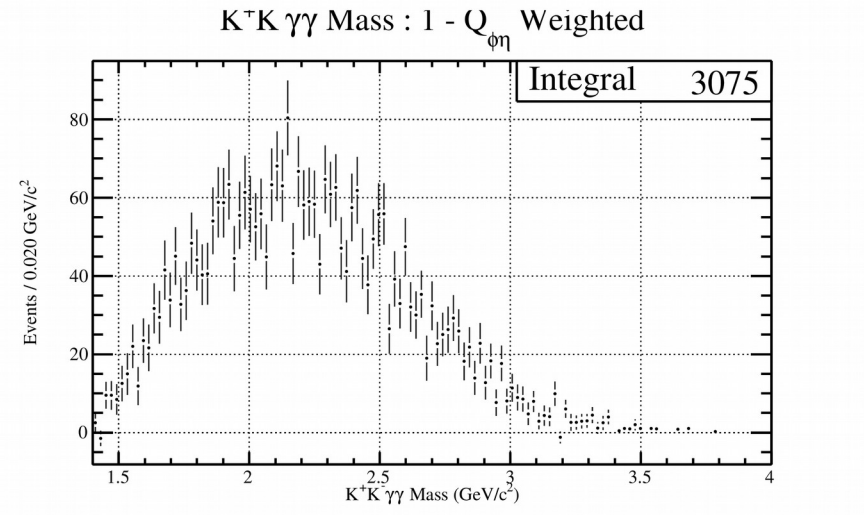

$K^+K^-\gamma\gamma$ Mass : 1 - $Q_{\phi\eta}$ Weighted
Integral 7214
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

Beam E > 7.5 GeV

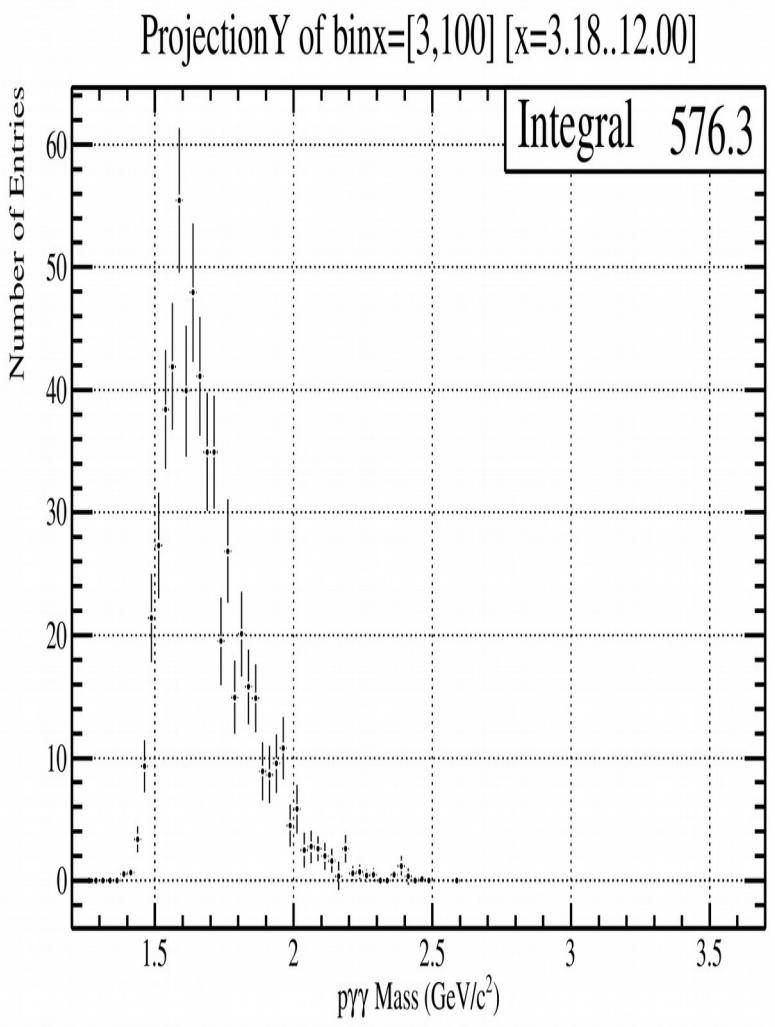

ProjectionY of binx=[51,100] [x=7.50..12.00]
Integral 2111
Number of Entries
0
10
20
30
40
50
1.5
2
2.5
3
3.5
pγγ Mass (GeV/c²)

