

Weekly work report

PWA of $e^+ e^- \rightarrow K^+ K^- \pi^0 \pi^0$

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Data sample

➤ **Boss version 6.6.5 p01**

➤ **Date sets**

15 Rscan data

➤ **Exclusive MC (ConExc)**

$$e^+e^- \rightarrow K^{*-}K^+\pi^0$$

$$e^+e^- \rightarrow K^{*-}K^{*+}$$

$$e^+e^- \rightarrow K^+K^-\pi^0\pi^0$$

$$e^-e^+ \rightarrow \phi\pi^0\pi^0$$

$$e^+e^- \rightarrow K_S K^\pm \pi^\mp$$

$$e^+e^- \rightarrow K^\pm K^\mp \pi^0 / \eta$$

Event selection criteria(I)

➤ **Charged Tracks:**

$|V_r| < 1.0 \ \&\& \ |V_z| < 10.0 \ \&\& \ |\cos\theta| < 0.93;$
 $N_{\text{good}} == 2 \ ;$

➤ **PID:**

Kaon: $\text{prob_K} > \text{prob_P} \ \&\& \ \text{prob_K} > \text{prob_}\pi;$
 $N_{\text{good}} == 2 \ : \ N(K^+) = N(K^-) = 1;$

➤ **Good Photon:**

$E_{\text{barrel}} > 25 \text{ MeV}; \ E_{\text{endcap}} > 50 \text{ MeV};$
 $\theta_{\text{min}}(\gamma, \text{charge}) > 10^\circ \ ;$
 $0 \leq \text{TDC} \leq 14 \ ; \ N_\gamma \geq 4;$

Event selection criteria(II)

- **6C kinematic fit : ($4\gamma K^+ K^-$)
constraint a pair π^0 mass**

Amplitude

Φ +anything

$\Phi\sigma$

$\Phi f_0(980)$

$\Phi f_0(1370)$

$\Phi f_2(1270)$

$\Phi\pi^0\pi^0$

$R(\pi^0\pi^0)+K^+K^-$

$K^+K^-f_0(980)$

$K^+K^-\sigma$

$K^+K^-f_0(1370)$

$K^{*+}K^{*-}$

$K^{*\pm}K^{\mp}\pi^0$

$K_1(1400)K$

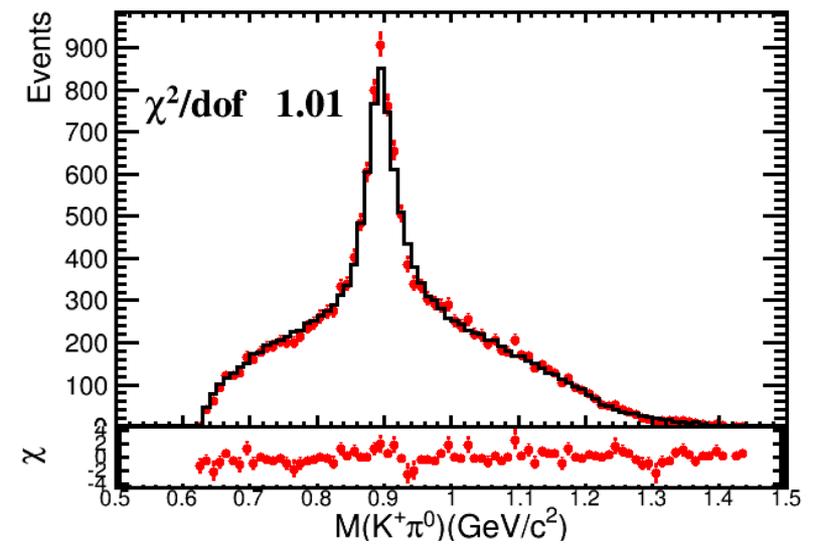
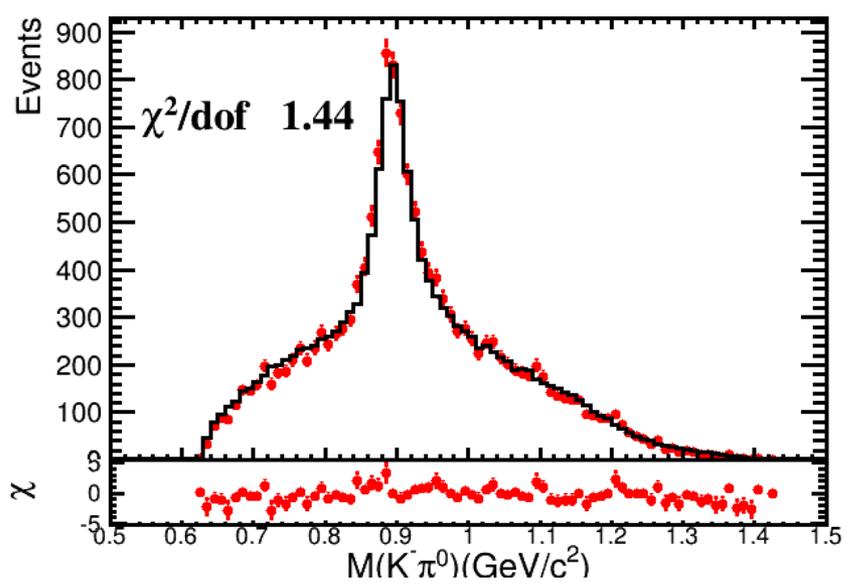
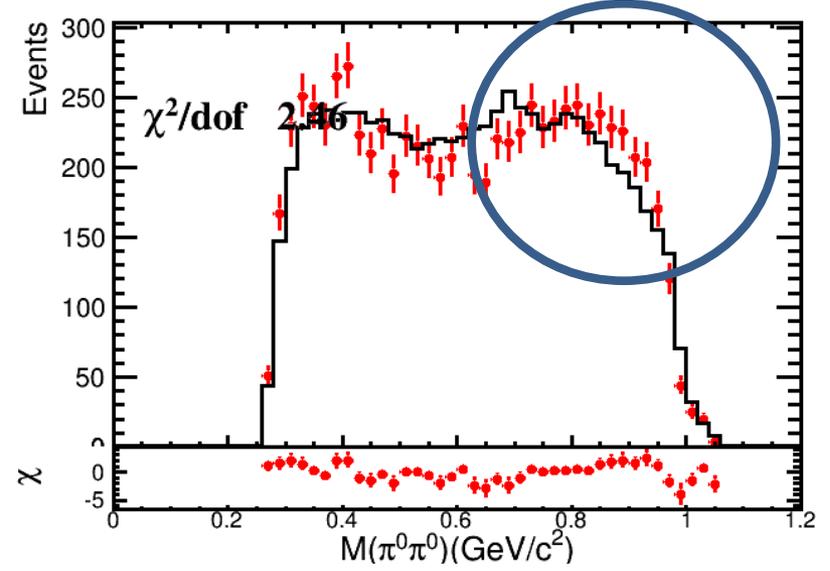
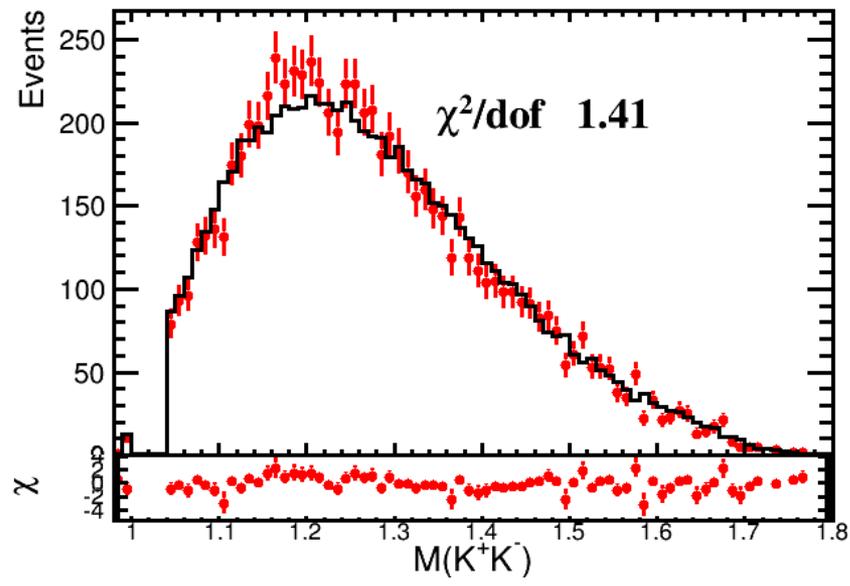
$K_1(1270)K$

PHSP

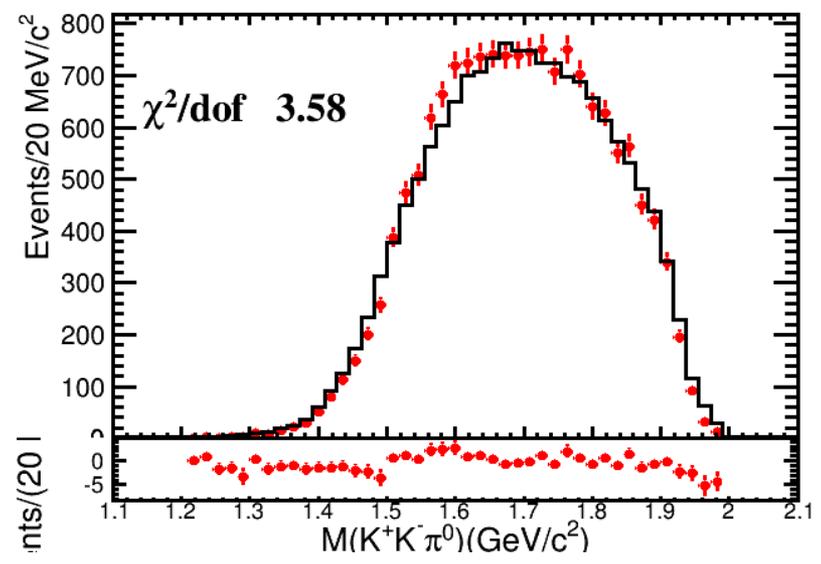
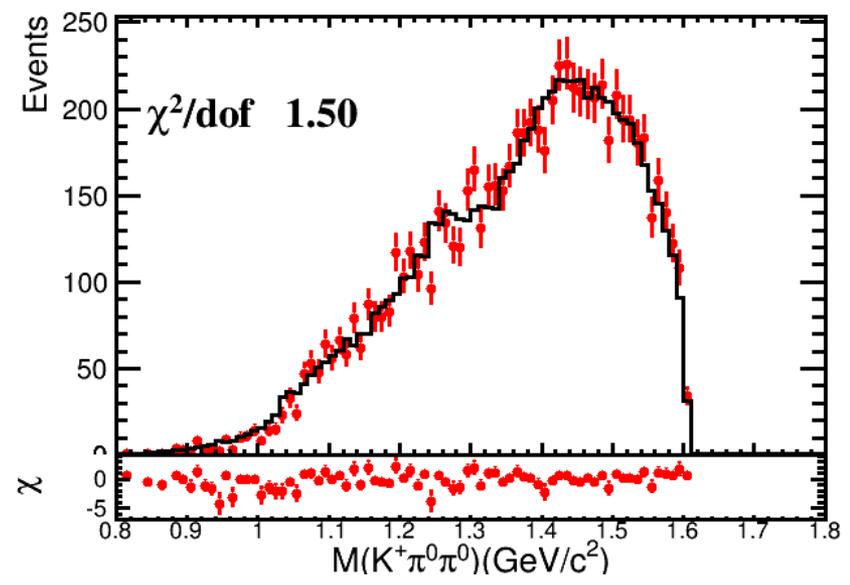
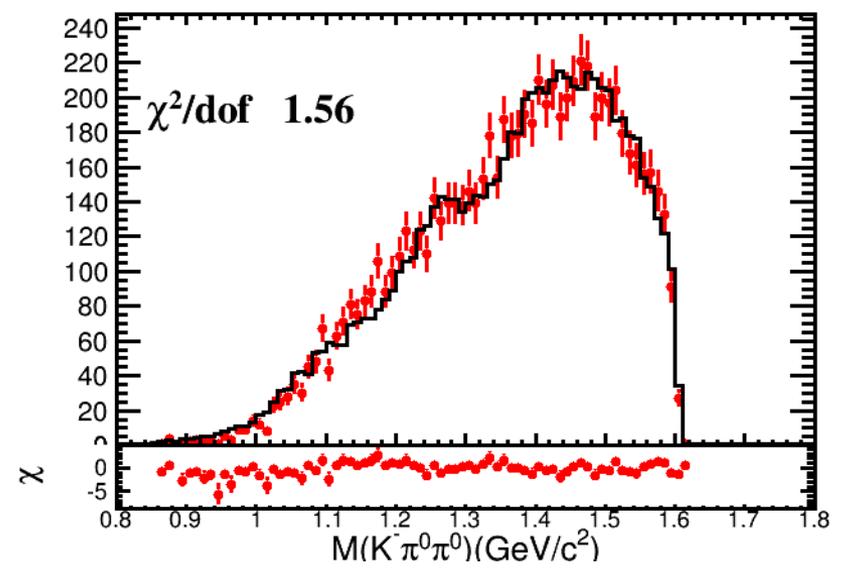
$K^+K^-\pi^0\pi^0$

