

Study of Cuts to Remove Photon Conversion to (e^+e^-)

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Previously ZEUS applied a cut of $M(e^+e^-) > 0.05$ GeV to remove γ conversions

In Studying $\phi \rightarrow M(K^+K^-)$, a narrow peak near threshold was seen in the Data

This excess in $M(K^+K^-)$ was also seen in Reconstructed Monte Carlo

It was not seen in Generated Monte Carlo

From matching these Generated and Reconstructed MC events: They were e^+e^- events

Recent HERA2 Pentaquark paper used a cut of $M(e^+e^-) > 0.07$ GeV

An analogous low mass enhancement was seen in $M(K\bar{p})$ Events

Events were selected with corrected $dE/dx > 1.20$ for each charged K

Following Plots show $M(K^+K^-)$ for various $M(e^+e^-)$ cuts and various probability cuts

Probability is chisq probability from energy loss for $K^\pm$

Calculated from dE/dx and $K^\pm$ momentum

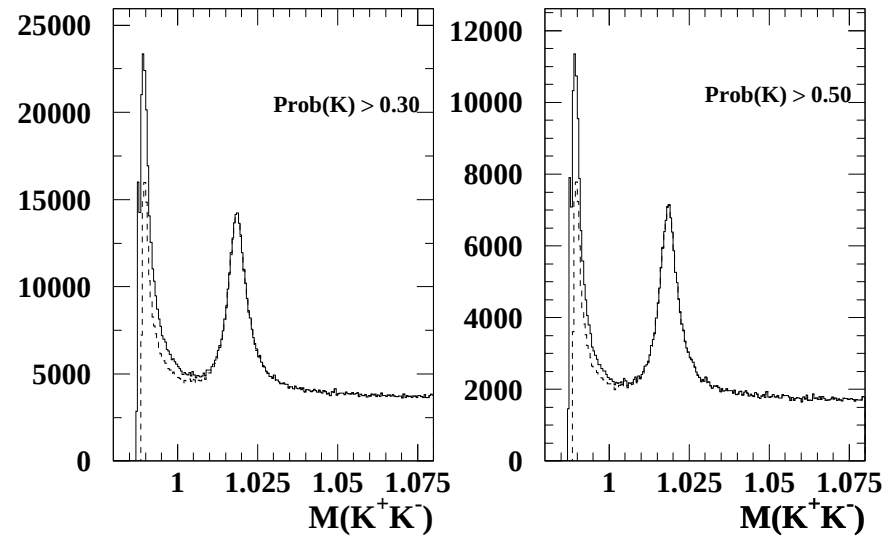
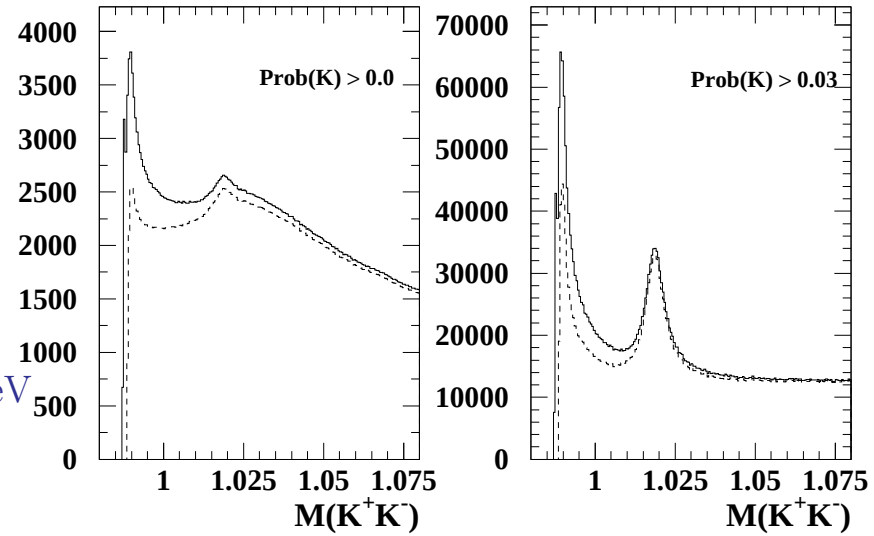
$M(K^+K^-)$ For Various Probability Cuts