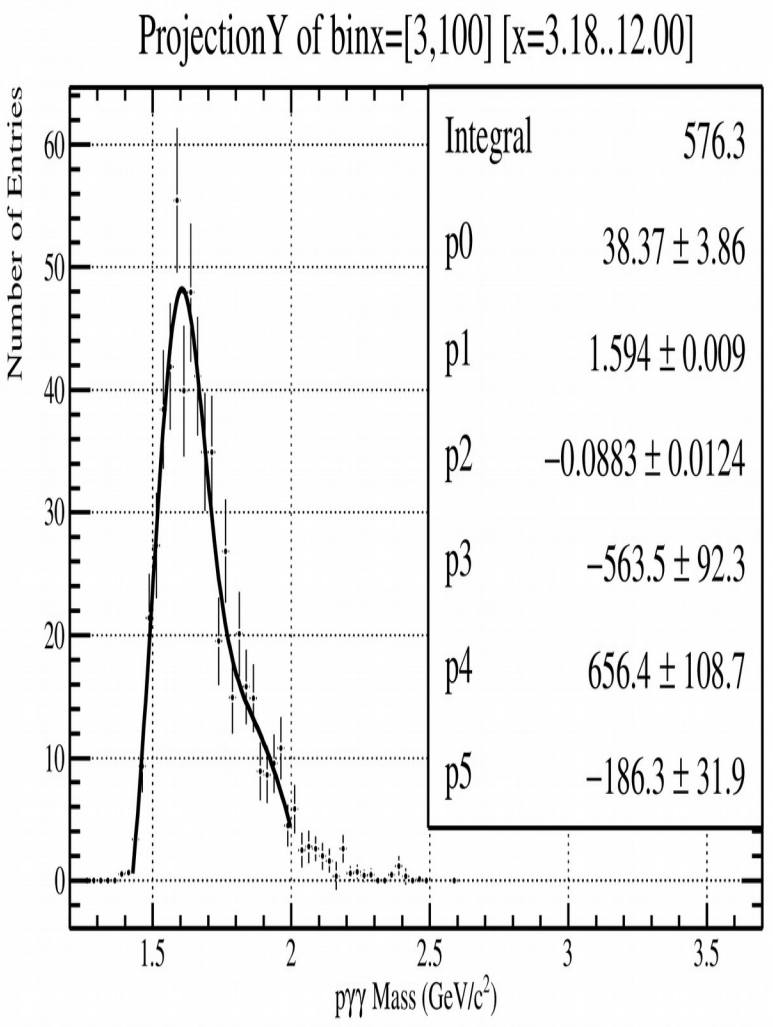
Theta > 18 deg


K⁺K γγ Mass : Q_φη Weighted
Integral 575.9
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)

