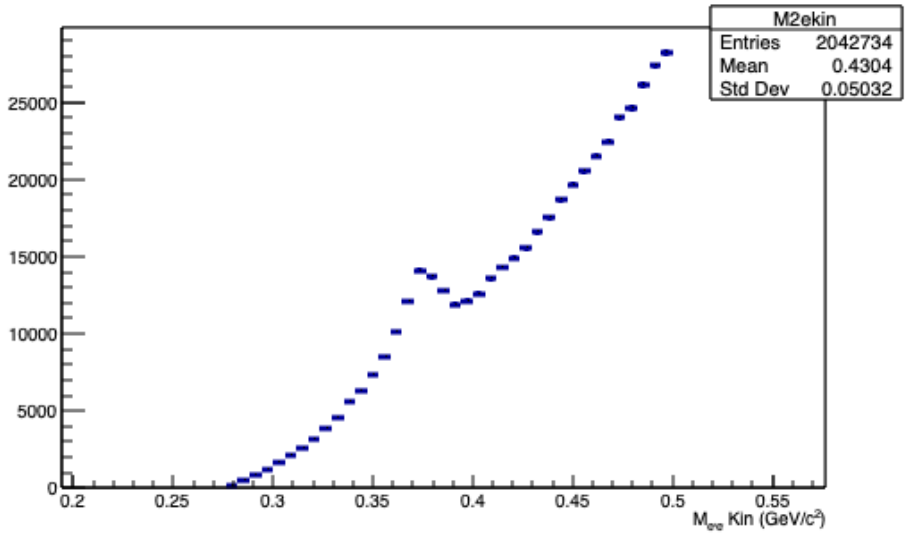
Work Overview

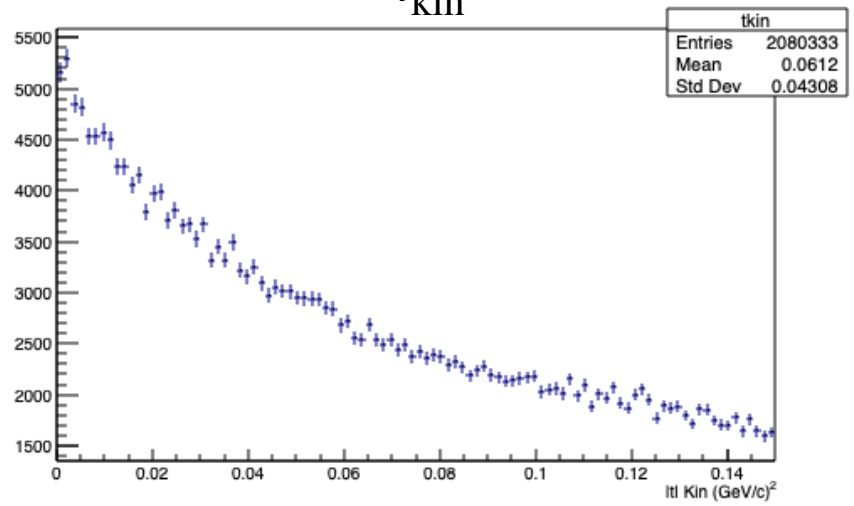
- $\gamma p \rightarrow e^+e^-(p)$ Polarization Study
  - MC of para and perp finished. Need to fit distribution.
  - Need to explain offset in the yield asymmetry for data.
- Neural Net for e/π separation
  - Albert's slides conclude: Differences in training variables between π+ and π- tracks negligible. Improved performance training on FCAL elasticity: $(E_{1fcal} + E_{2fcal})/E_\gamma$
  - Training performance highly favors 2 track neural net
  - However initial tests with real data suggests two single track NNs with two cuts has better performance—possible advantage in making sure *both* tracks are good
- $\gamma p \rightarrow \pi^+\pi^-(p)$
  - Analyze in the $m_{\pi\pi} < 0.5$ GeV, and low t region. Plot t, ϕ_{π^+}, and $\psi_{\pi\pi}$
  - Compare with simulation: Primakoff, $f_0(500)$, ρ^0—AmpTools Tutorial Mar 25, 9AM

