

Update on $\gamma p \rightarrow \pi^+ \pi^- \pi^+ n$

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Physics Working Group Meeting

February 28, 2011

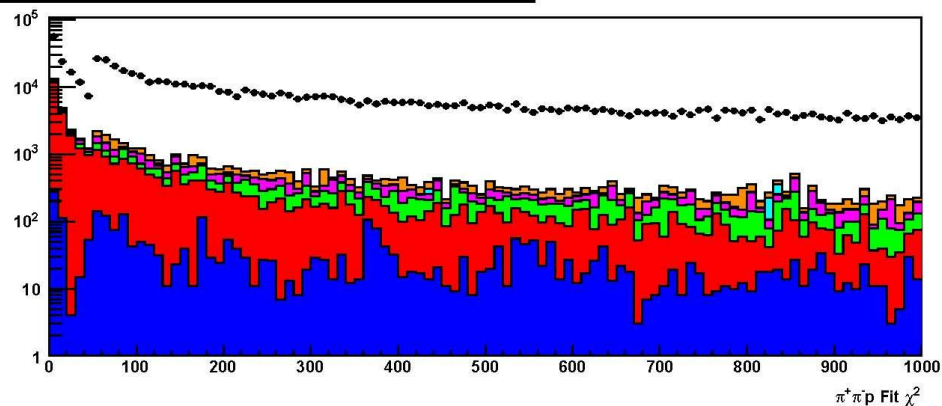
Simulations on the grid

- Simulation seems to work fine, reconstruction has some issues to be worked out
 - Can run through bggen, hdgeant, mcsmear
 - Crashes on analysis?
 - Getting close!
- Added wiki page under offline software
 - Brief introduction to what is being done and our goals, issues, etc.

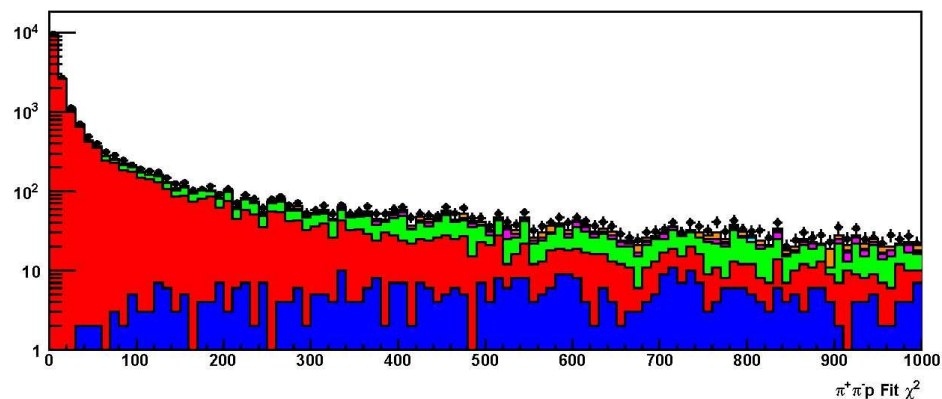
$\gamma p \rightarrow \pi^+ \pi^- \pi^+ n$ Reconstruction

- Looking at kinematic fitting
 - What is the shape of the signal efficiency?
 - Can it be used for signal isolation?

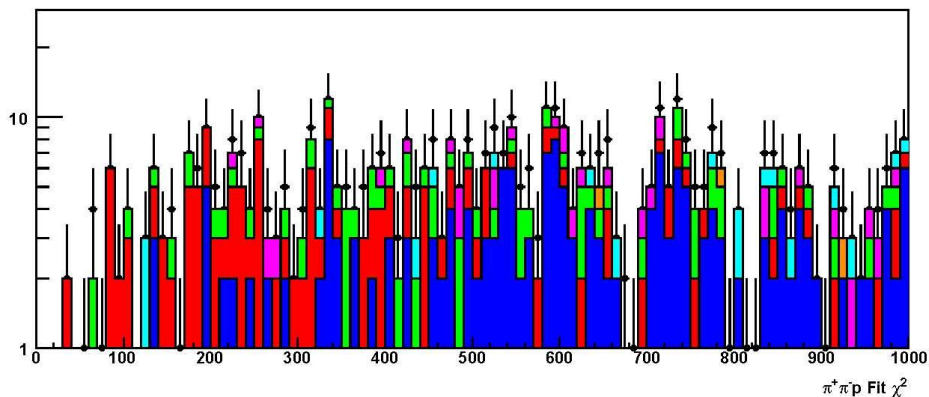
At least 2 positive and 1 negative tracks