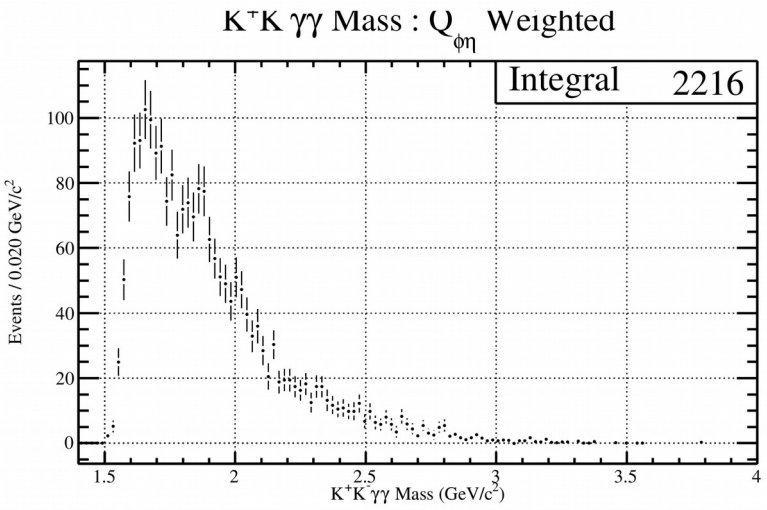

K⁺K γγ Mass : 1 - Q_φη Weighted
Integral 3075
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)

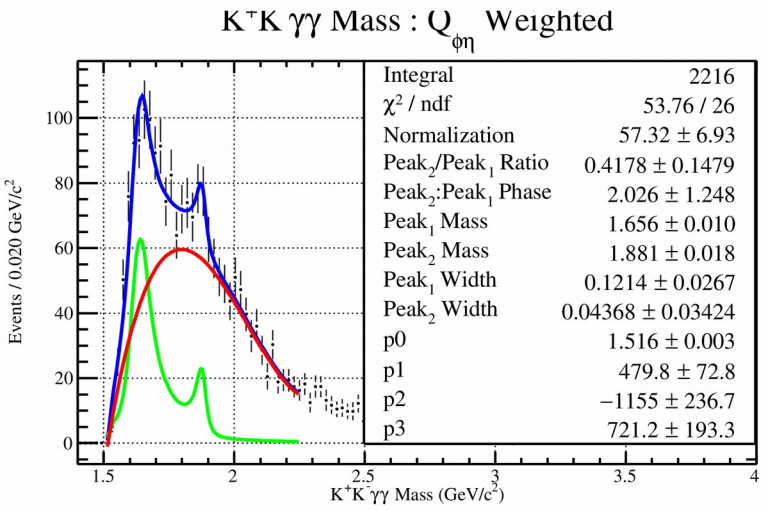
Theta > 18 deg

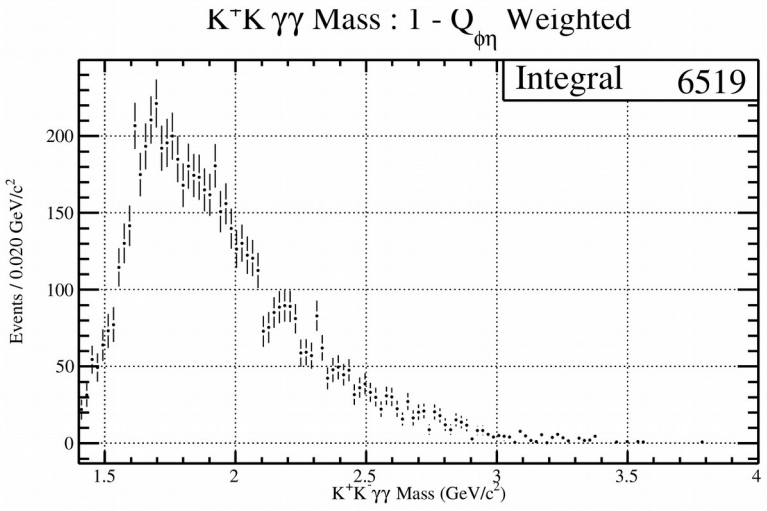

ProjectionY of binx=[3,100] [x=3.18..12.00]
Integral 576.3
Number of Entries
pγγ Mass (GeV/c²)