2018-08 $\gamma p \to \pi^+\pi^-(p)$ GlueX data

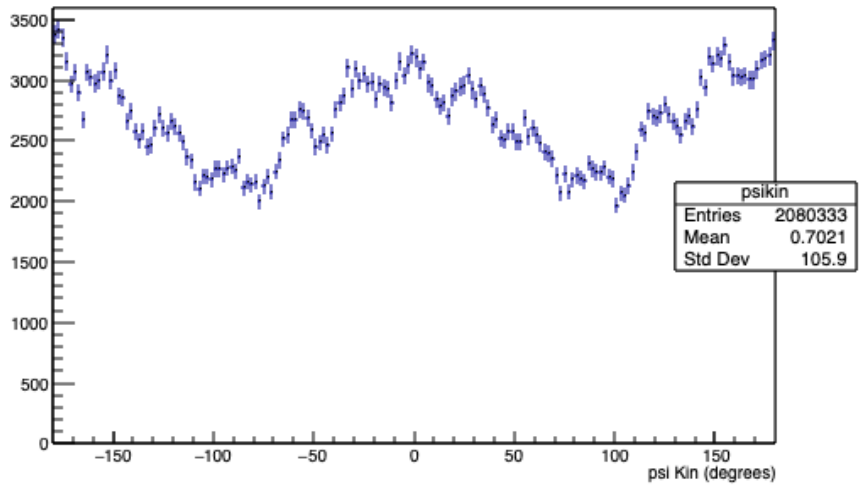
2π Invariant Mass < 0.5 GeV, **Elasticity < 0.4**



$-t_{\mathrm{kin}}$



ψ



Neural Net Classification Cuts (NN1,2> 0.9)