$\times 10^2$

Solid Histograms: No $M(e^+e^-)$ cut

Dashed Histograms: $M(e^+e^-) > 0.050 \text{ GeV}$

Low Mass Peak Exists Even After Cut



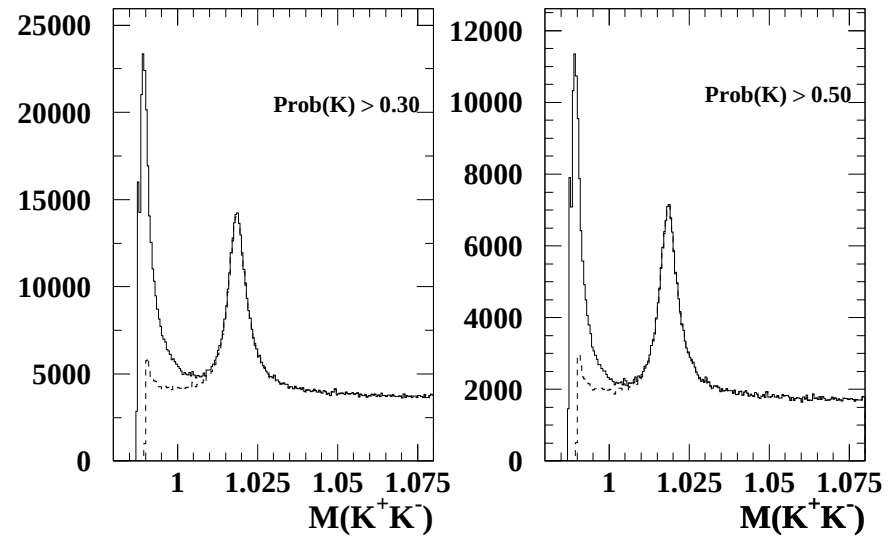
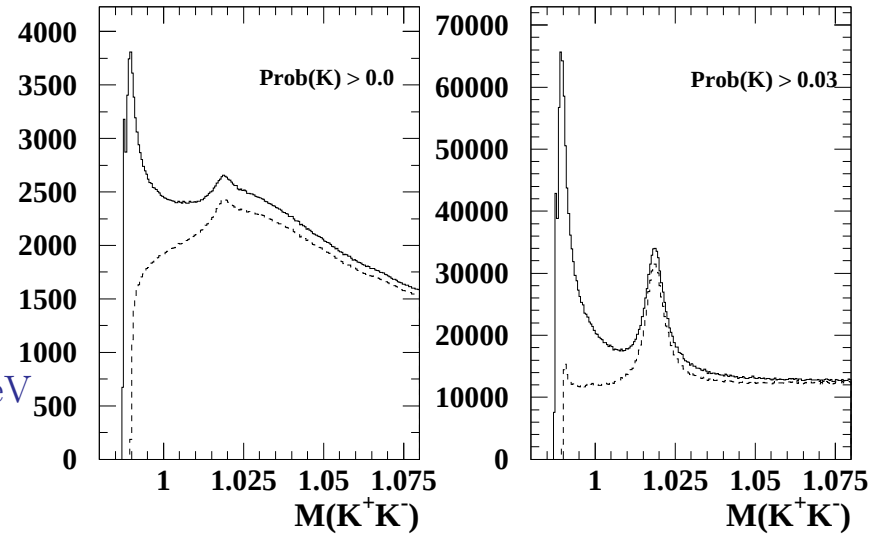
M(K⁺K⁻) For Various Probability Cuts