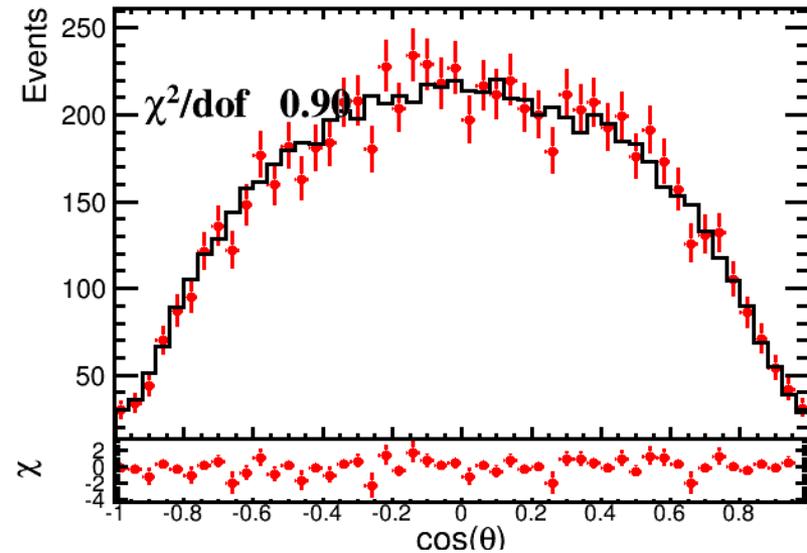
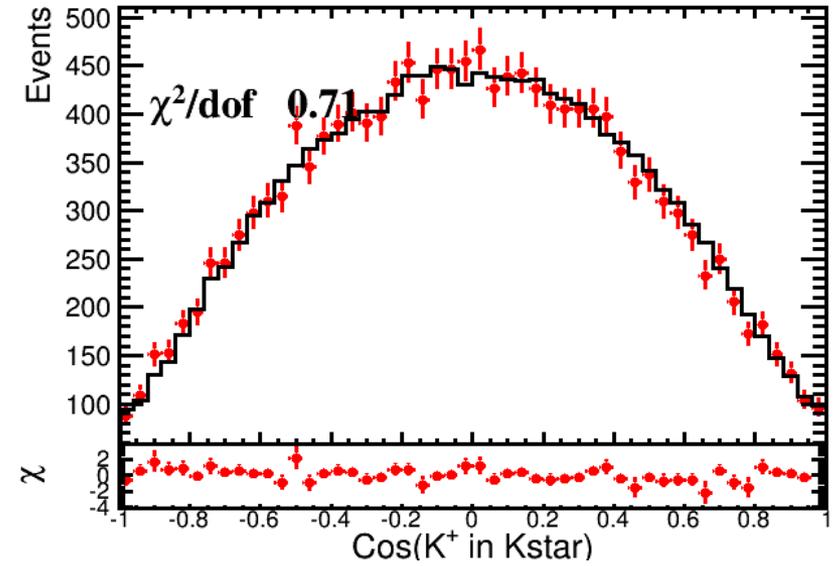
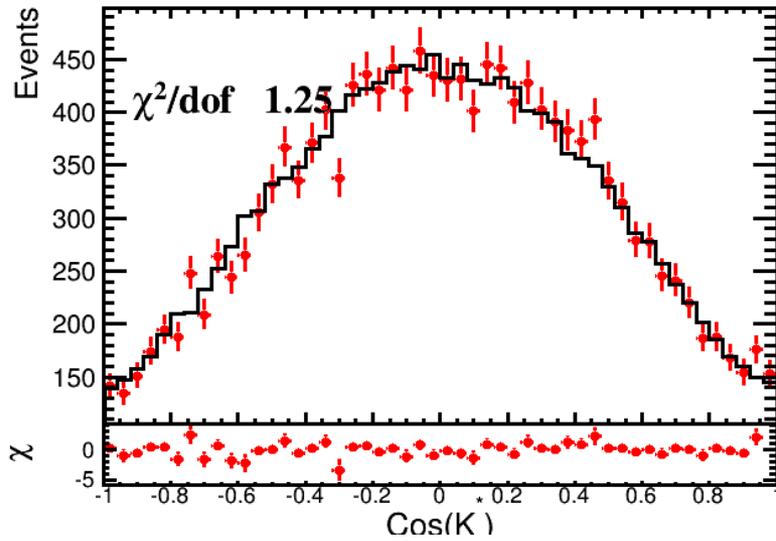
Phi mass window region:

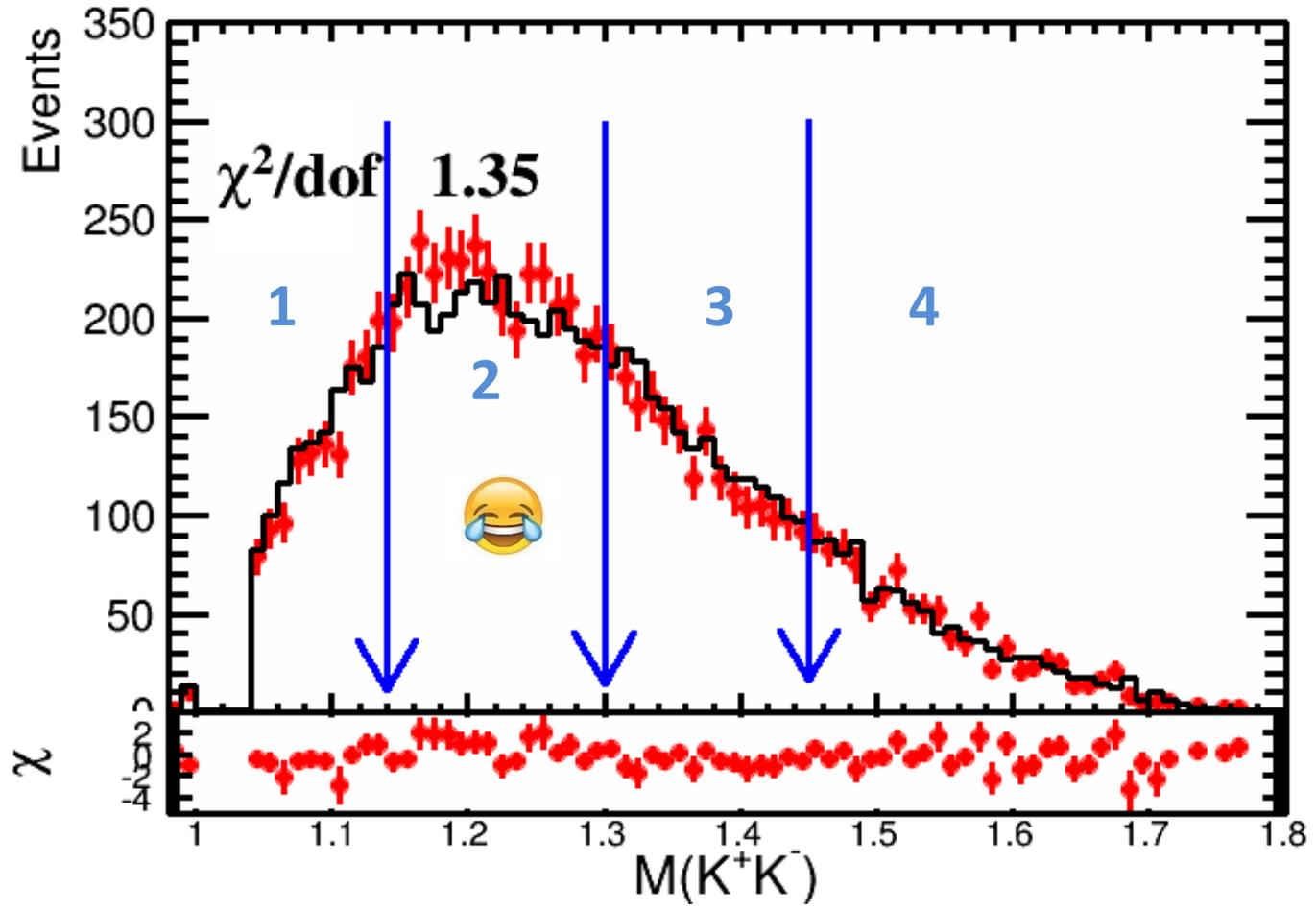
$|M(KpKm)-1.02| < 0.02$ GeV



None phi region

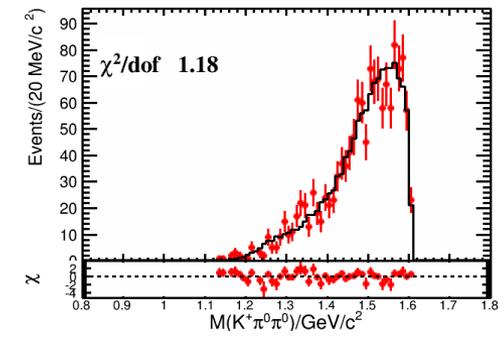
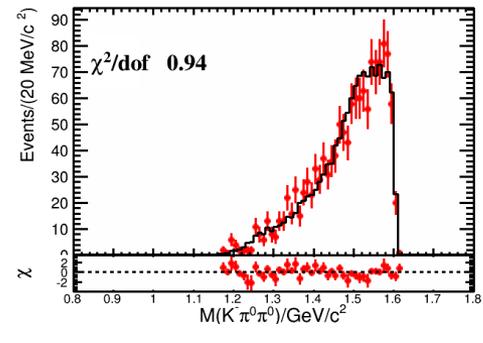
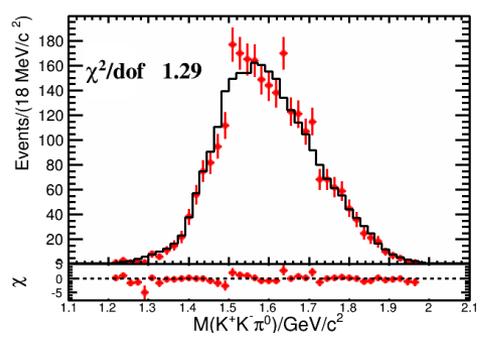




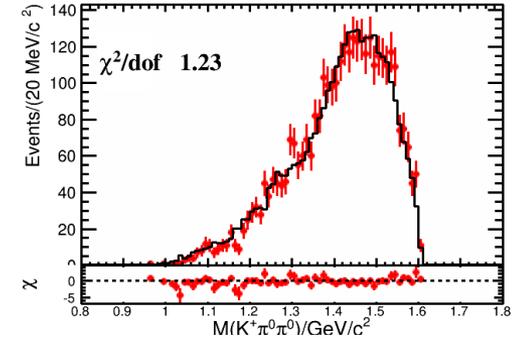
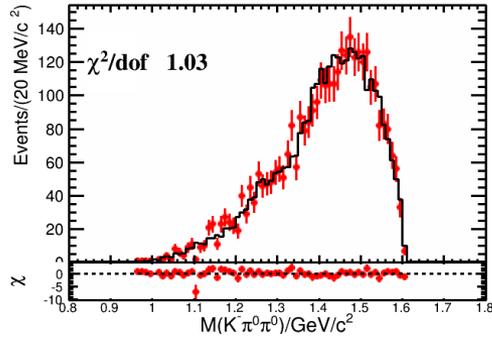
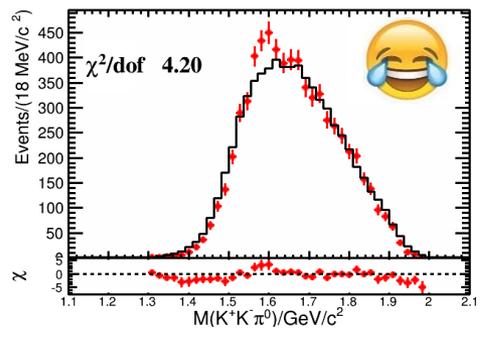