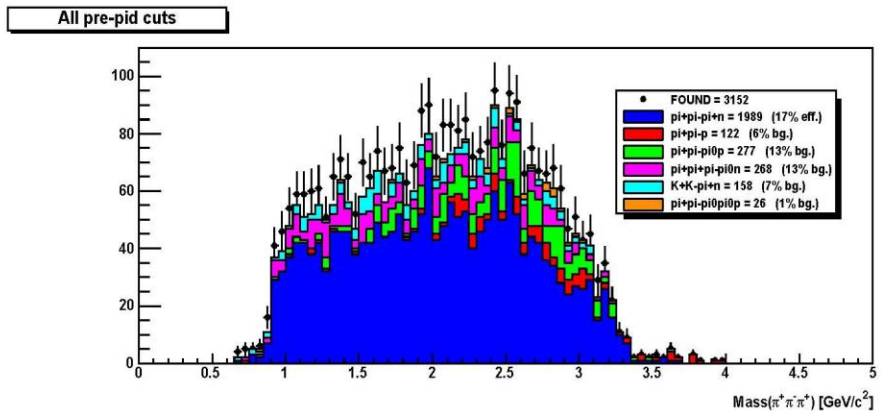
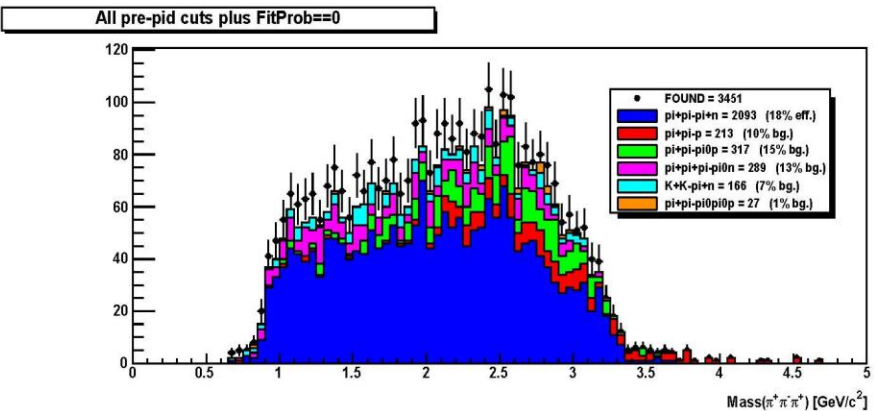
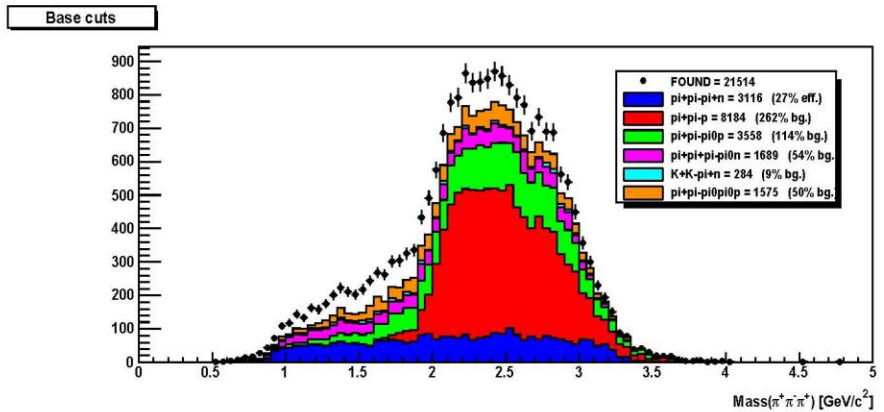