x 10²

Solid Histograms: No $M(e^+e^-)$ cut

Dashed Histograms: $M(e^+e^-) > 0.070$ GeV

Low Mass Greatly Reduced After Cut



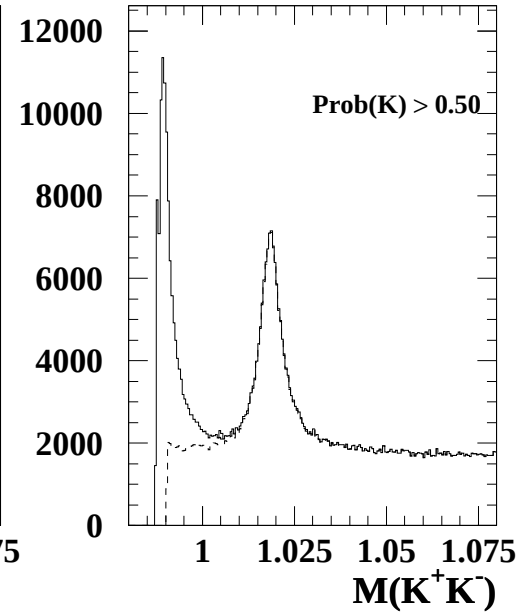
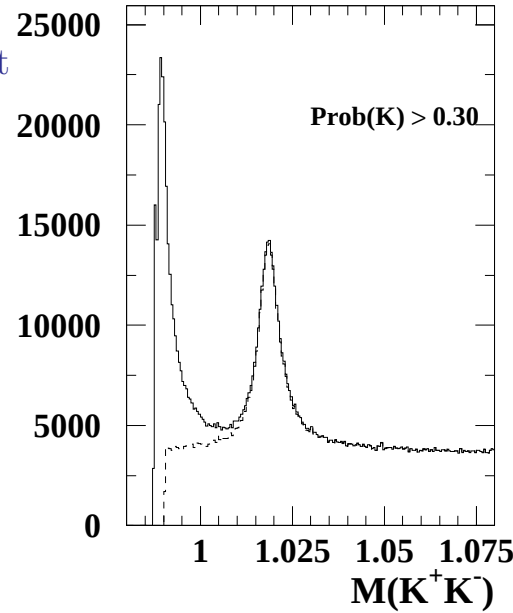
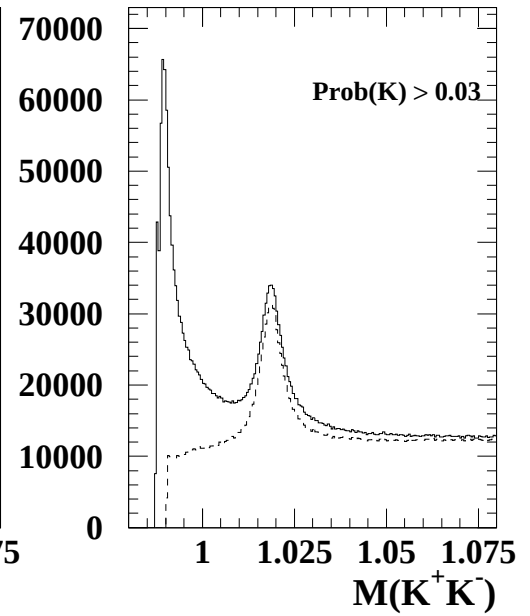
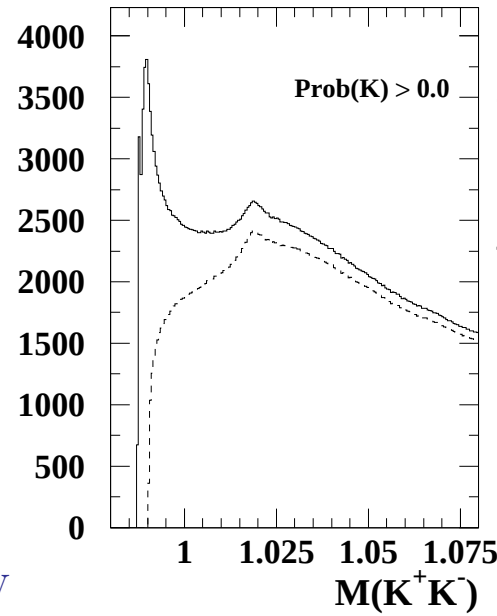
M(K⁺K⁻) For Various Probability Cuts