2.125

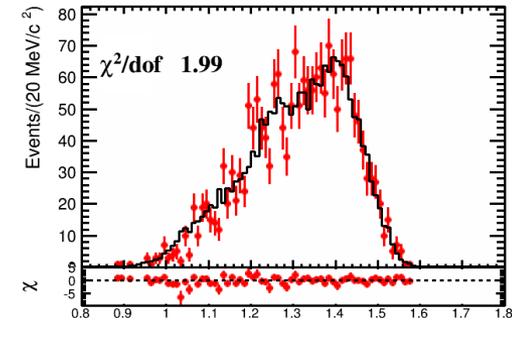
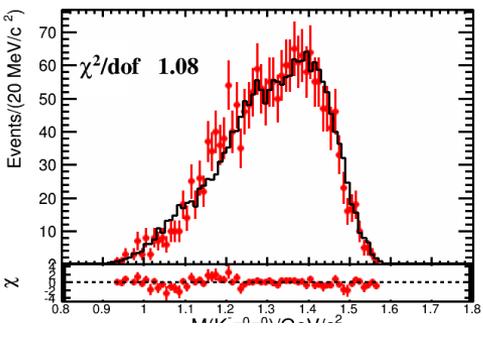
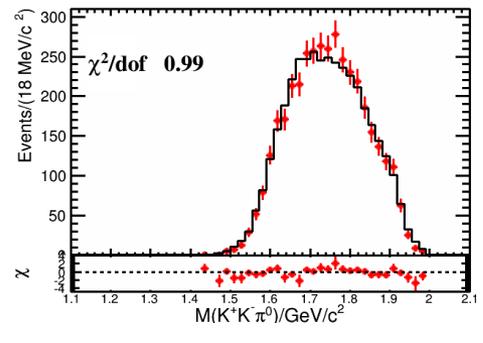
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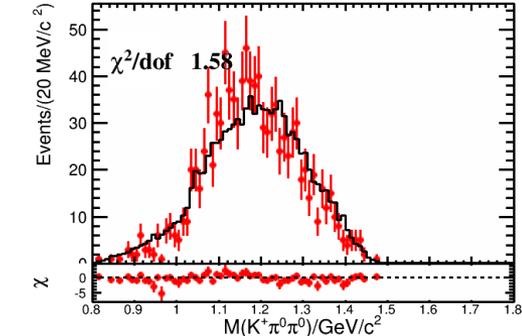
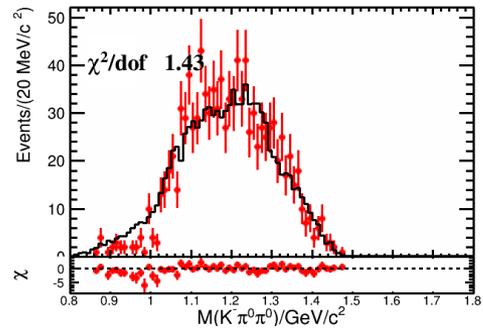
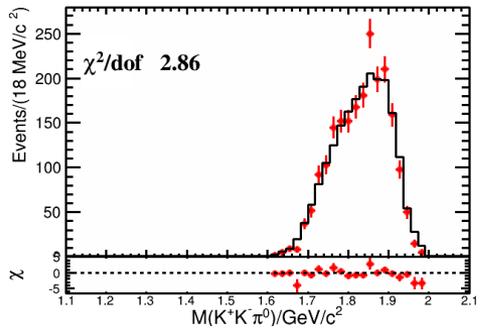
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3

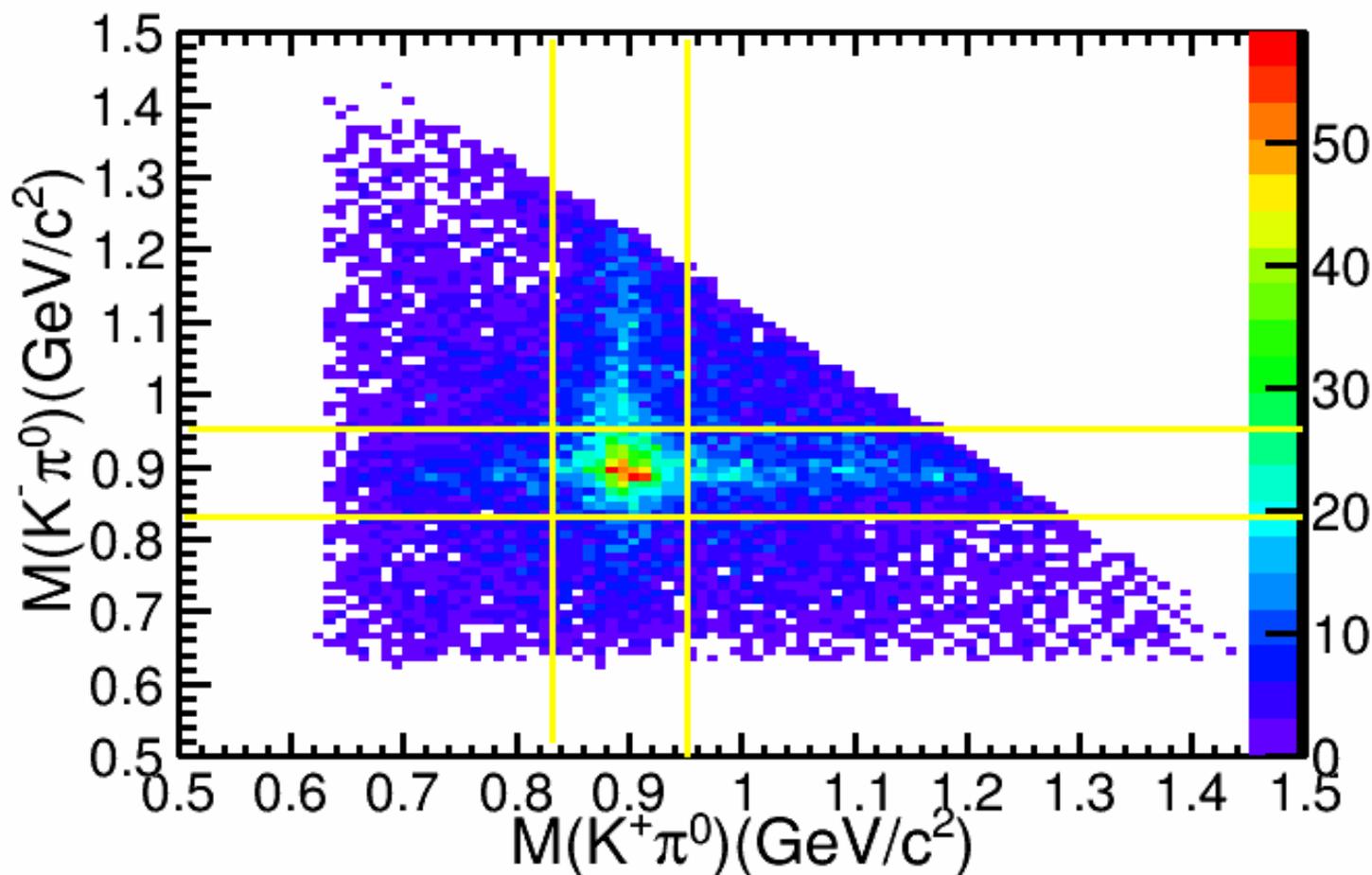


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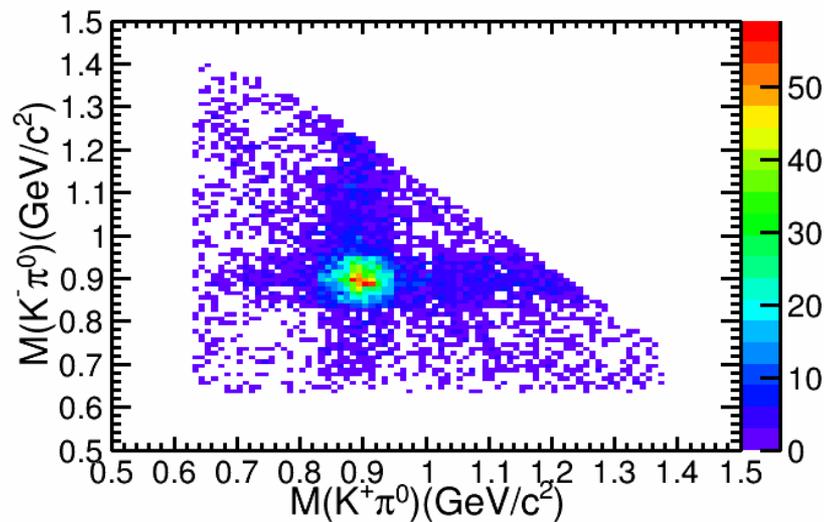


2D Distribution

$$M(K^+\pi^0) \text{ vs } M(K^-\pi^0)$$

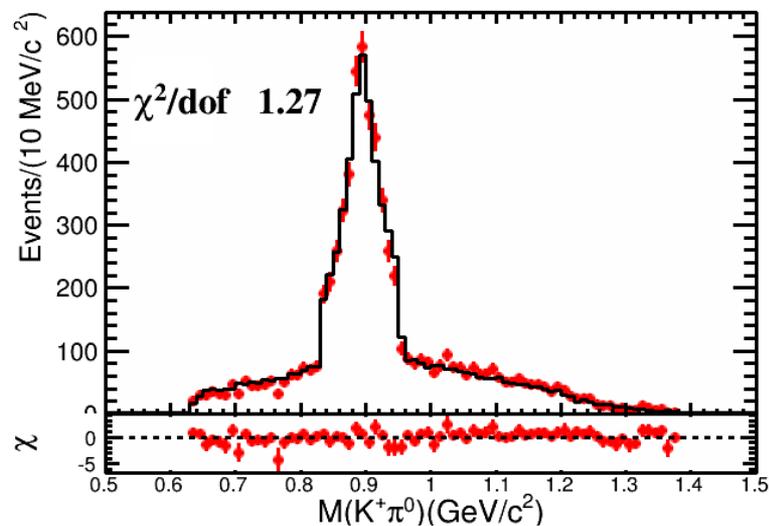
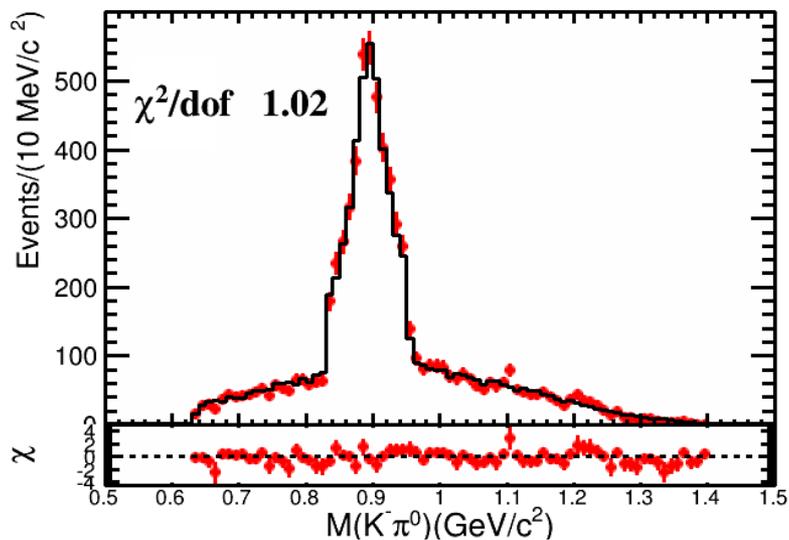


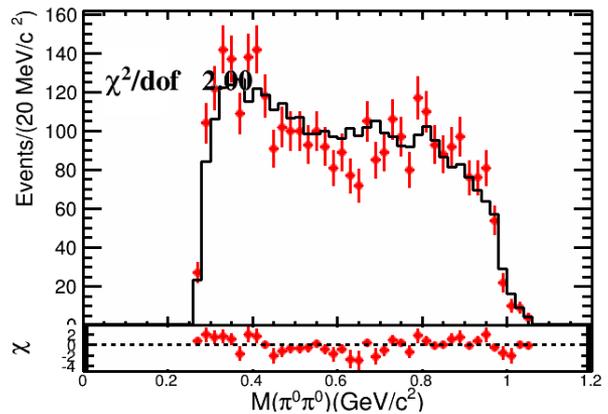
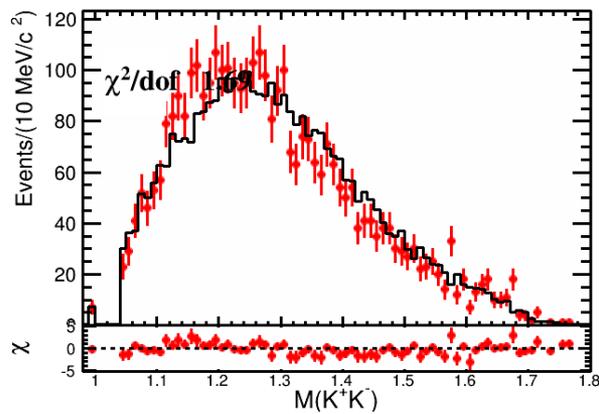
$K^{*+}K^{*-}$ signal