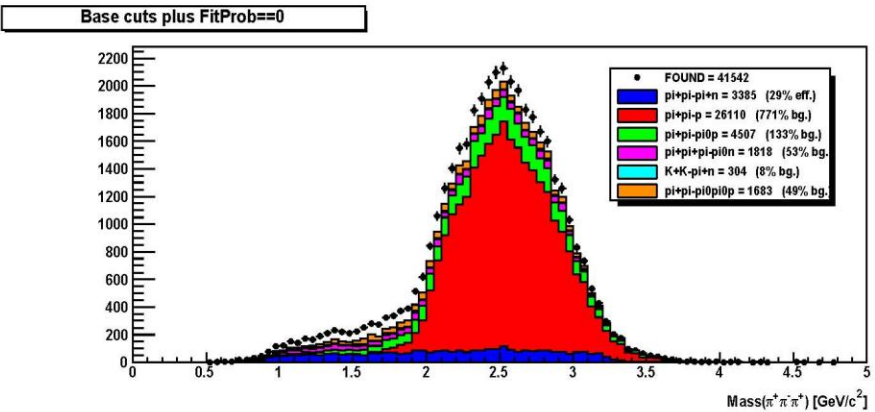
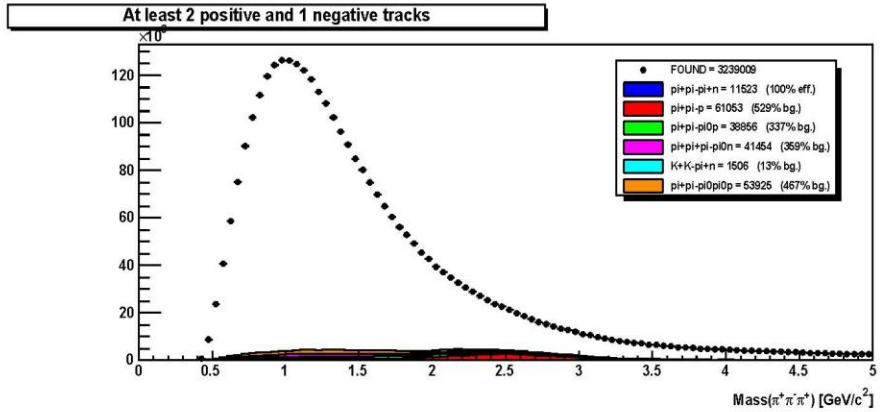
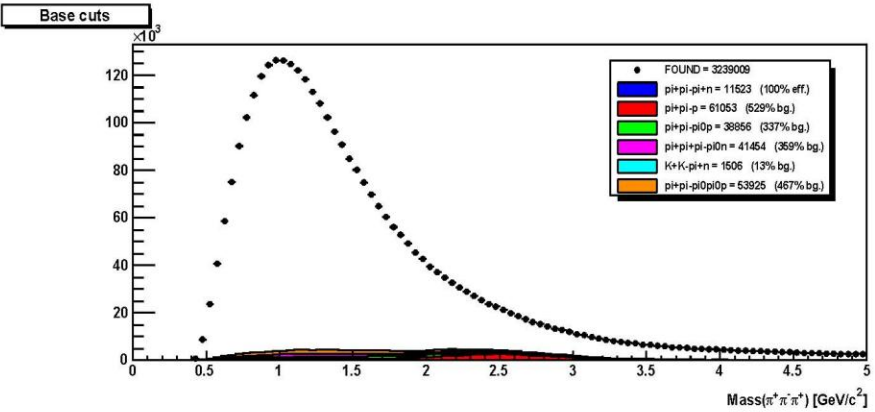
Base cuts