x 10²

Solid Histograms: No $M(e^+e^-)$ cut

Dashed Histograms: $M(e^+e^-) > 0.075$ GeV

Low Mass Peak Nearly Vanishes After Cut



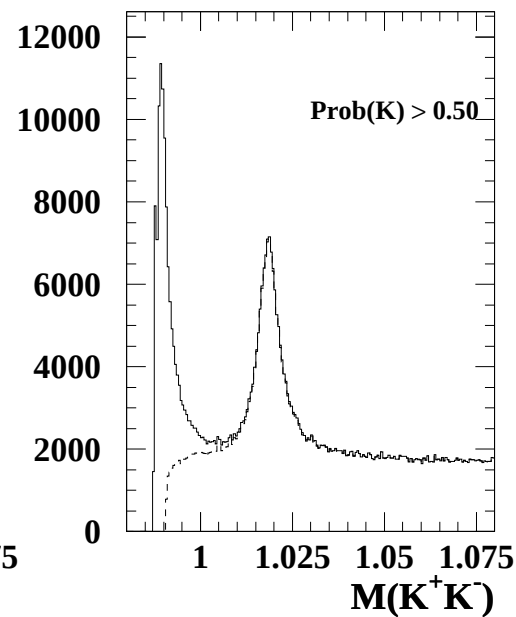
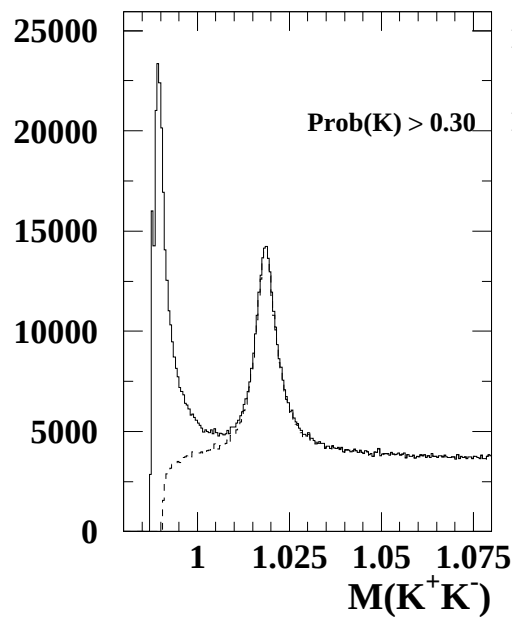
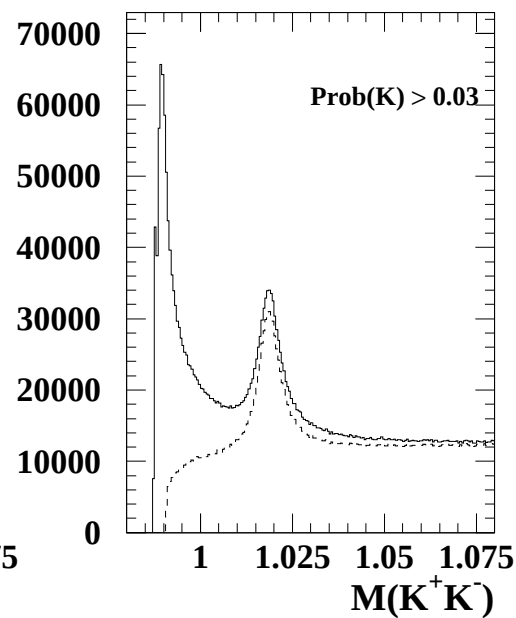
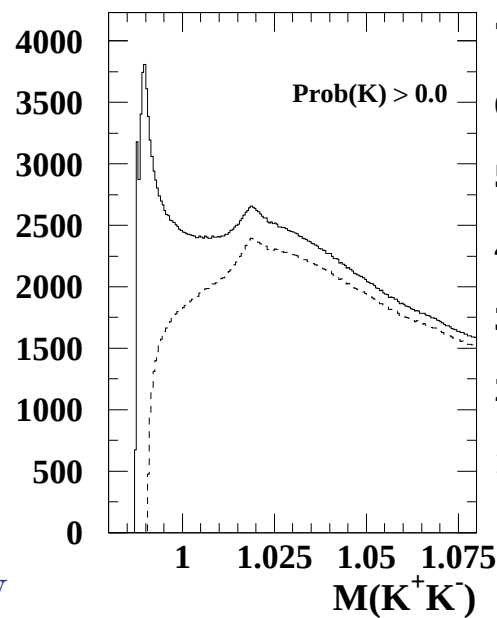
M(K⁺K⁻) For Various Probability Cuts