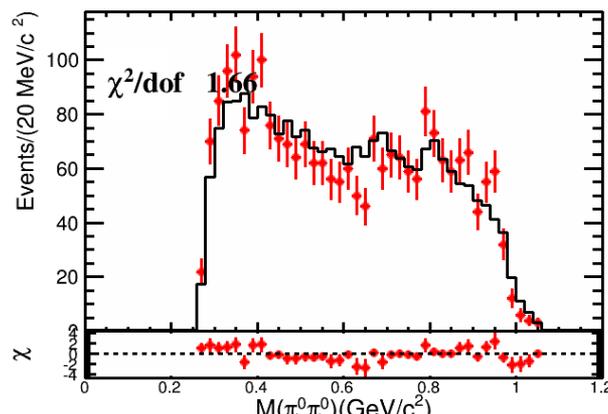
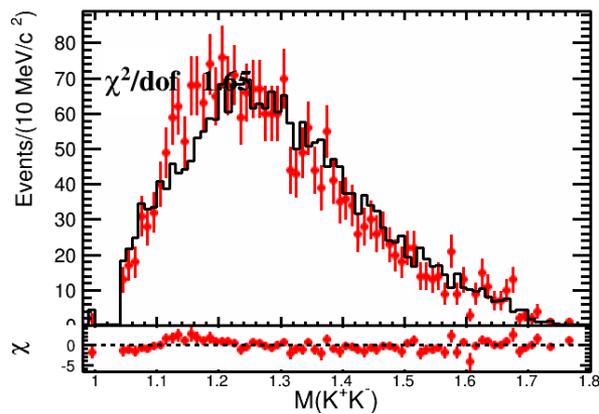
$$\left|K^+\pi_1^0 - 0.982\right| < 0.06 \text{ MeV} \text{ or}$$
$$\left|K^+\pi_2^0 - 0.982\right| < 0.06 \text{ MeV}$$

$$\left|K^-\pi_1^0 - 0.982\right| < 0.06 \text{ MeV} \text{ or}$$
$$\left|K^-\pi_2^0 - 0.982\right| < 0.06 \text{ MeV}$$

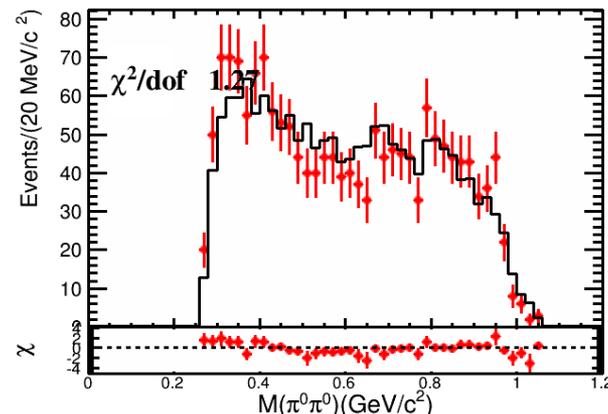
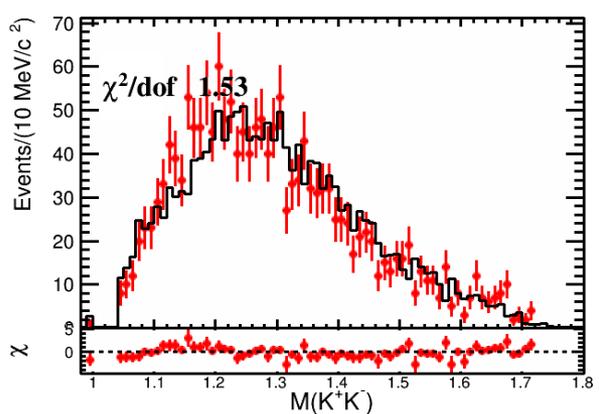




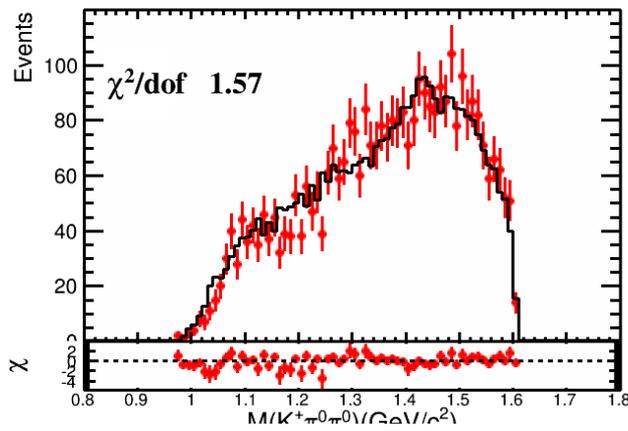
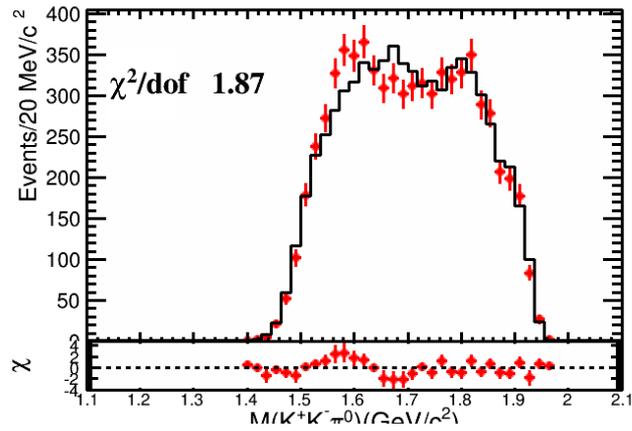
Mass 60 MeV



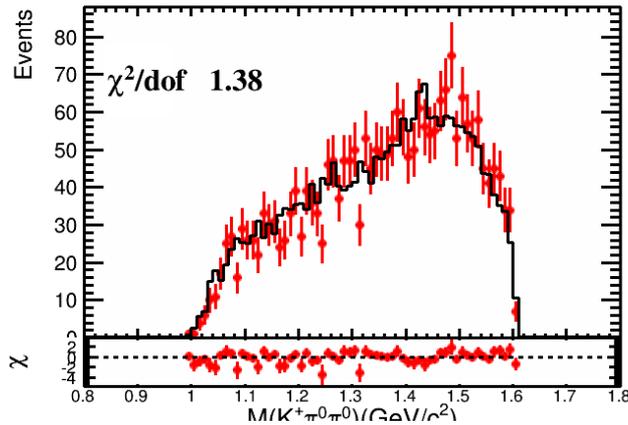
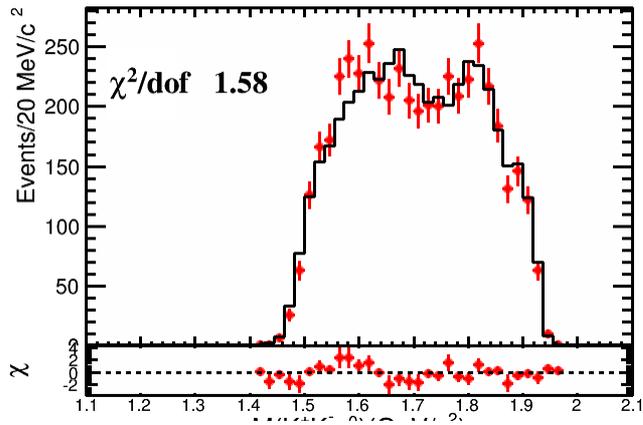
Mass 40 MeV



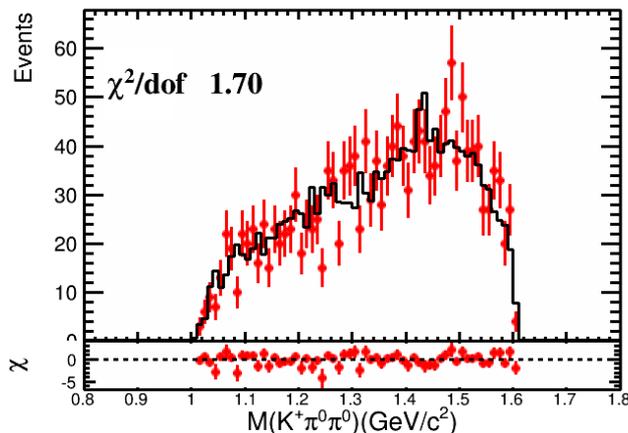
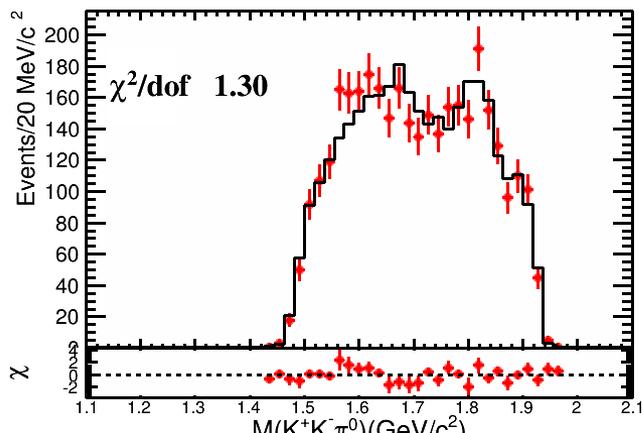
Mass 30 MeV