All pre-pid cuts



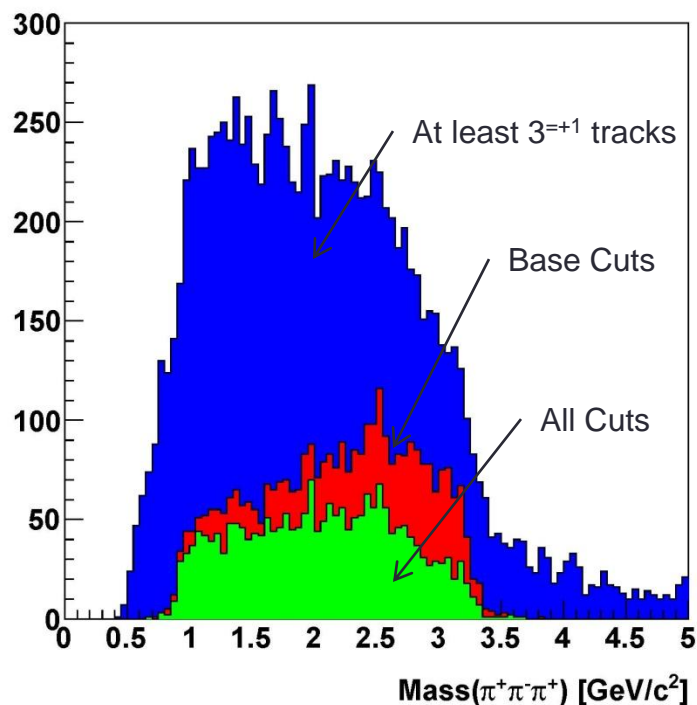
- Fit to background and veto on good fits
 - $\pi^+ \pi p$ shown on right
- Can also fit to signal and veto on poor fits
- Not great for signal isolation alone, but possibly useful



