

Preliminary Analysis of ρ Photoproduction

- 2017-01 Offline Monitoring ver10 -

Alexander Austregesilo
JLab

March 28, 2017



Outline

1 ρ Polarization

2 Remaining Issues

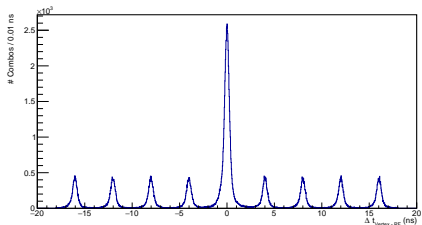
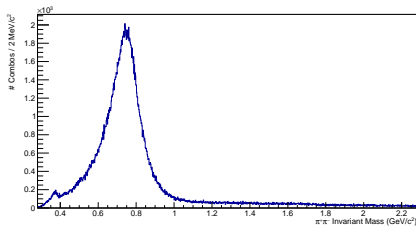
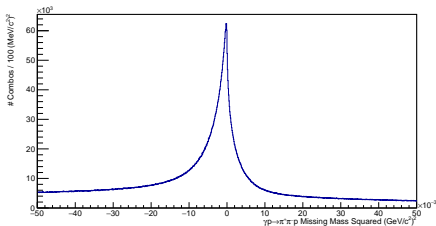
Event Selection

$\gamma p \rightarrow \rho^0(770)p, \rho^0(770) \rightarrow \pi^+\pi^-$

- Offline Monitoring **Version 10**
- 30694, 30736 (0°), 30693, 30735 (90°), 30696, 30737 (45°), 30690, 30738 (135°)
- Basic PID and convergence of kinematic fit
- $|\text{Missing Mass Squared}| < 0.02 \text{ (GeV}/c^2)^2$
- $-0.4 < \text{Missing Energy} < 0.5 \text{ GeV}$
- $0.60 < \text{Invariant Mass} < 0.88 \text{ GeV}/c^2$
- $50 < \text{Vertex Z} < 74 \text{ cm}$
- $|\text{Vertex Time} - \text{Tagger Time}| < 2.004 \text{ ns}$ (Accidentals $\in [2.004, 6.012] \text{ ns}$)
- $4\text{-momentum transfer squared} < 1 \text{ (GeV}/c)^2$

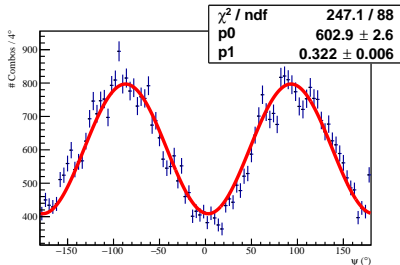
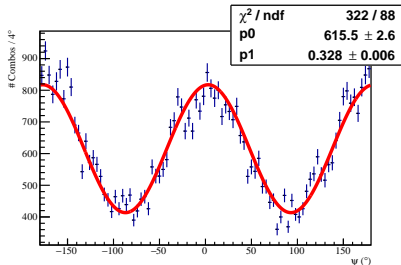
Event Selection

30694, 8.2 - 8.8 GeV

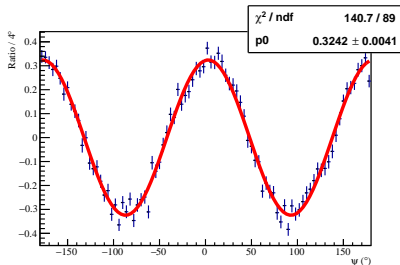


Coherent Peak

30693,30694, 8.2 - 8.8 GeV

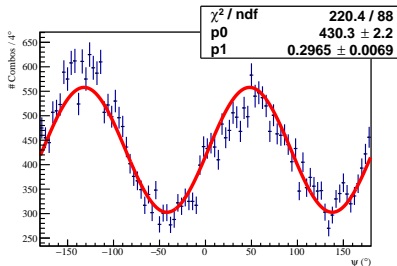
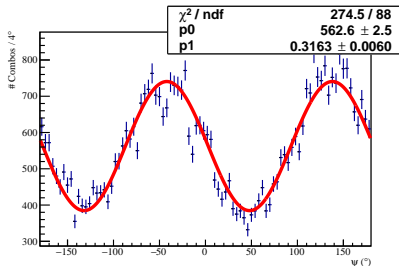