Mass 60 MeV

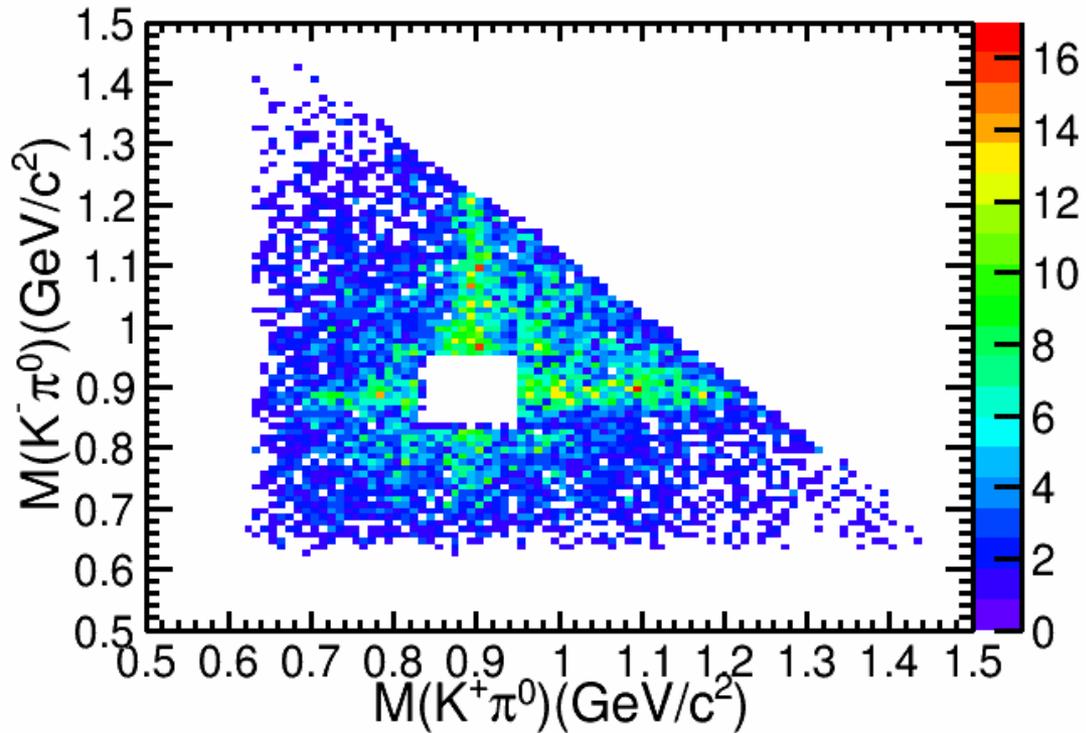


Mass 40 MeV

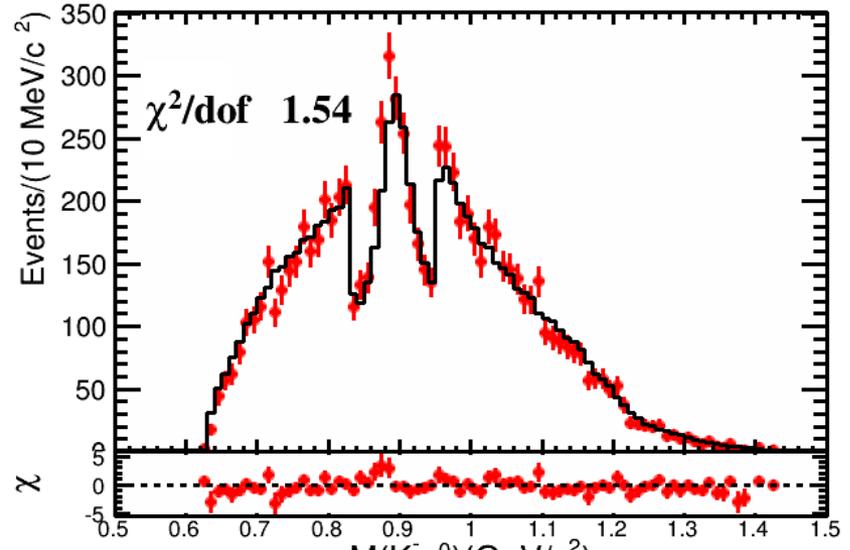
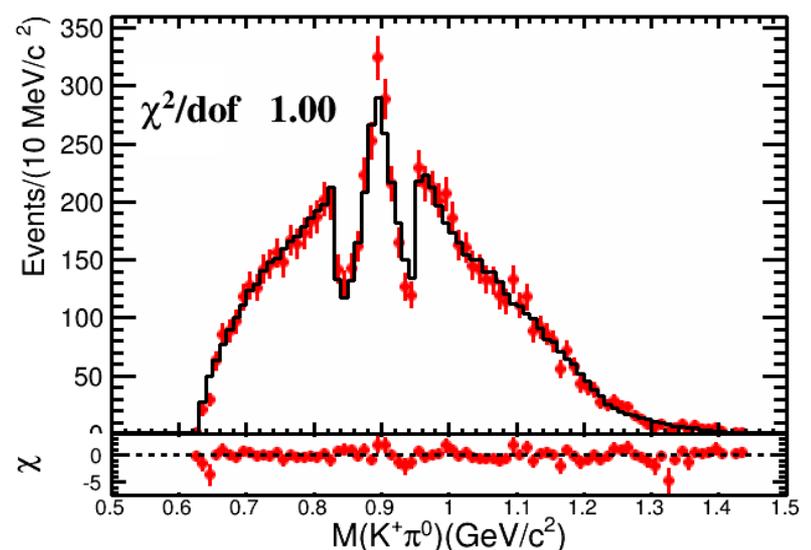
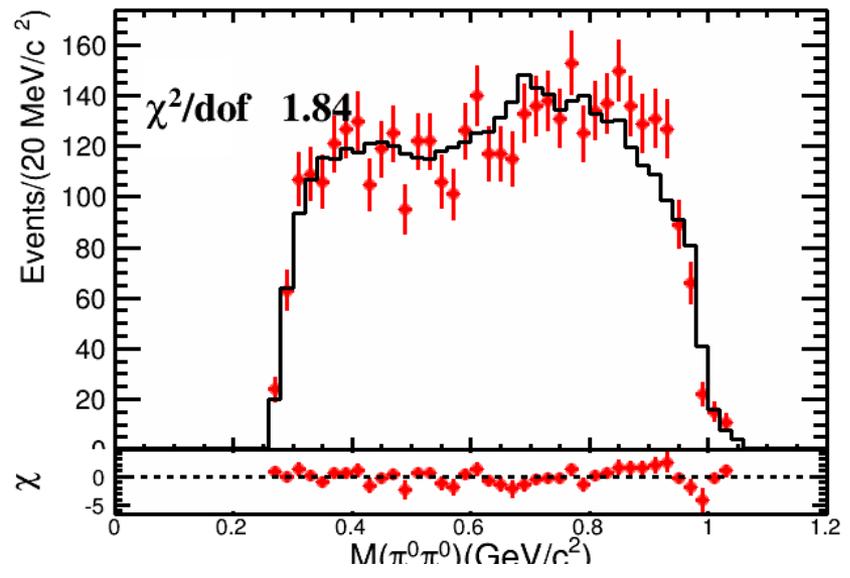
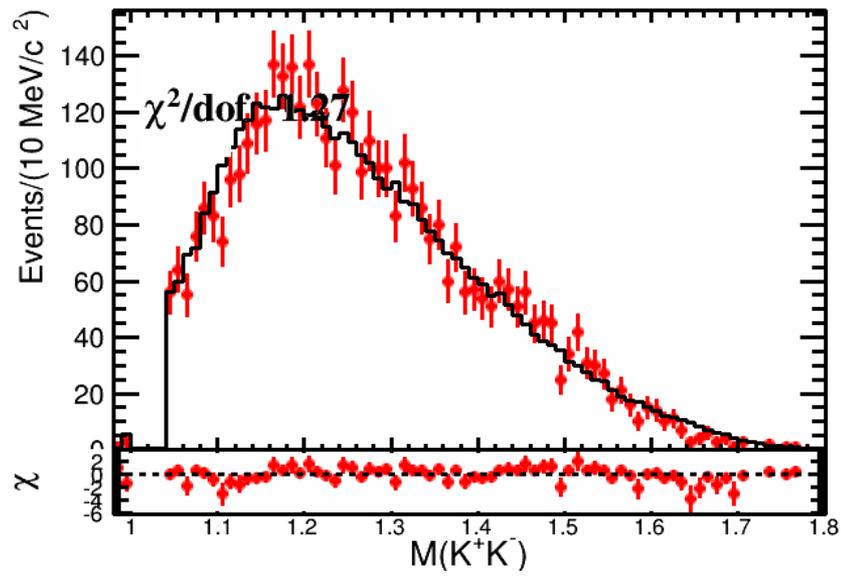


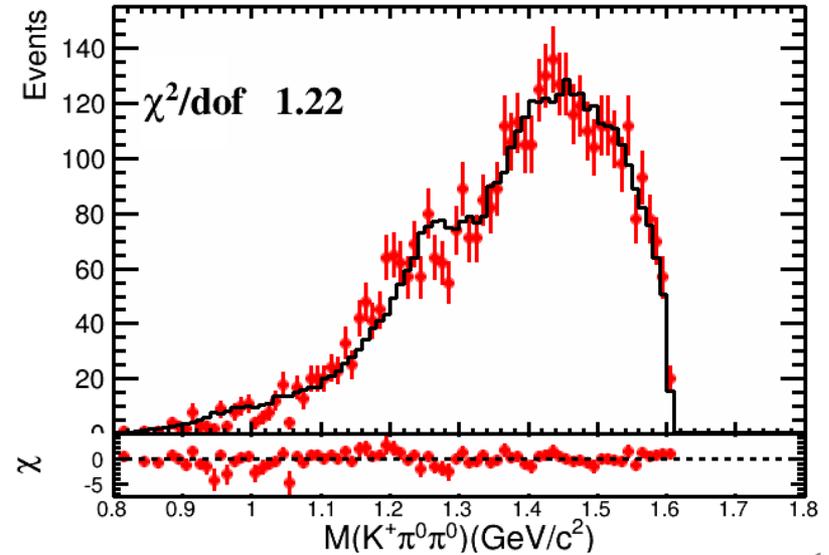
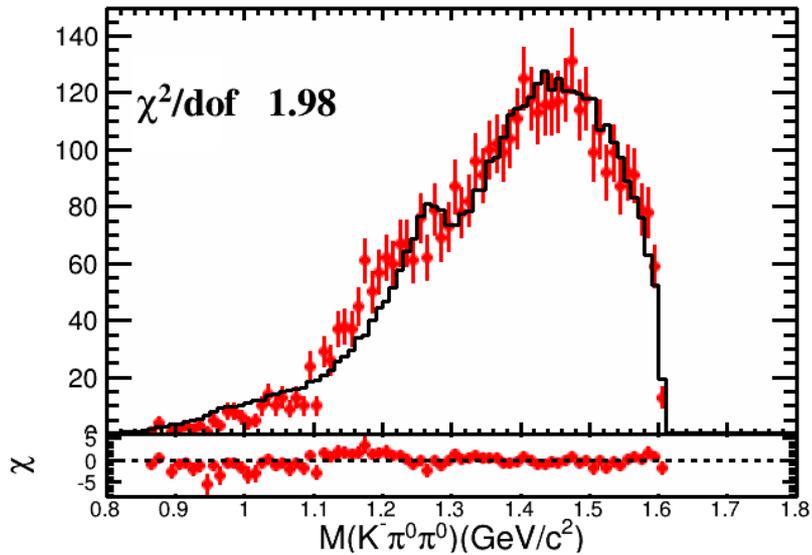
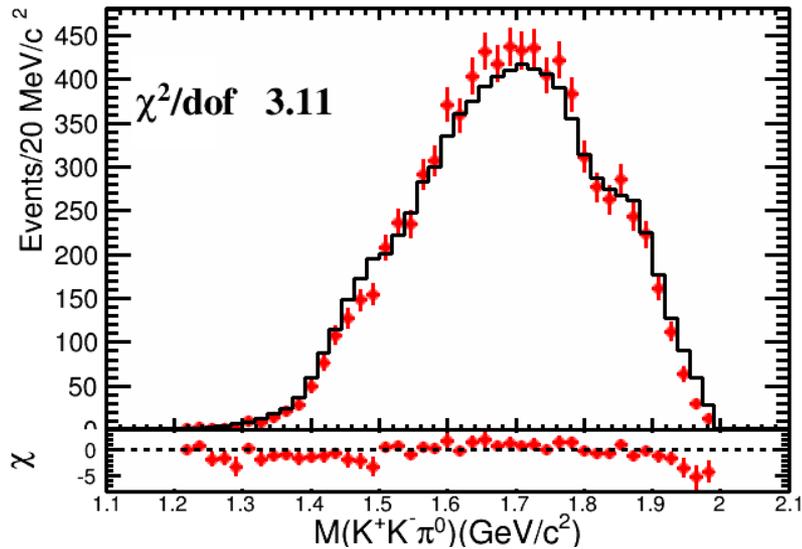
Mass 30 MeV

Remove $K^{*+}K^{*-}$ contribution

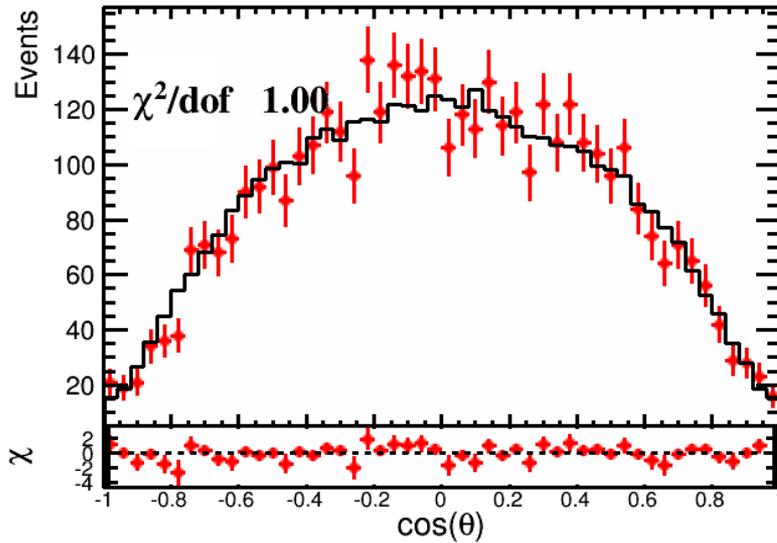
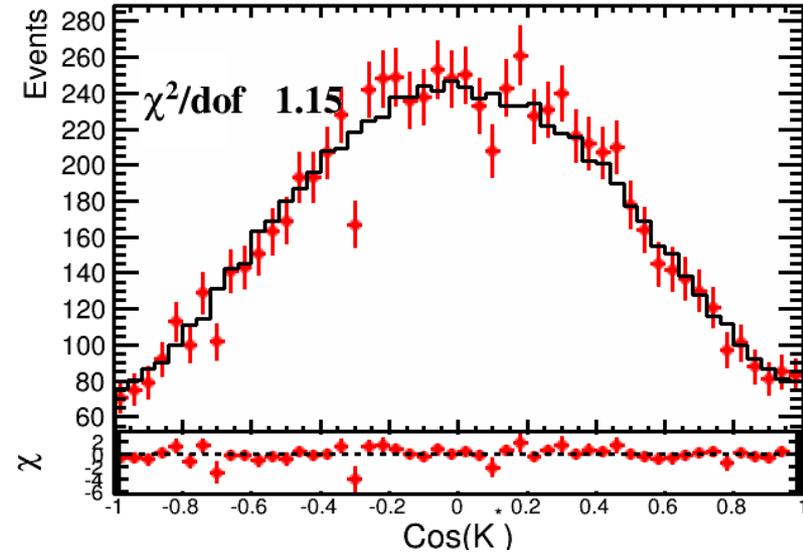
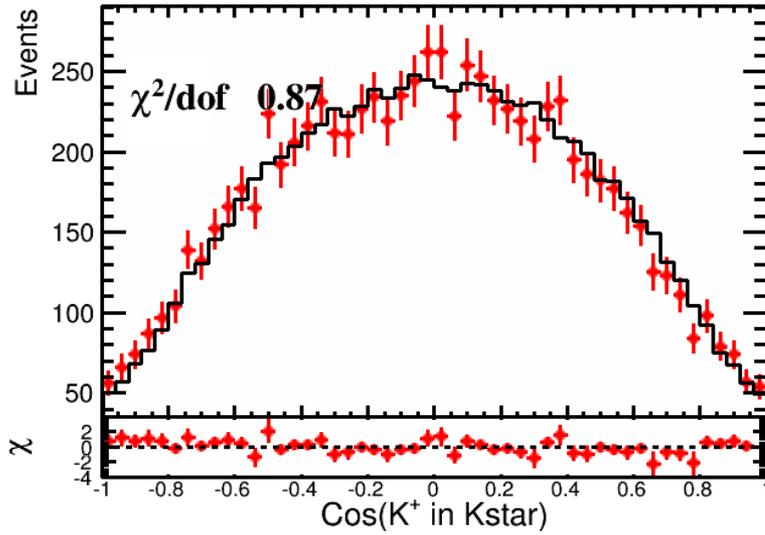