$\gamma p \rightarrow \pi^+ \pi^- \pi^+ n$ Reconstruction

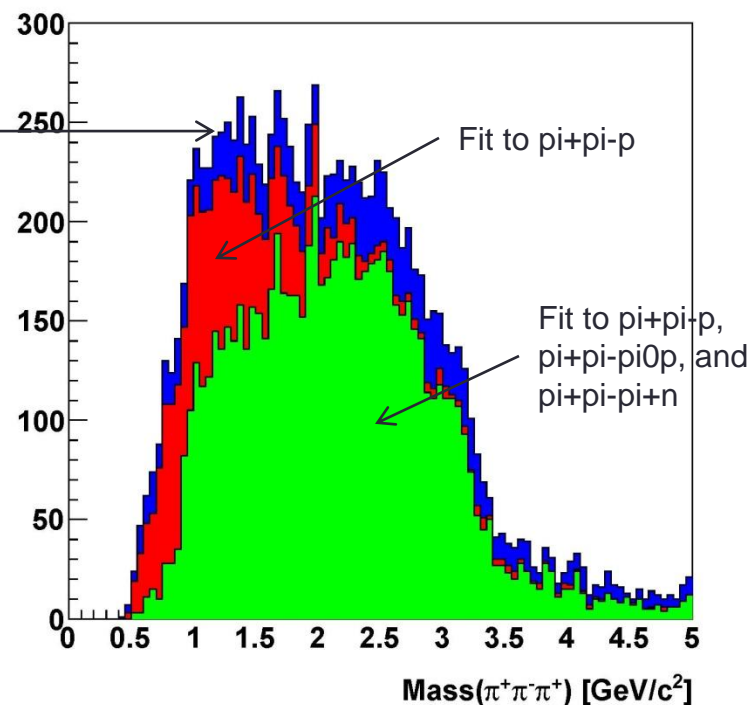
Pre-PID cuts

Signal shape



Kinematic Fitting cuts

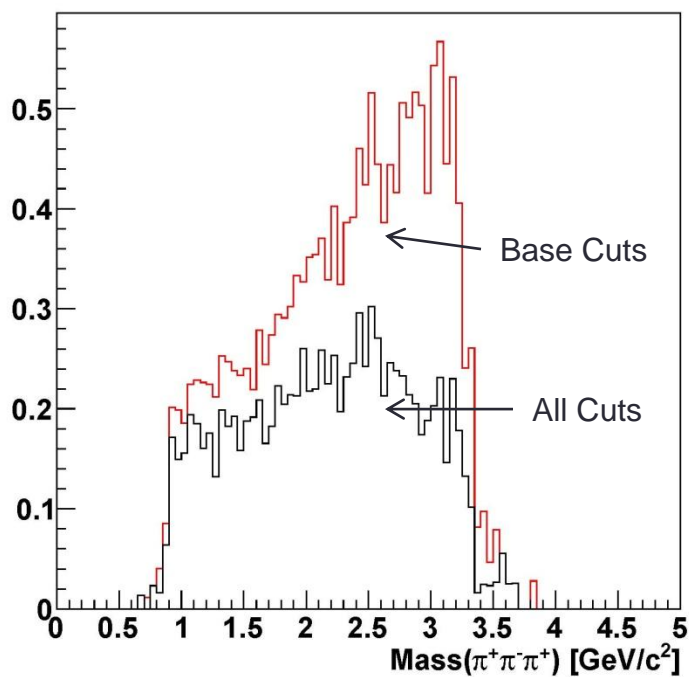
Signal shape



$\gamma p \rightarrow \pi^+ \pi^- \pi^+ n$ Reconstruction

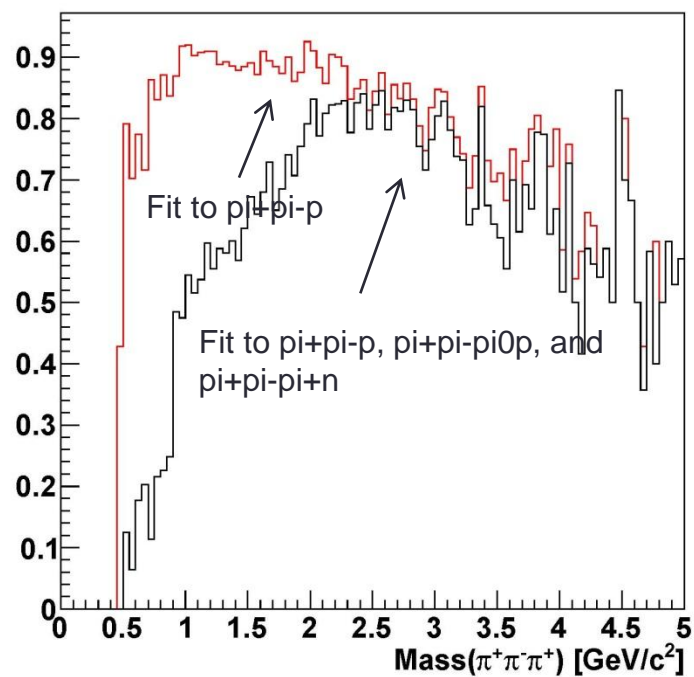
Pre-PID cuts

