

Photoproduction of the $\rho^0(770)$ meson at GlueX

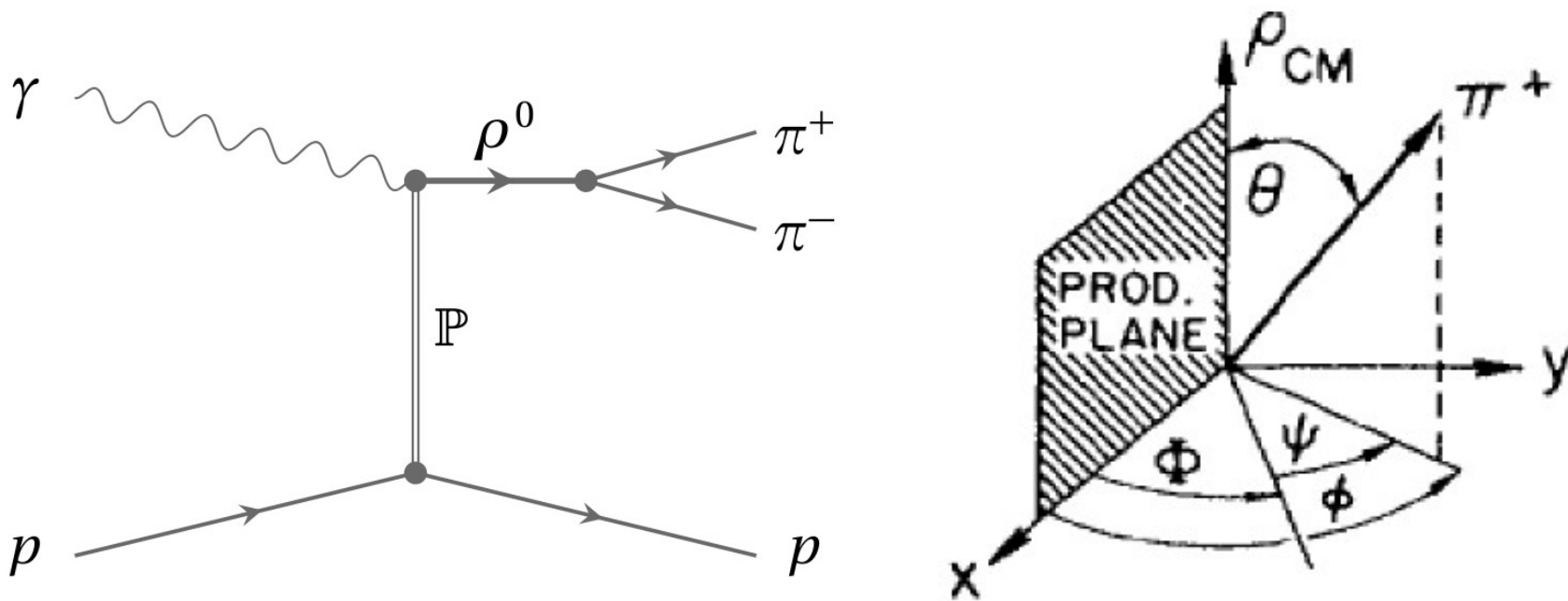
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The GlueX experiment at Jefferson Lab was designed to study the spectrum of light mesons with a 9 GeV linearly-polarized photon beam. The data recorded during its final commissioning run in spring 2016 already outperforms previous experiments in terms of both quantity and quality, and can provide valuable measurements of single-meson photoproduction. We will present preliminary results for the reaction $\gamma p \rightarrow \rho^0(770) p$, where the linearly-polarized photon beam asymmetry independently confirms the beam polarization measurement. Furthermore, the production mechanism is studied using the spin density matrix elements and their dependence on the squared four-momentum transfer to the target.