Remove $K^{*+}K^{*-}$ contribution

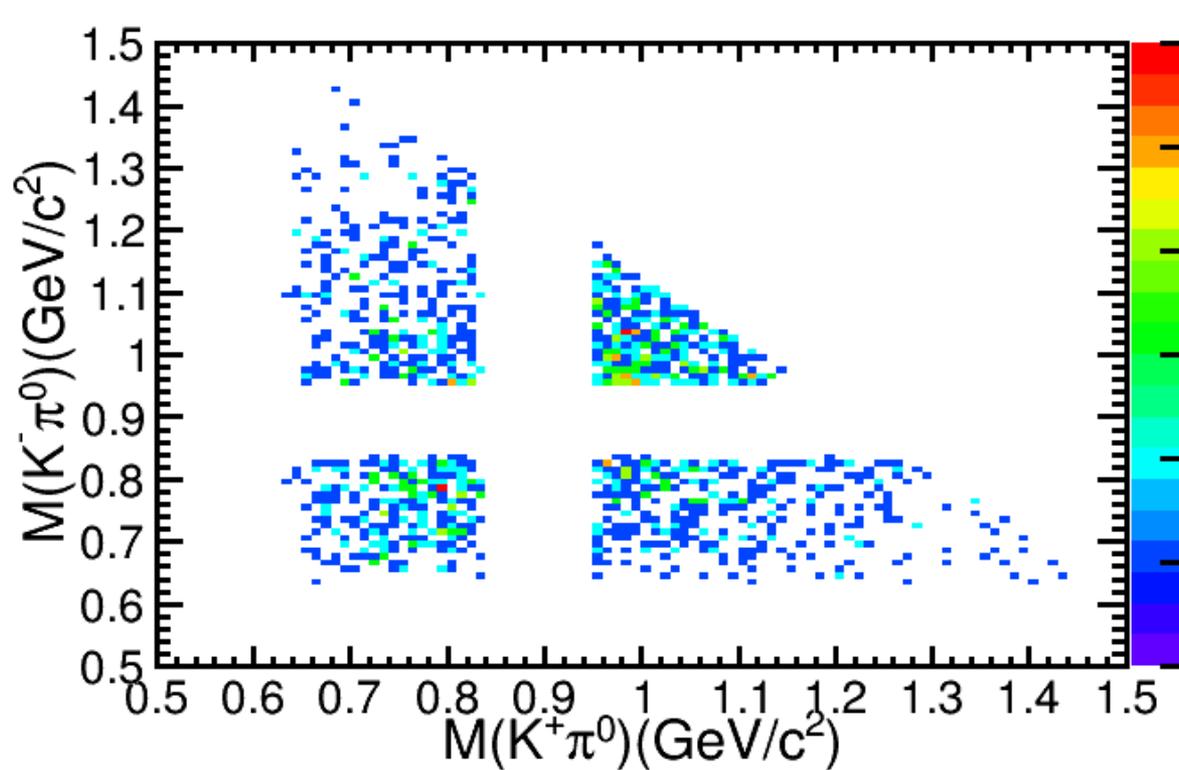


Remove $K^{*+}K^{*-}$ contribution

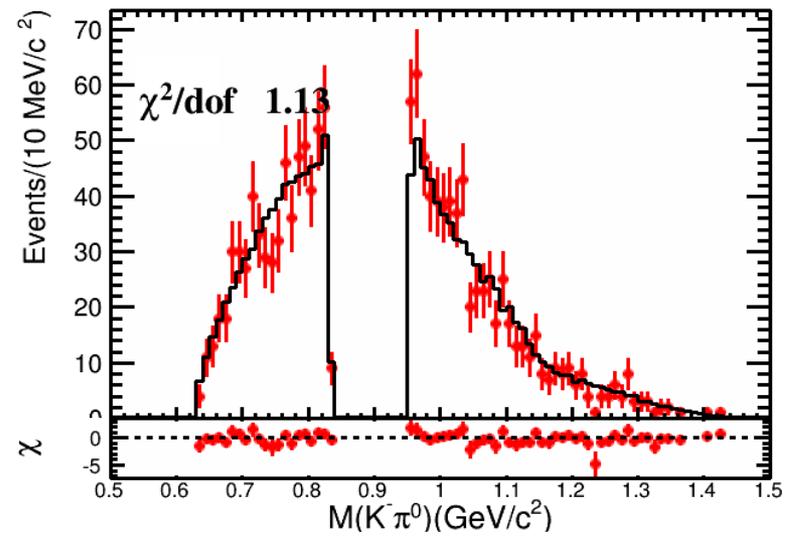
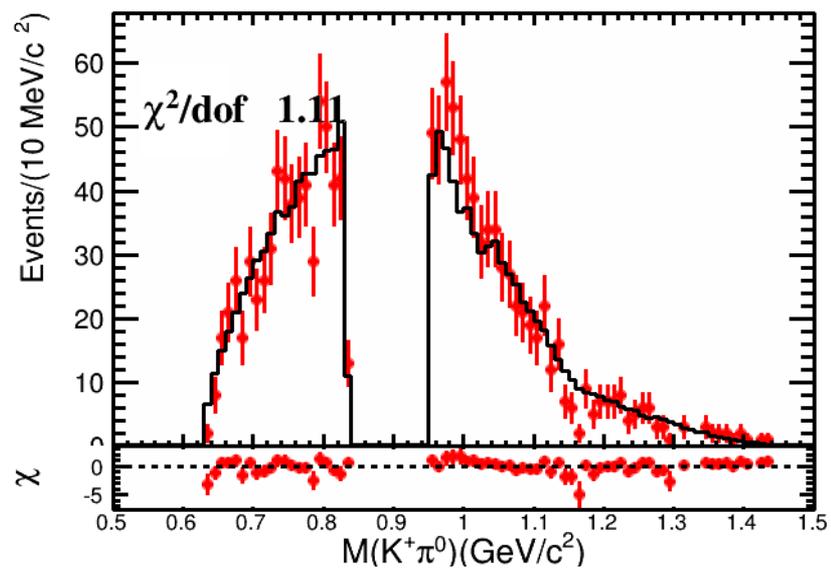
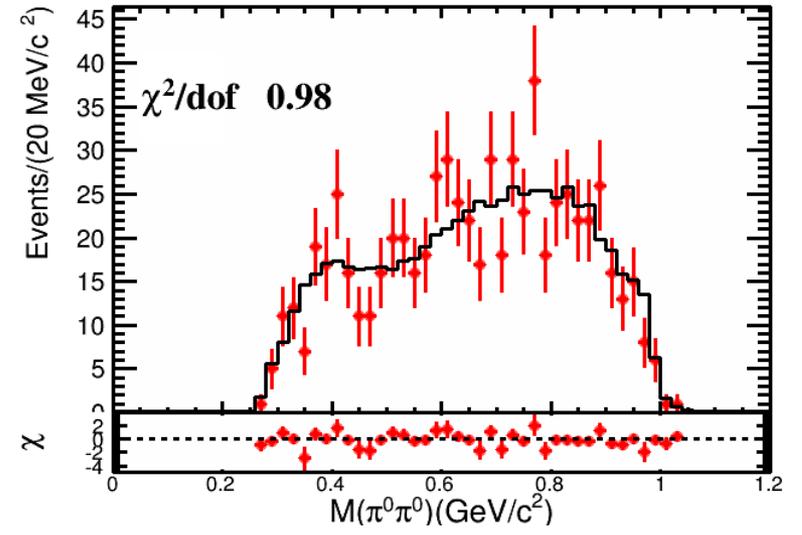
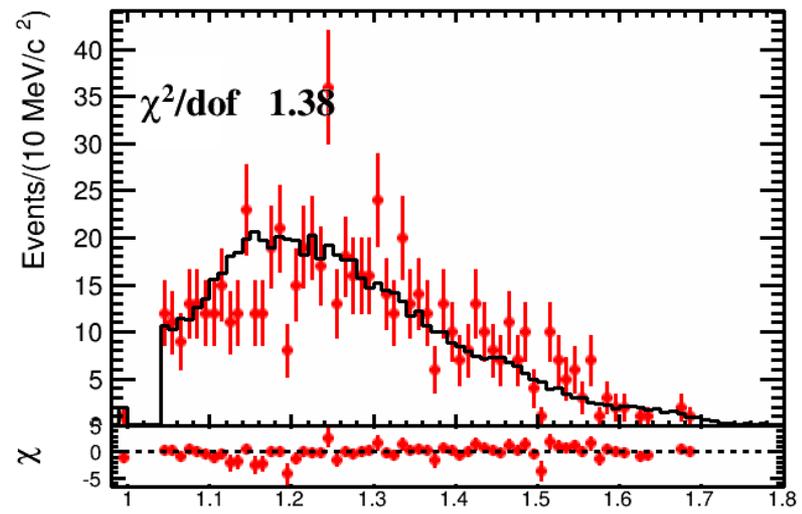
Remove $K^{*+}K^{*-}$ contribution



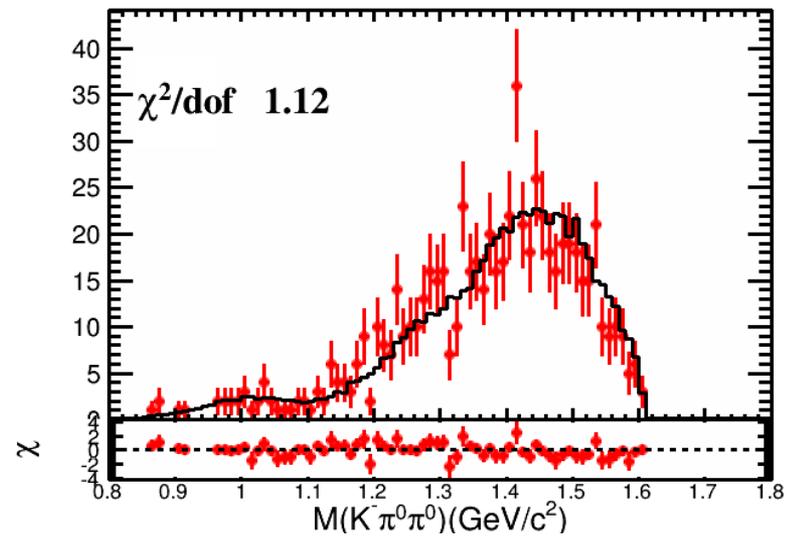
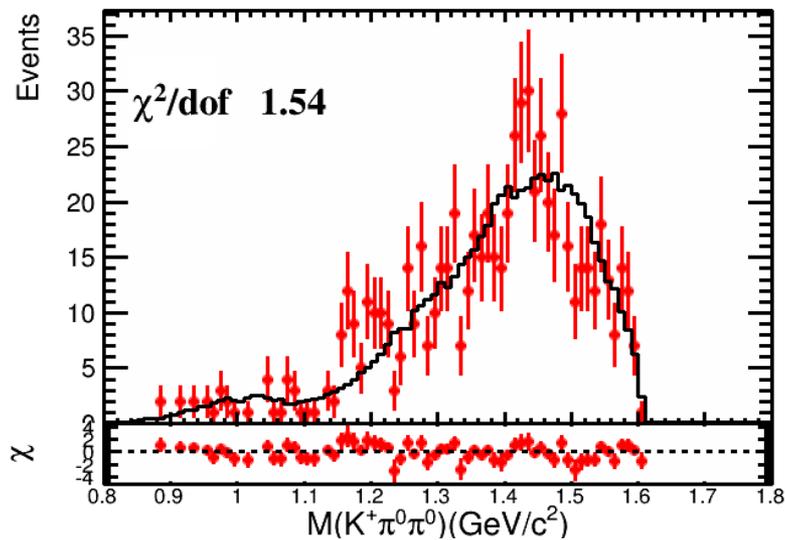
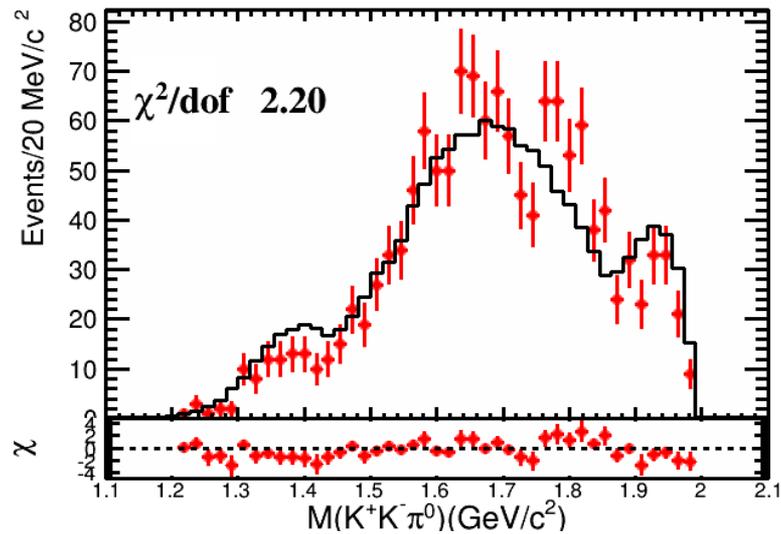
Not include the contribution of Kstar