Signal efficiency



Kinematic Fitting cuts

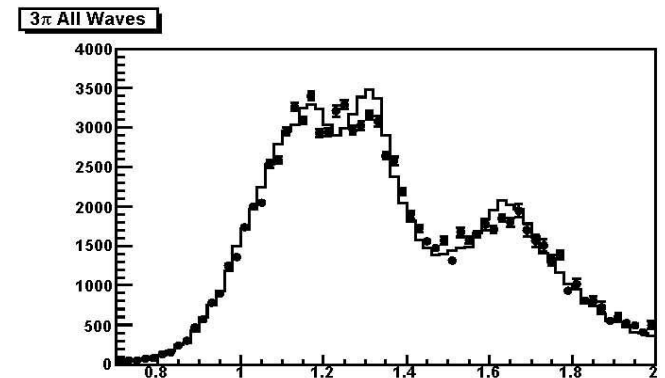
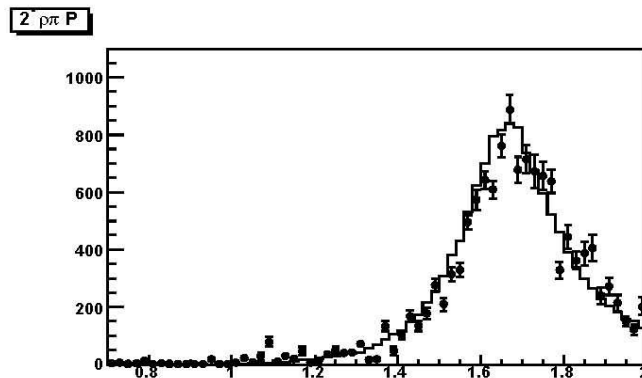
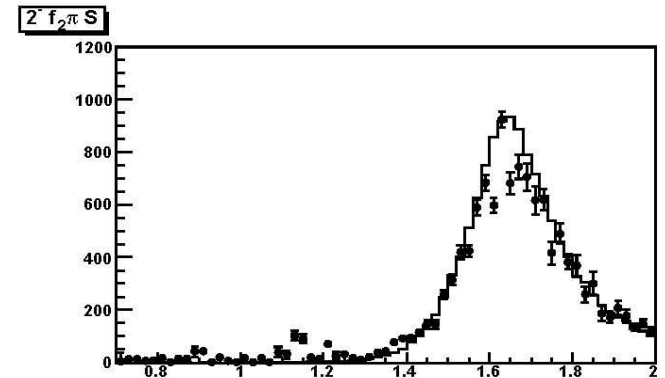
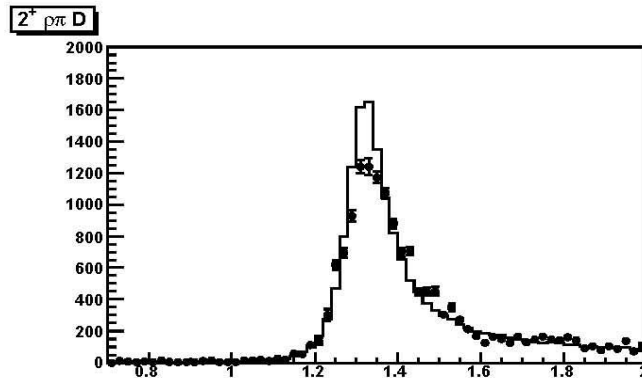
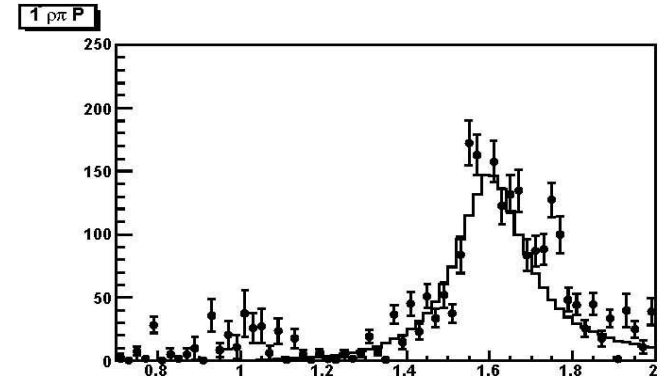
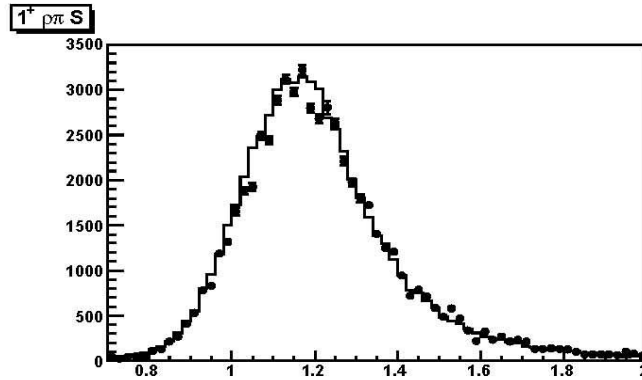
Signal efficiency