x 10²

Solid Histograms: No $M(e^+e^-)$ cut

Dashed Histograms: $M(e^+e^-) > 0.080$ GeV

Low Mass Peak Vanishes After Cut



A narrow peak near threshold was also seen in the data in $M(p\bar{p})$

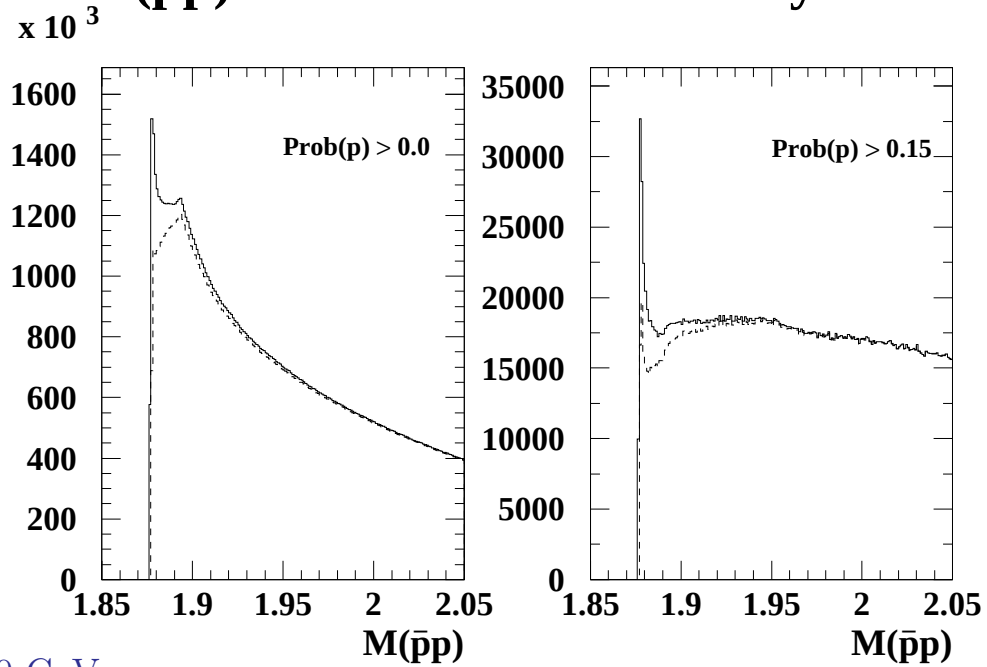
This excess was also seen in Reconstructed Monte Carlo but not in Generated Monte Carlo

From matching these Generated and Reconstructed MC events: They were also e^+e^- events

Events were selected with corrected $dE/dx > 1.15$ for each p or $\bar{p}$

Following Plots show $M(p\bar{p})$ for various $M(e^+e^-)$ cuts and various probability cuts

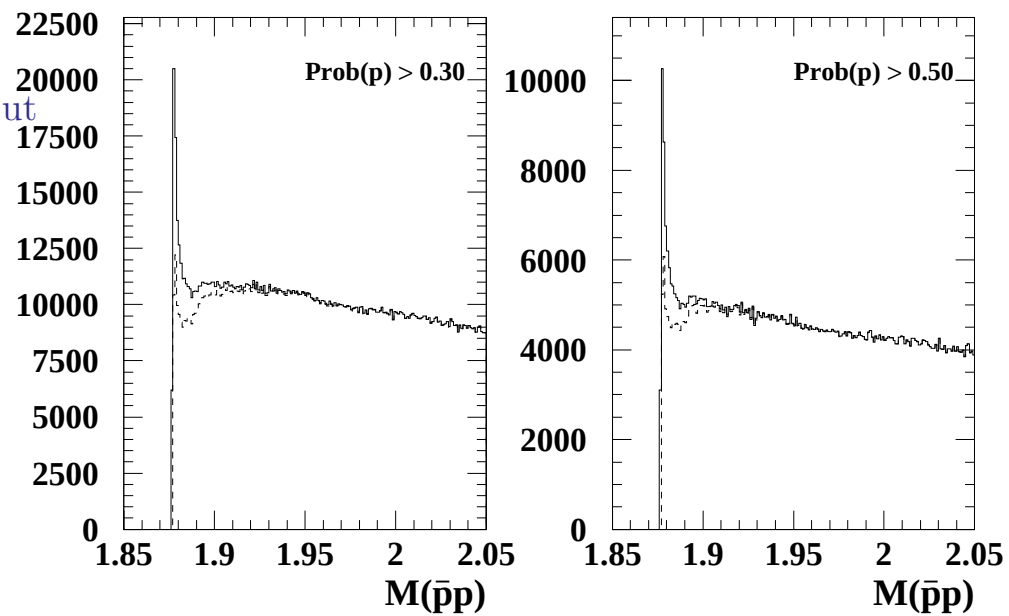
M($\bar{p}p$) For Various Probability Cuts