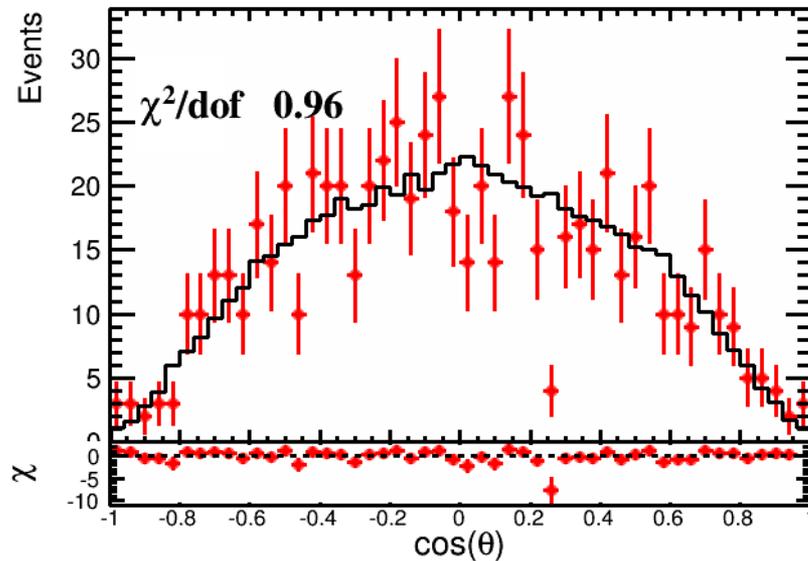
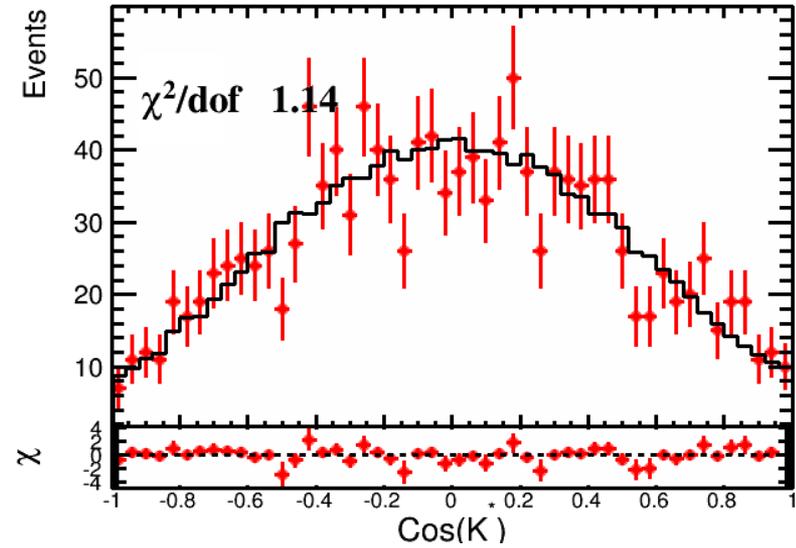
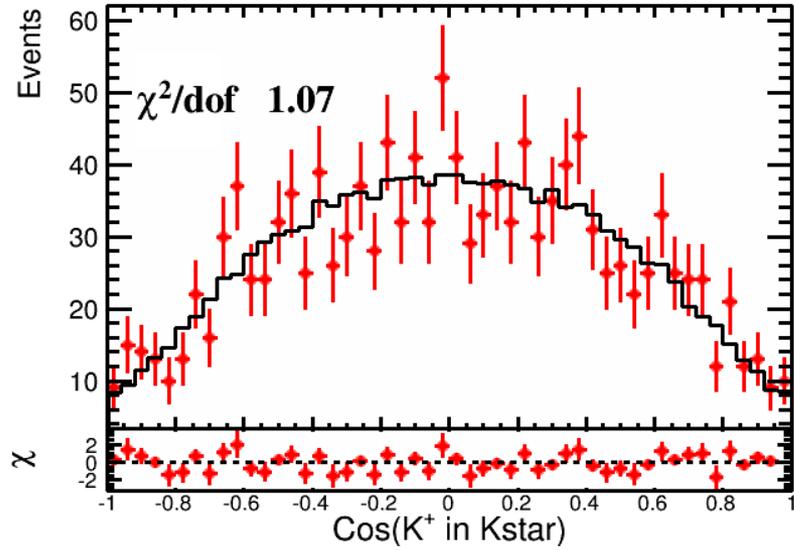
Not Kstar contribution



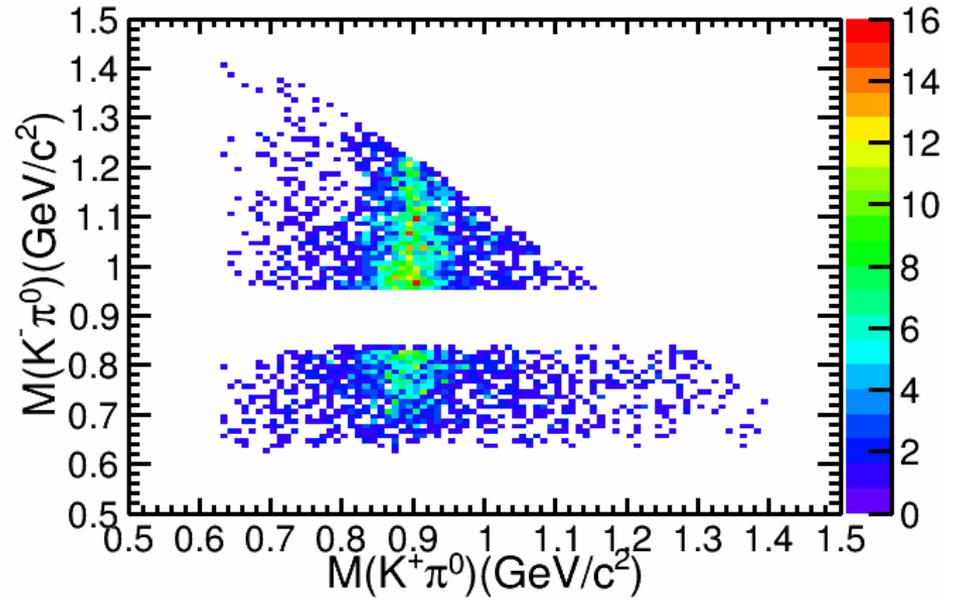
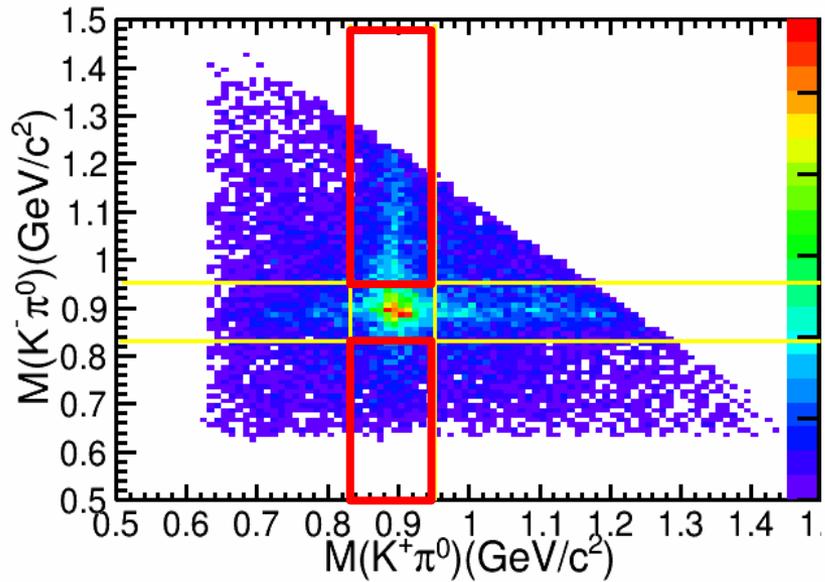
Not Kstar contribution

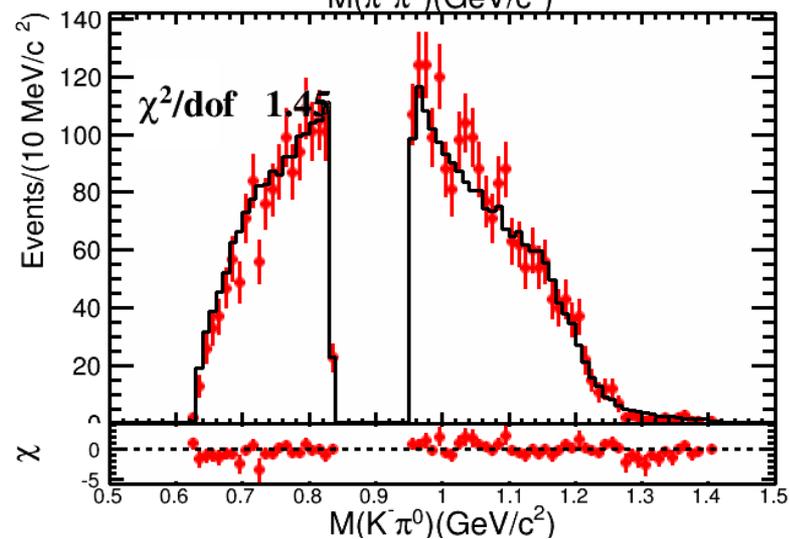
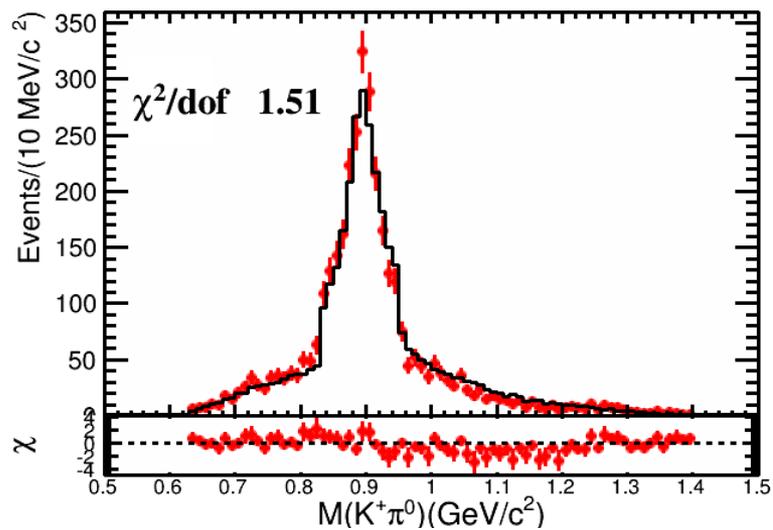
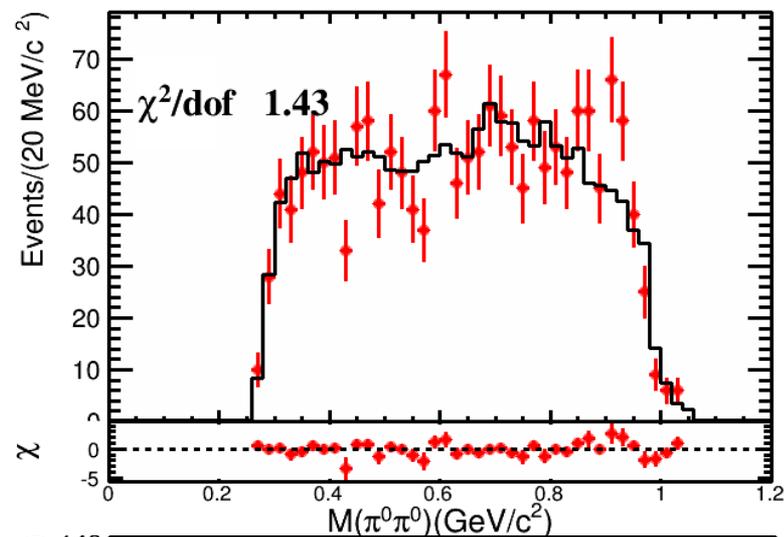
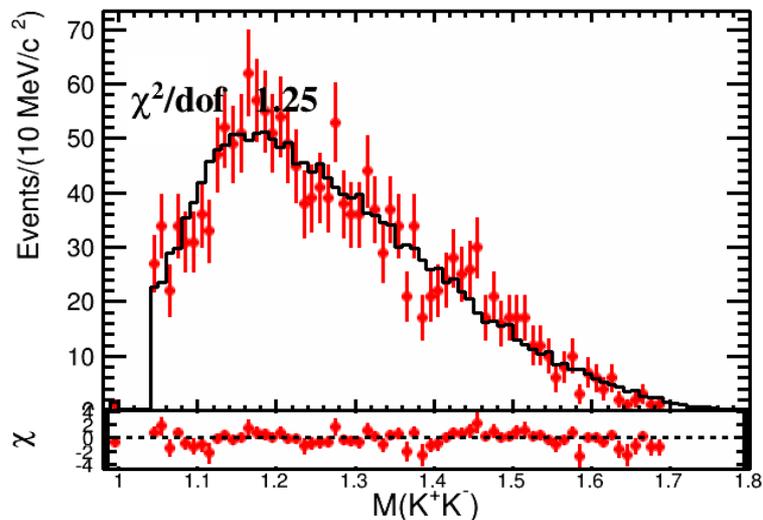