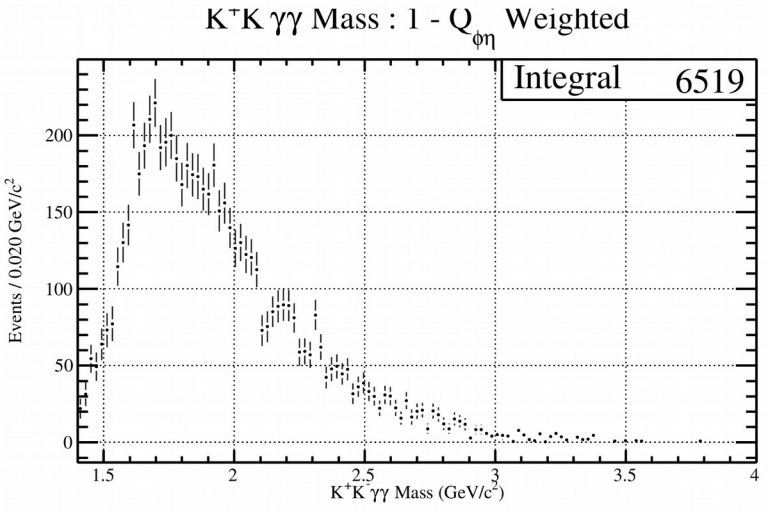

ProjectionY of binx=[3,100] [x=3.18..12.00]
Integral 576.3
p0 38.37 ± 3.86
p1 1.594 ± 0.009
p2 −0.0883 ± 0.0124
p3 −563.5 ± 92.3
p4 656.4 ± 108.7
p5 −186.3 ± 31.9
Number of Entries
pγγ Mass (GeV/c²)

Theta < 18 deg

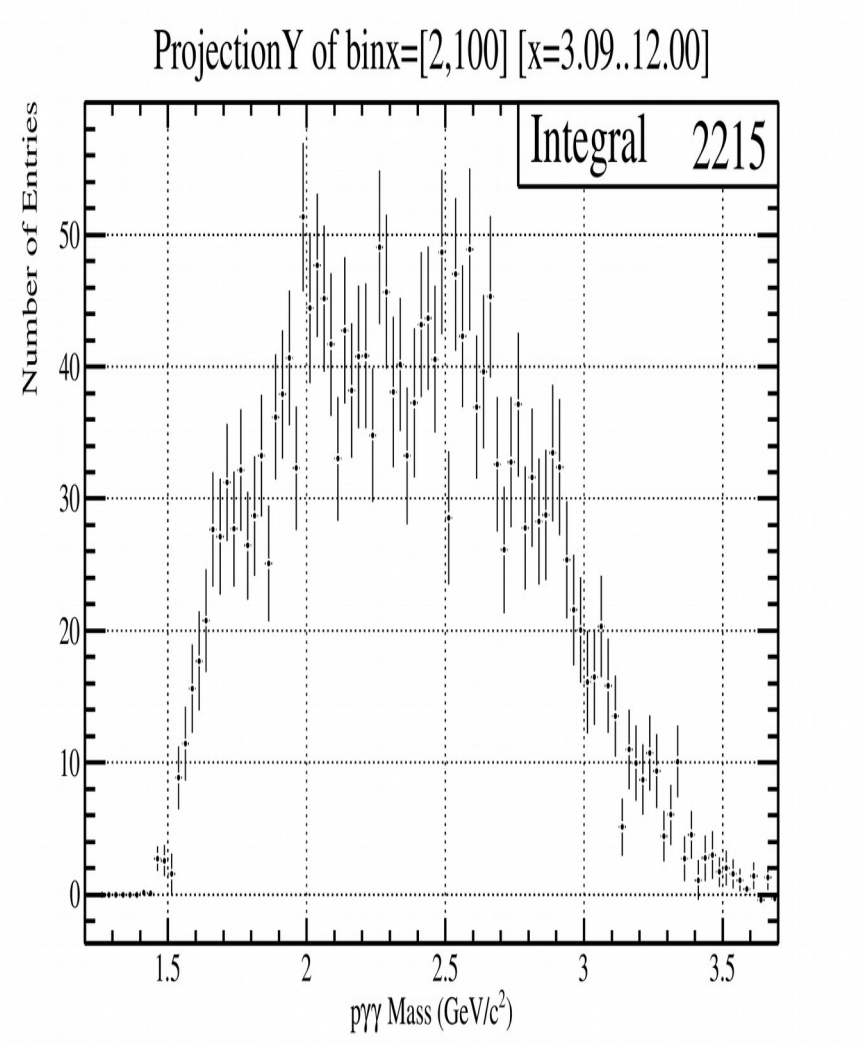

K⁺K γγ Mass : Q_φη Weighted
Integral 2216
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)