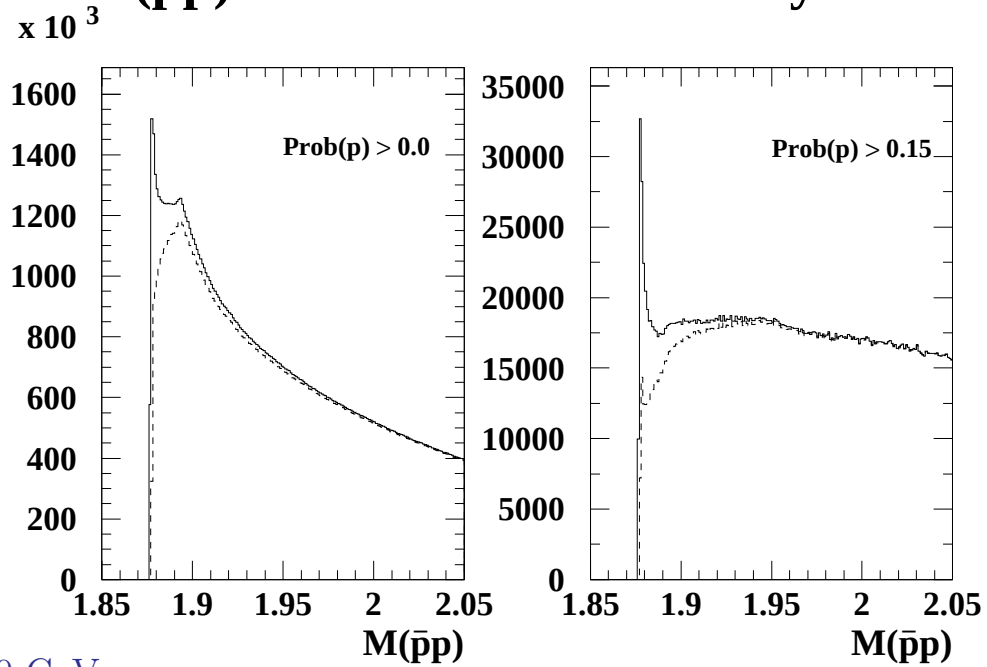
Solid Histograms: No $M(e^+e^-)$ cut

Dashed Histograms: $M(e^+e^-) > 0.050$ GeV

Low Mass Peak Exists Even After Cut



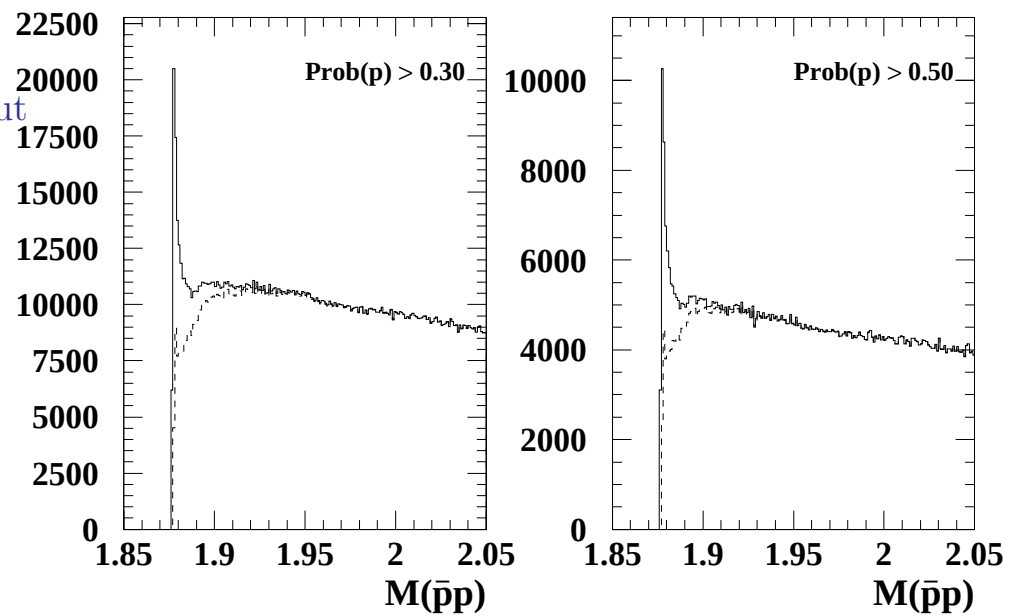
M($\bar{p}p$) For Various Probability Cuts