Amplitude Analysis

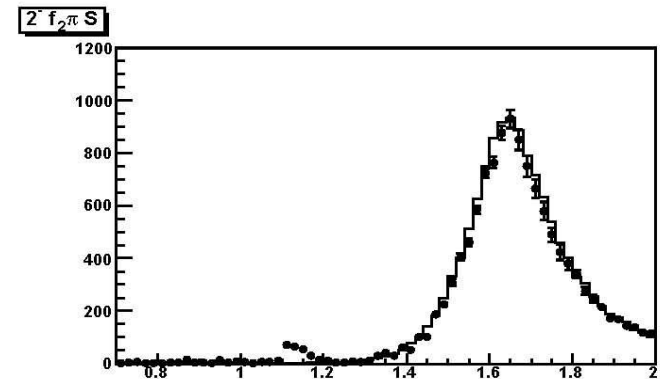
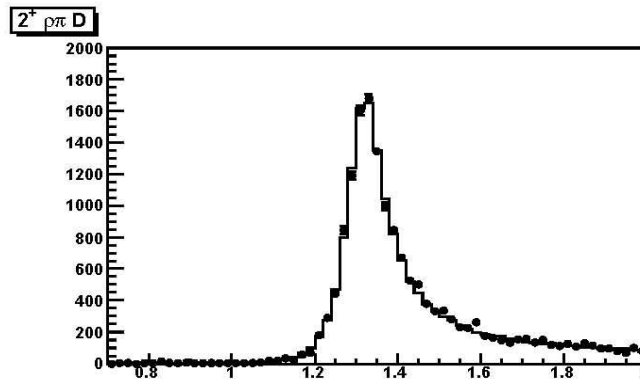
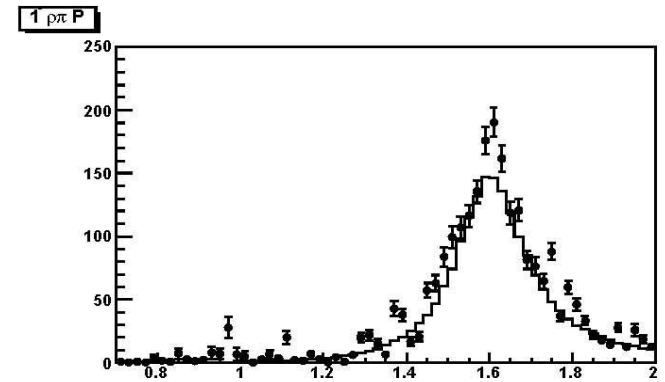
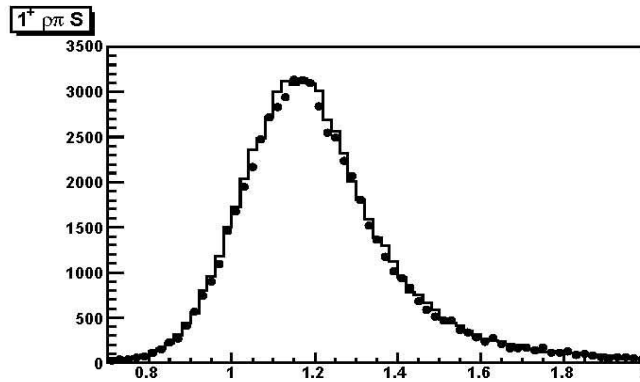
- Goals:
 - Generate sample similar to CLAS results
 - Add exotic wave
 - Use bggen MC background to attempt “realistic” amplitude analysis
 - Running on the grid would be nice

Fit with actual
detector
reconstruction



- $a_1 \rightarrow \rho\pi$ S-wave
- $a_2 \rightarrow \rho\pi$ D-wave
- $\pi_1 \rightarrow \rho\pi$ P-wave
- $\pi_2 \rightarrow f_2\pi$ S-wave
- $\pi_2 \rightarrow \rho\pi$ P-wave

Fit with perfect acceptance



- $a_1 \rightarrow \rho\pi$ S-wave
- $a_2 \rightarrow \rho\pi$ D-wave
- $\pi_1 \rightarrow \rho\pi$ P-wave
- $\pi_2 \rightarrow f_2\pi$ S-wave
- $\pi_2 \rightarrow \rho\pi$ P-wave