K⁺K γγ Mass : Q_φη Weighted
Integral 2216
χ² / ndf 53.76 / 26
Normalization 57.32 ± 6.93
Peak₂/Peak₁ Ratio 0.4178 ± 0.1479
Peak₂:Peak₁ Phase 2.026 ± 1.248
Peak₁ Mass 1.656 ± 0.010
Peak₂ Mass 1.881 ± 0.018
Peak₁ Width 0.1214 ± 0.0267
Peak₂ Width 0.04368 ± 0.03424
p0 1.516 ± 0.003
p1 479.8 ± 72.8
p2 −1155 ± 236.7
p3 721.2 ± 193.3
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)

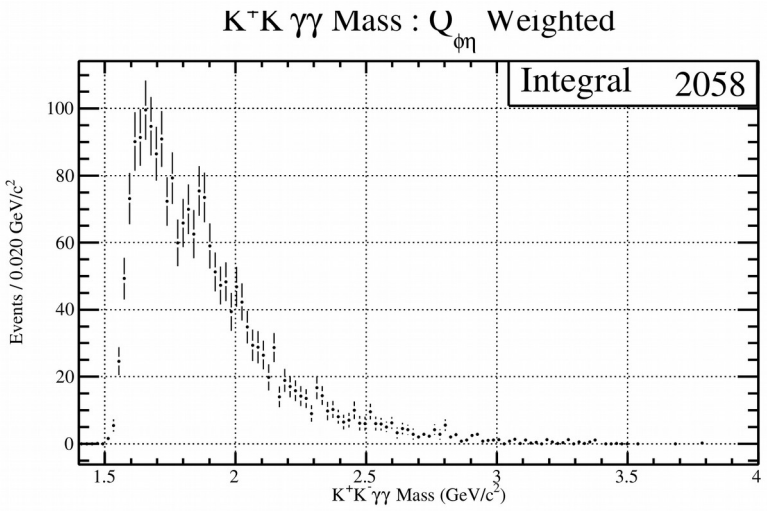

K⁺K γγ Mass : 1 - Q_φη Weighted
Integral 6519
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)

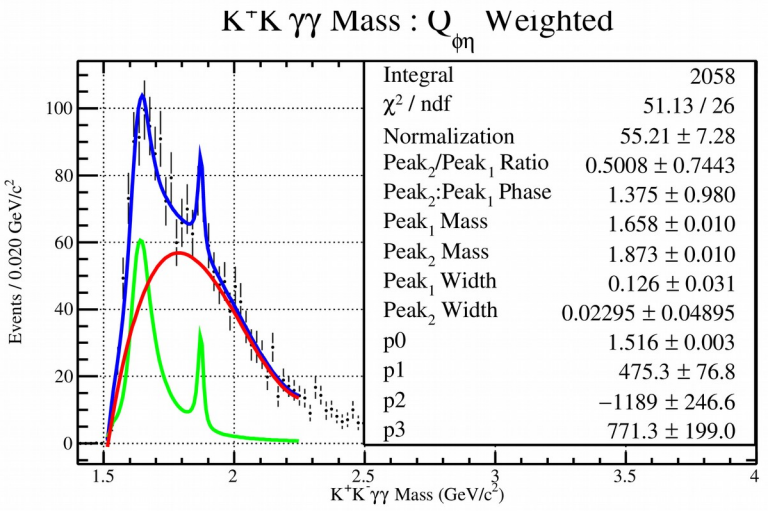

K⁺K γγ Mass : 1 - Q_φη Weighted
Integral 6519
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)