$8.2\,\mathrm{GeV} < E_\gamma < 8.8\,\mathrm{GeV}$

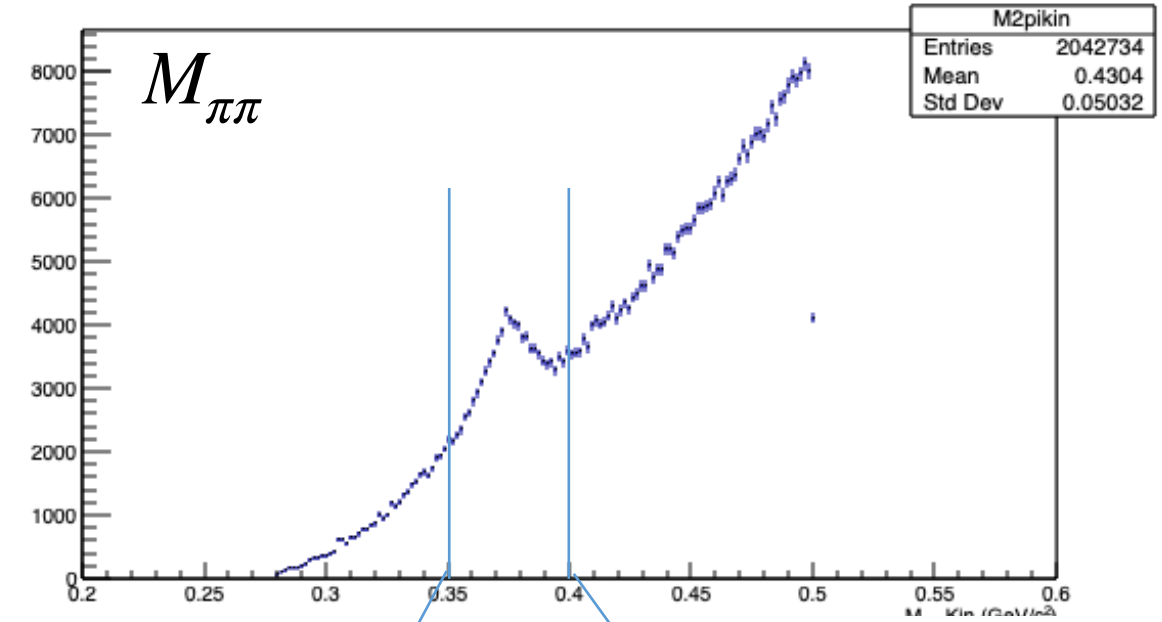
$W_{\pi\pi} < 0.5\,\mathrm{GeV}$

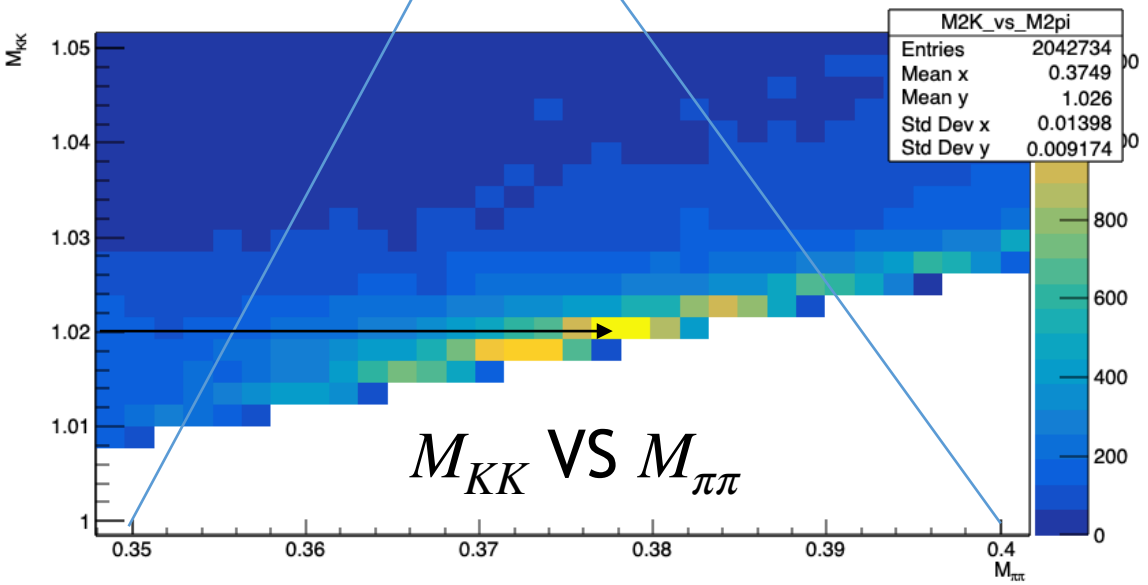
Both pions have hits in the TOF

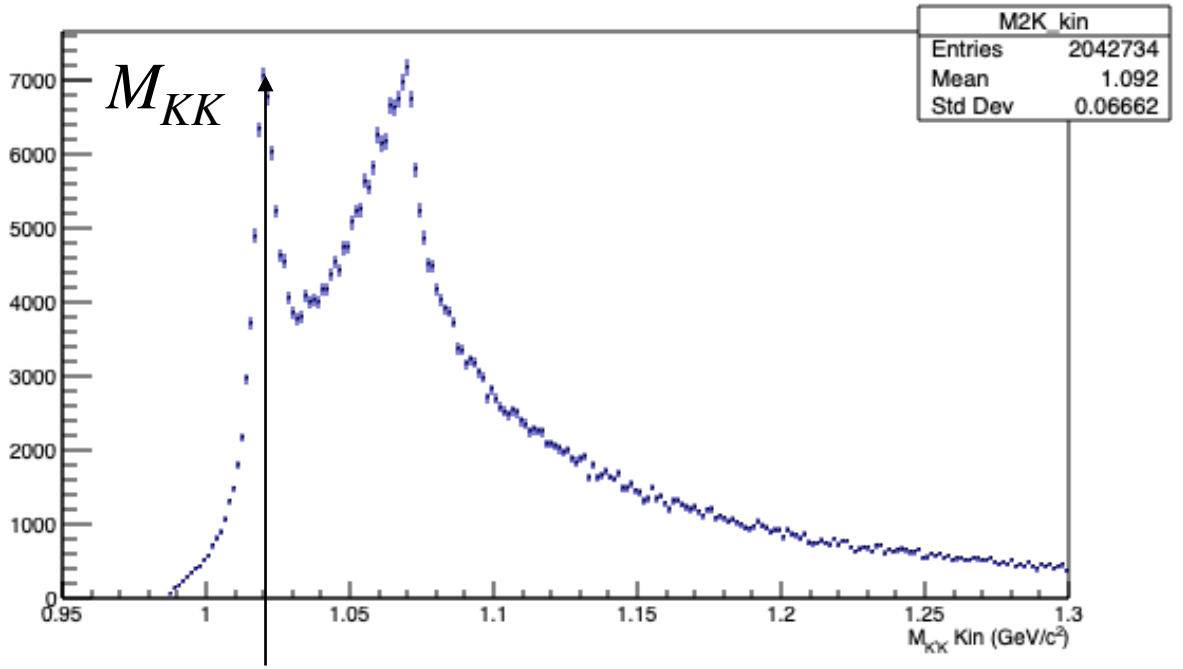
$\theta_1, \theta_2 > 1.5\,\mathrm{deg}$