Scope

- Production Mechanism & Decay

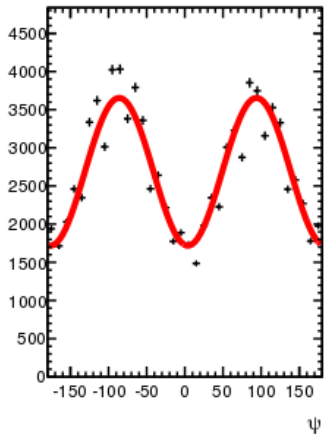


Scope

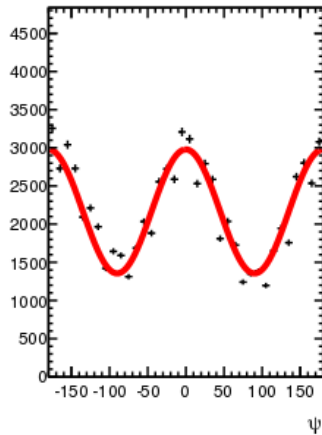
- Production Mechanism & Decay
- Beam Asymmetry, SDMEs (t dep.)

$$W_h^L(\phi, \Phi) = \frac{1}{2\pi} \left[1 - \boxed{P_\gamma \Sigma_h^d \cos 2(\Phi - \phi)} - P_\gamma \Sigma_h^e \cos 2(\Phi + \phi) \right]$$

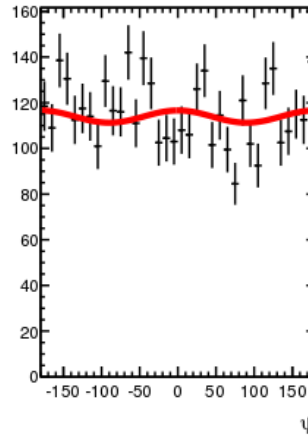
PERP



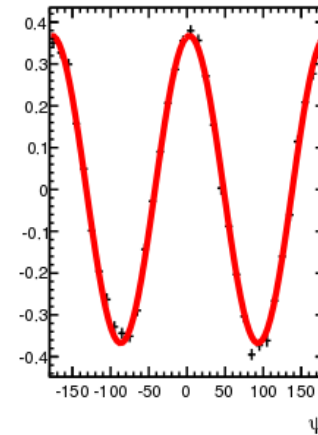
PARA



Amorphous



$$\frac{N_{\parallel} - N_{\perp}}{N_{\parallel} + N_{\perp}}$$

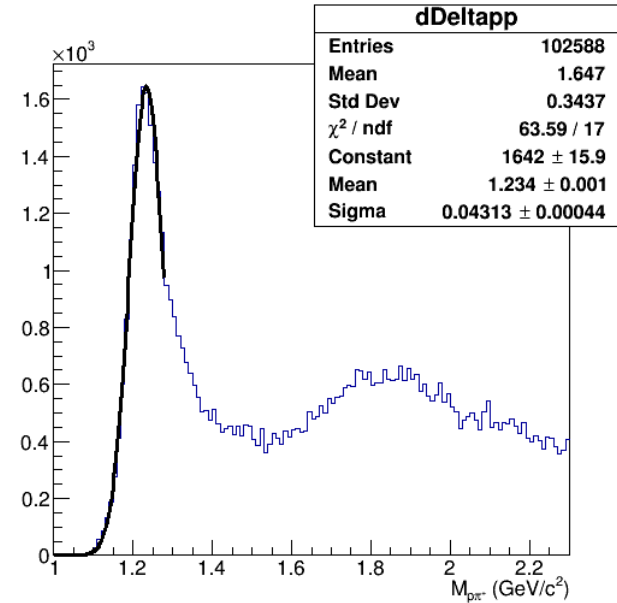
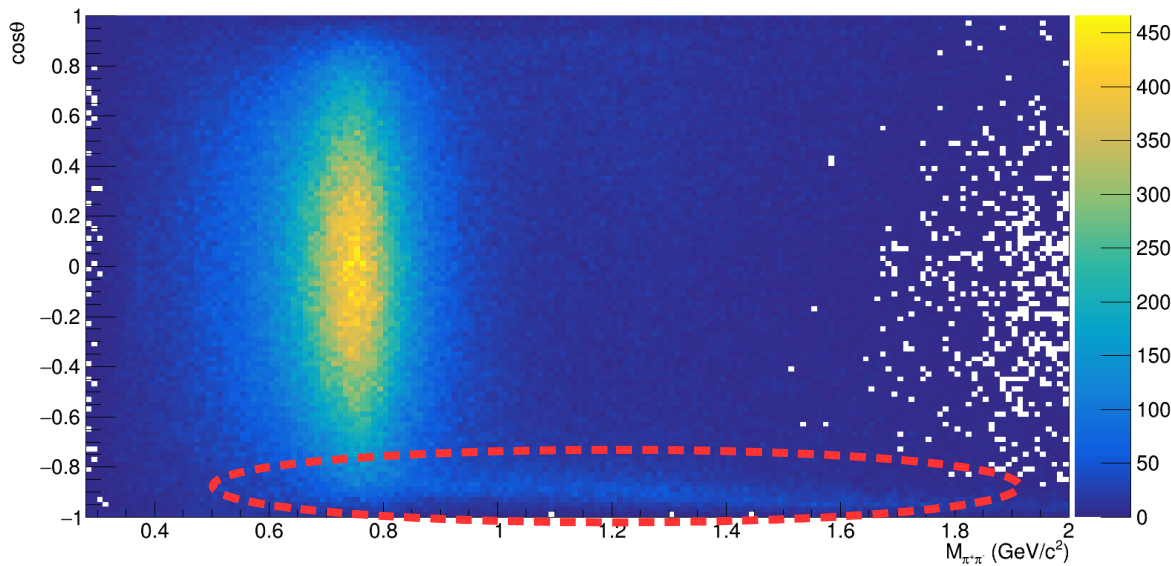