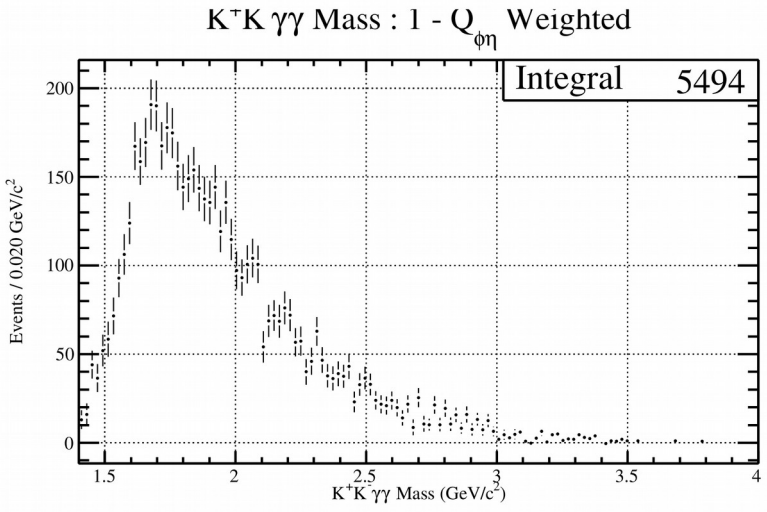
Theta < 18 deg

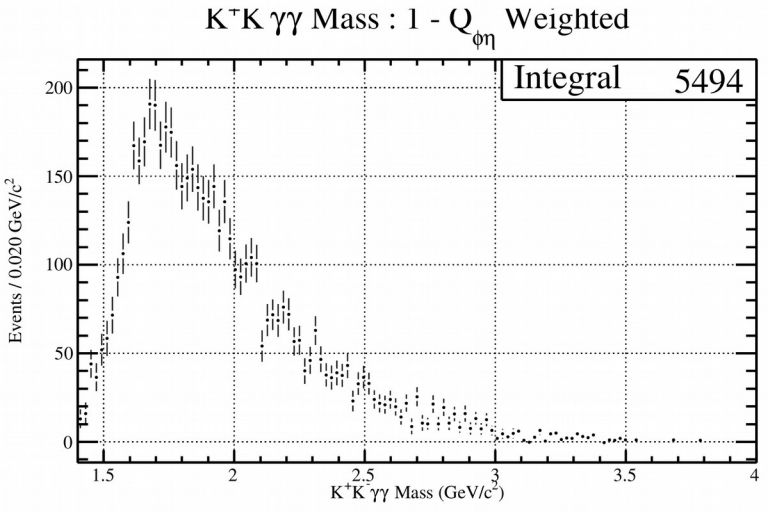

ProjectionY of binx=[2,100] [x=3.09..12.00]
Integral 2215
Number of Entries
0
10
20
30
40
50
1.5
2
2.5
3
3.5
pγγ Mass (GeV/c²)