$$\psi_0 \approx -3^\circ$$

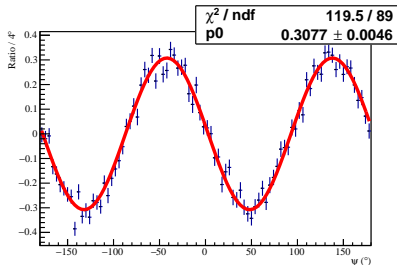


Coherent Peak

30690,30696, 8.2 - 8.8 GeV



$$\psi_0 \approx 42^\circ$$

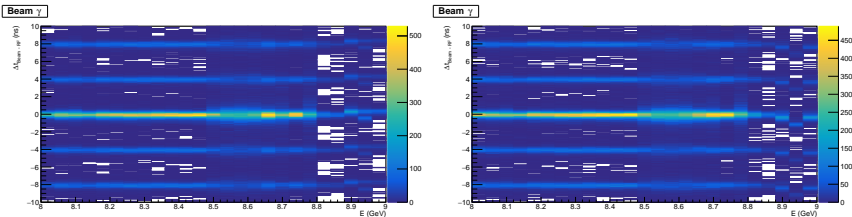


Summary

Run	Orientation ($^{\circ}$)	Raw Fits (%)	Asymmetry (%)
30694	0	32.2 ± 0.6	32.4 ± 0.4
30693	90	32.8 ± 0.6	
30696	45	31.6 ± 0.6	30.8 ± 0.5
30690	135	29.7 ± 0.7	
30736	0	32.6 ± 0.6	32.4 ± 0.4
30735	90	32.0 ± 0.6	
30737	45	31.8 ± 0.6	32.1 ± 0.4
30738	135	32.3 ± 0.6	

Timing

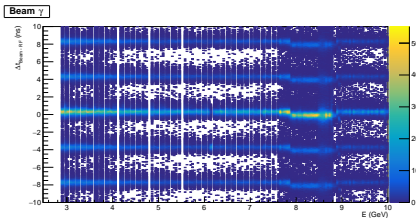
30693,30694



Worse timing resolution between 8.5 and 8.7 GeV?
Shifts and double peaks above 8.9 GeV?

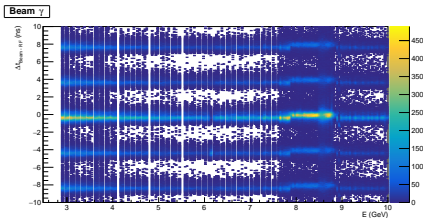
Timing

30693,30694



30693

Shift of TagH timing by $\approx +0.3$ ns

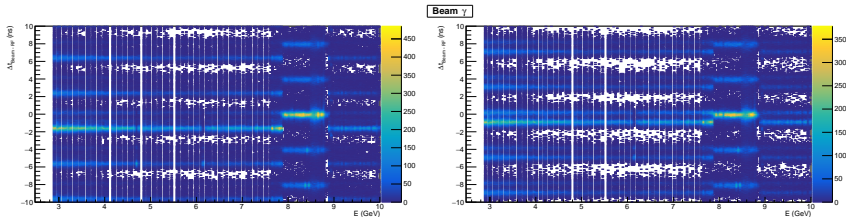


30694

Shift of TagH timing by ≈ -0.3 ns

Timing

30690,30696



30690

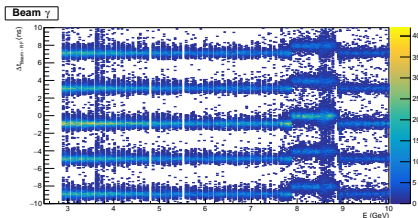
Double peak in TagH timing $+0.3 / - 1.6$ ns

30696

Double peak in TagH timing $+0.3 / - 0.8$ ns

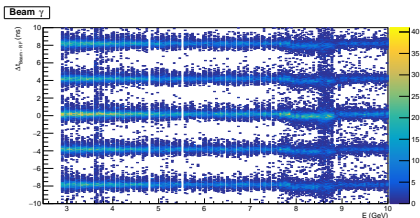
Timing

30696



30696 000

Shift of TagH timing -0.8 ns

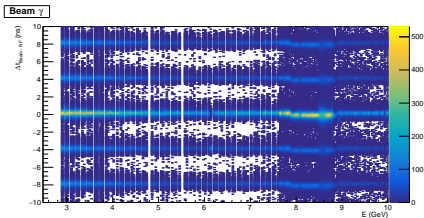


30696 089

Shift of TagH timing $+0.3$ ns

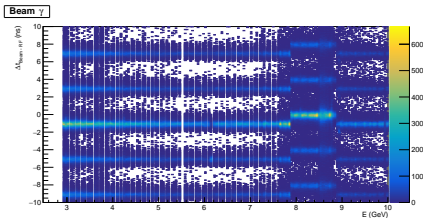
Timing

30737,30738



30737

Shift of TagH timing by $\approx +0.1$ ns



30738

Shift of TagH timing by ≈ -1 ns