$$\psi = \Phi - \phi$$

$$P \Sigma_h^d$$

Scope

- Production Mechanism & Decay
- Beam Asymmetry
- SDMEs (as a function of t'), MC
- Delta++ (pion exchange) as BG



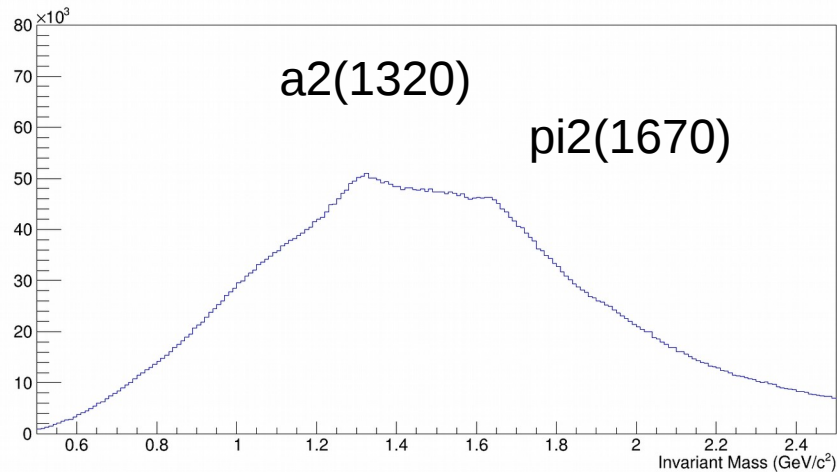
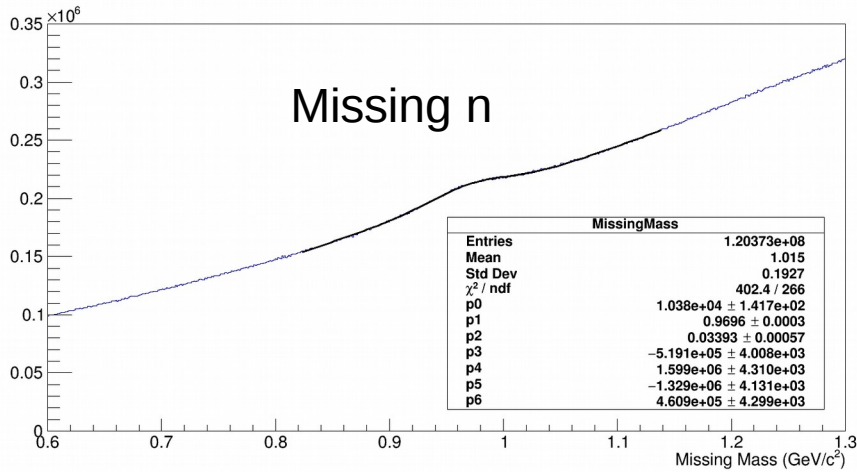
Scope

- Production Mechanism & Decay
- Beam Asymmetry
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- Δ^{++} (pion exchange) as BG

- Maybe: ρ in other channels
p4pi, n3pi?

Outlook

- $n3\pi$?



Dalitz plot at $\pi_2(1670)$ mass