N* > 1.8 GeV/c^2

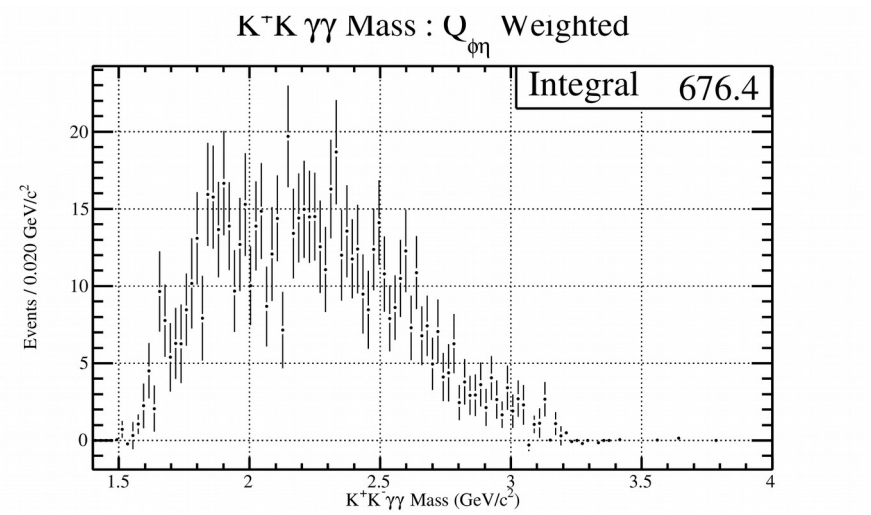

K⁺K γγ Mass : Q_φη Weighted
Integral 2058
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)

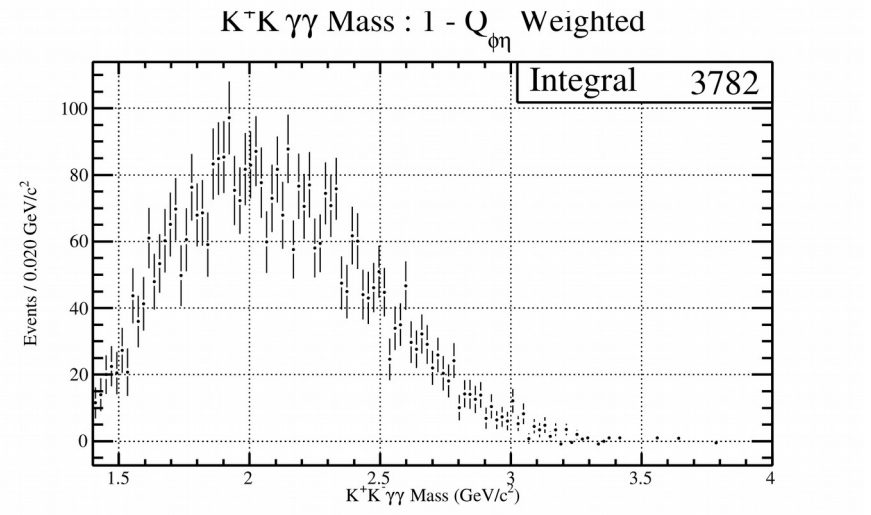

K⁺K γγ Mass : Q_φη Weighted
Integral 2058
χ² / ndf 51.13 / 26
Normalization 55.21 ± 7.28
Peak₂/Peak₁ Ratio 0.5008 ± 0.7443
Peak₂:Peak₁ Phase 1.375 ± 0.980
Peak₁ Mass 1.658 ± 0.010
Peak₂ Mass 1.873 ± 0.010
Peak₁ Width 0.126 ± 0.031
Peak₂ Width 0.02295 ± 0.04895
p0 1.516 ± 0.003
p1 475.3 ± 76.8
p2 −1189 ± 246.6
p3 771.3 ± 199.0
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)


K⁺K γγ Mass : 1 - Q_φη Weighted
Integral 5494
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)


K⁺K γγ Mass : 1 - Q_φη Weighted
Integral 5494
Events / 0.020 GeV/c²
K⁺K⁻γγ Mass (GeV/c²)

N* < 1.8 GeV/c^2


$K^+K^-\gamma\gamma$ Mass : $Q_{\phi\eta}$ Weighted
Integral 676.4
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)


$K^+K^-\gamma\gamma$ Mass : 1 - $Q_{\phi\eta}$ Weighted
Integral 3782
Events / 0.020 GeV/c^2
$K^+K^-\gamma\gamma$ Mass (GeV/c^2)

Summary

CUT	SIGNAL	BG
• No Cut:	Amplitude: 59	~495 Events
• BeamE @ 7.5:	-17%	-55%
• Theta @ 18:	-3%	-92%
• N* Cut:	-7%	-100%

Summary

CUT	SIGNAL	BG
• BeamE @ 7.5:	-70%	-31%
• Theta @ 18:	-6%	-82%
• N* Cut:	-15%	-87%