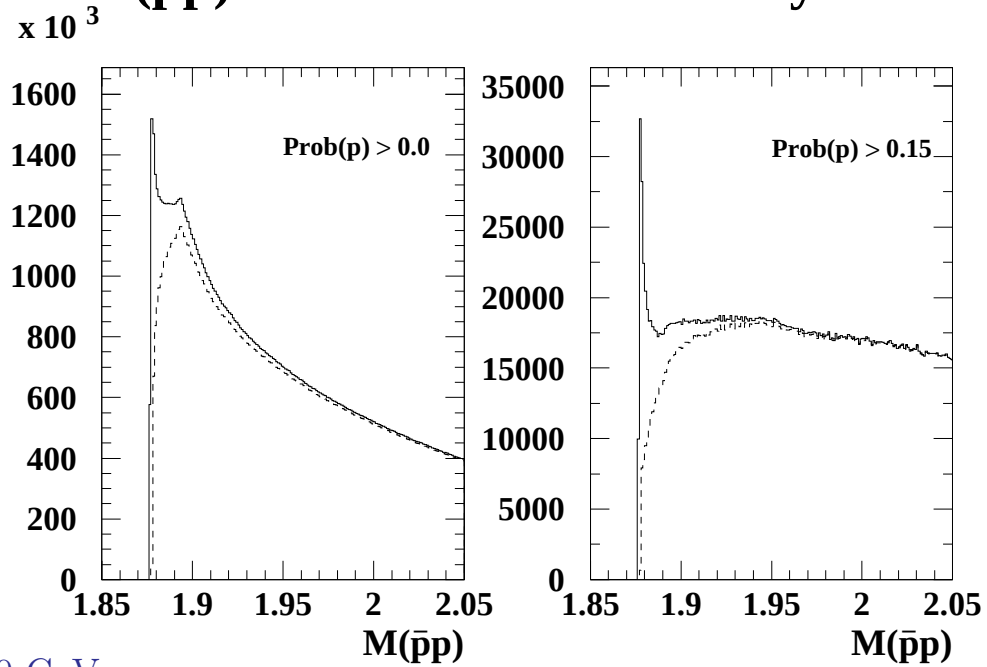
Solid Histograms: No $M(e^+e^-)$ cut

Dashed Histograms: $M(e^+e^-) > 0.060$ GeV

Low Mass Greatly Reduced After Cut



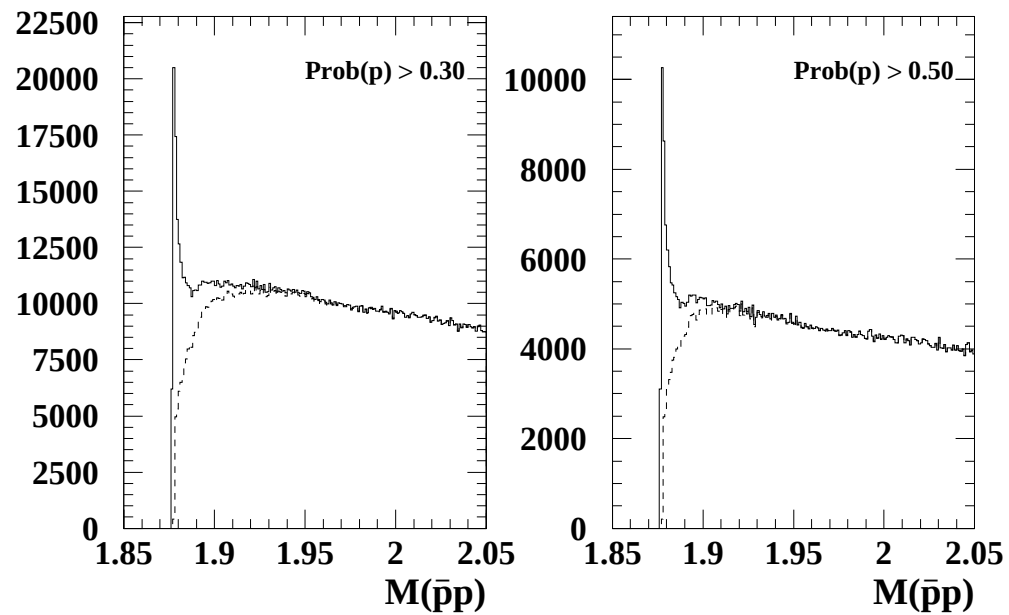
M($\bar{p}p$) For Various Probability Cuts