Elasticity < 0.4

Vertex cut (Window free): 52 < z < 78 cm

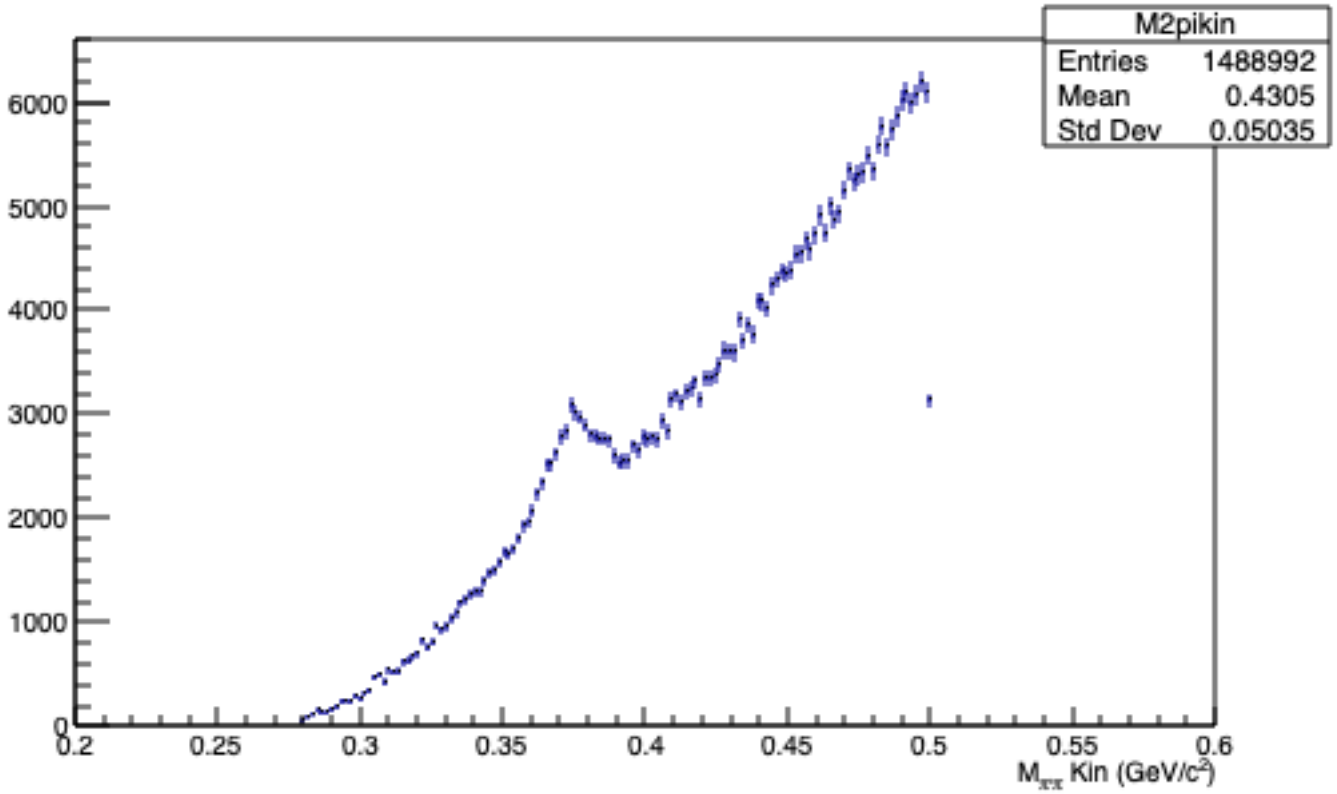






1.020 GeV

Sure looks like $\phi(1020) \rightarrow K^+K^-$



Neural Net Classification Cuts (NN1,2> 0.9)

$8.2\,\mathrm{GeV} < E_\gamma < 8.8\,\mathrm{GeV}$

$W_{\pi\pi} < 0.5\,\mathrm{GeV}$

Both pions have hits in the TOF

$1.5\,\mathrm{deg} < \theta_1, \theta_2 < 5.3\,\mathrm{deg}$

(Upper limit comes from MWPCs)

Elasticity < 0.4

Vertex cut (Window free): 52 < z < 78 cm