Solid Histograms: No $M(e^+e^-)$ cut

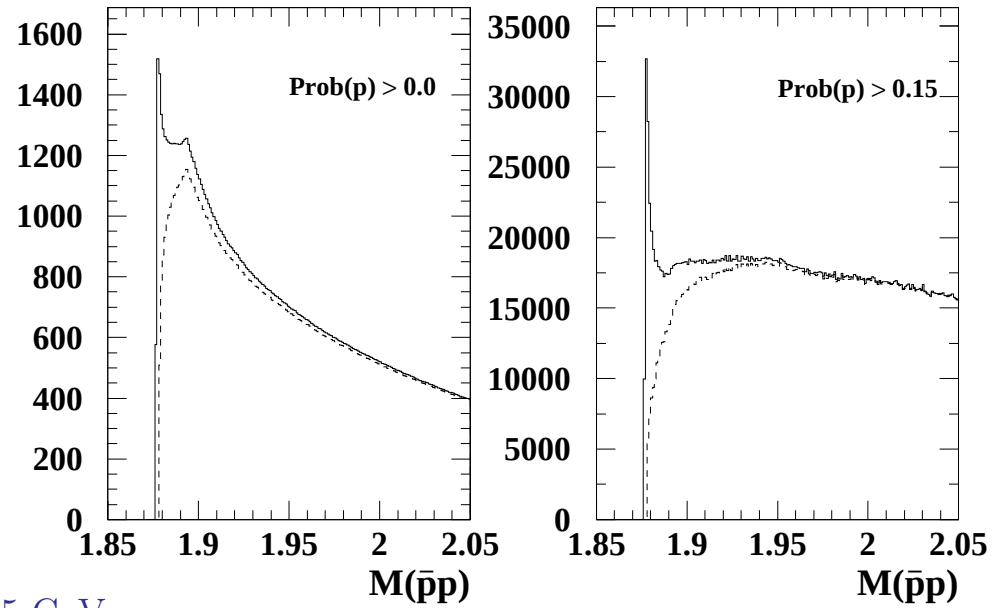
Dashed Histograms: $M(e^+e^-) > 0.070$ GeV

Low Mass Peak Vanishes After Cut



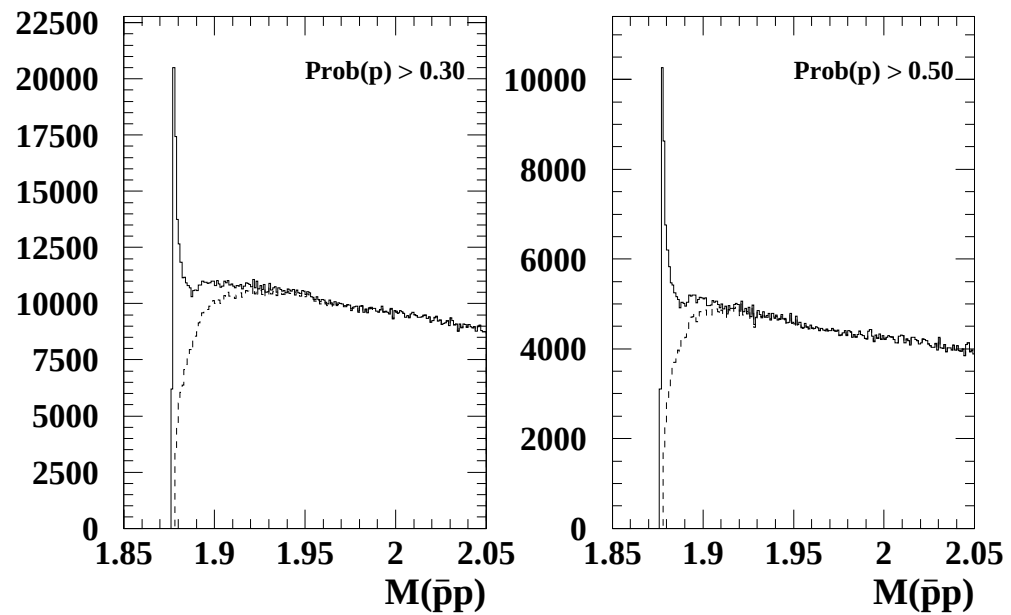
$M(\bar{p}p)$

$\times 10^3$



Solid Histograms: No $M(e^+e^-)$ cut

Dashed Histograms: $M(e^+e^-) > 0.075$ GeV



Low Mass Peak Vanishes After Cut

SUMMARY

Low Mass Peak Removed for $M(e^+e^-) > 0.080$ GeV and mostly for > 0.075 GeV

Future analyses should use one of these higher cuts