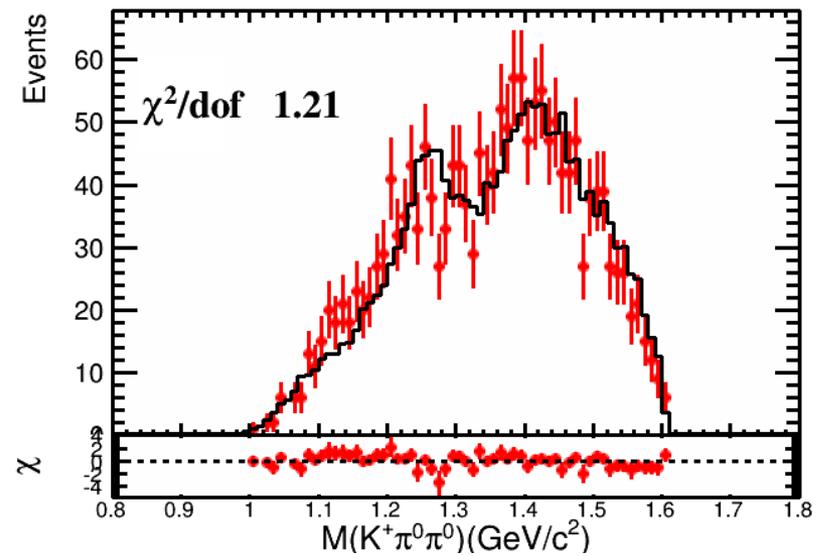
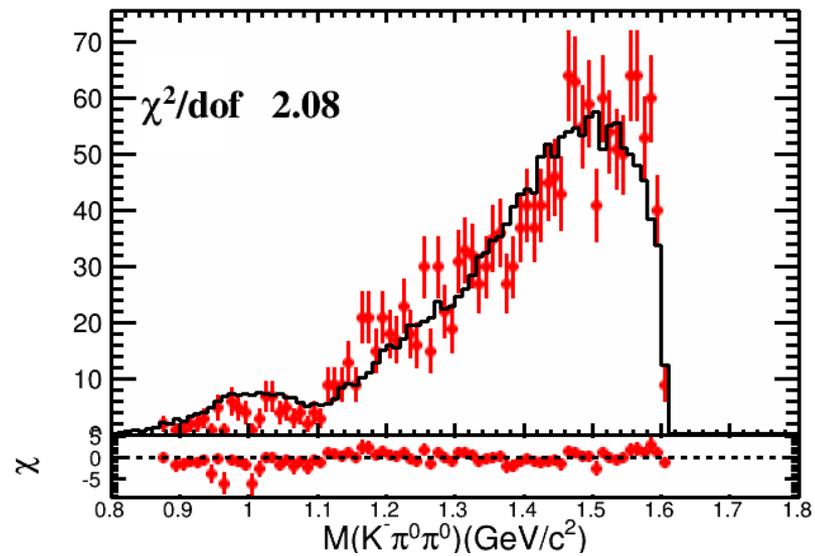
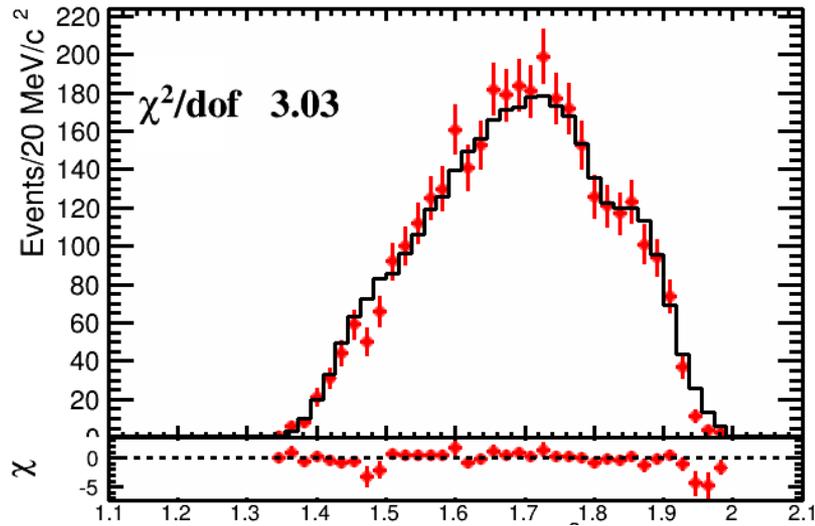
Not Kstar contribution



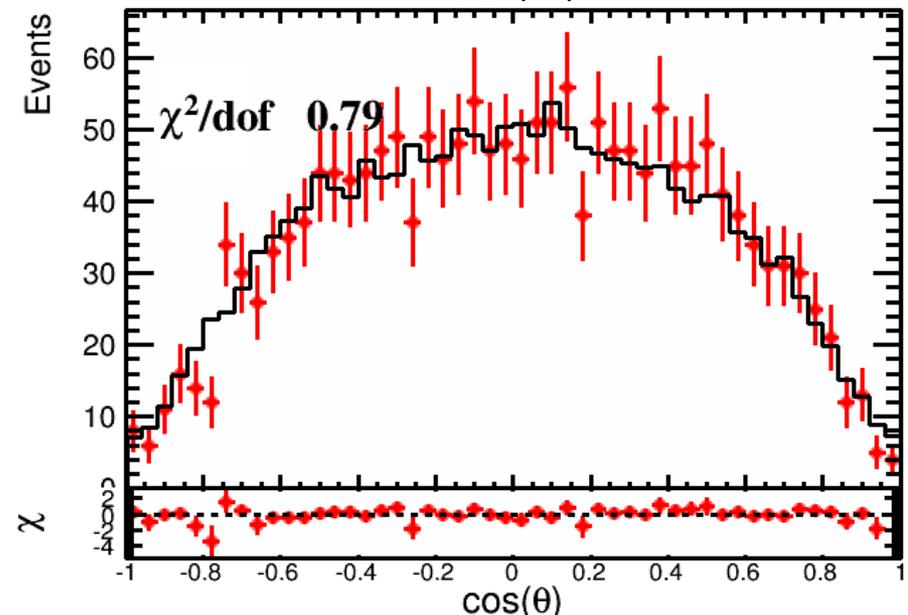
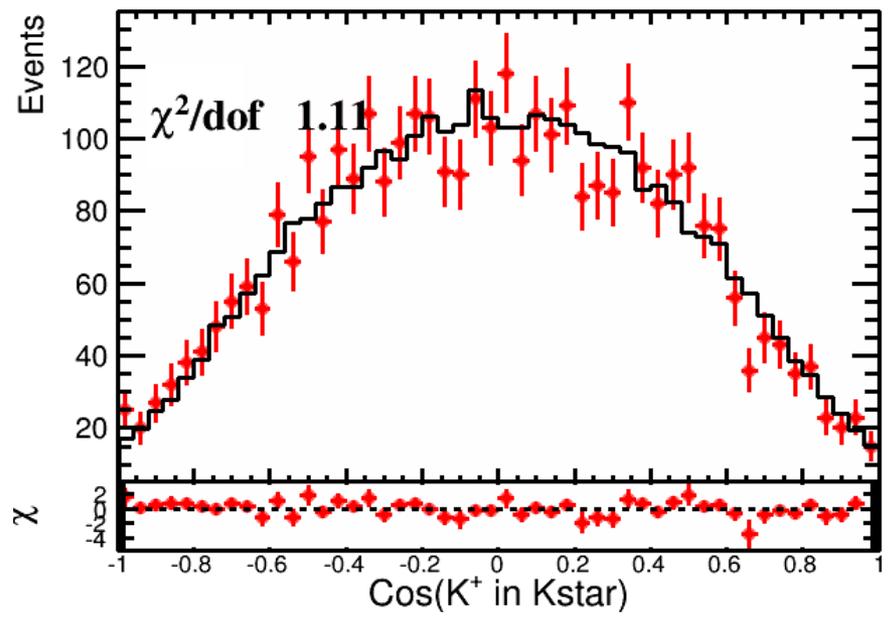
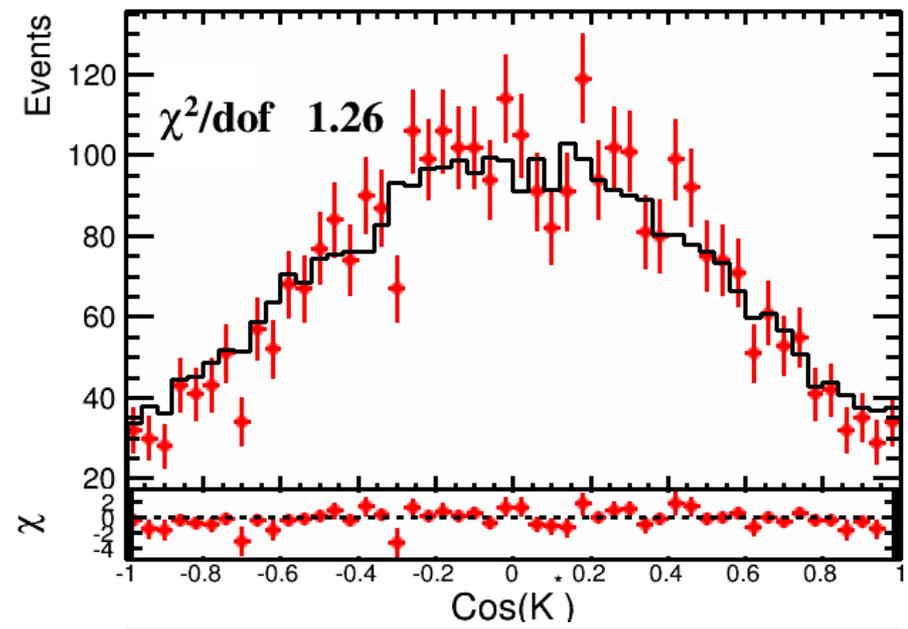
$K^{*+}K^{-}\pi^0$ distribution



$K^{*+} K^{-} \pi^0$ distribution

$K^{*+}K^{-}\pi^0$ distribution

$K^{*+} K^{-} \pi^0$ distribution

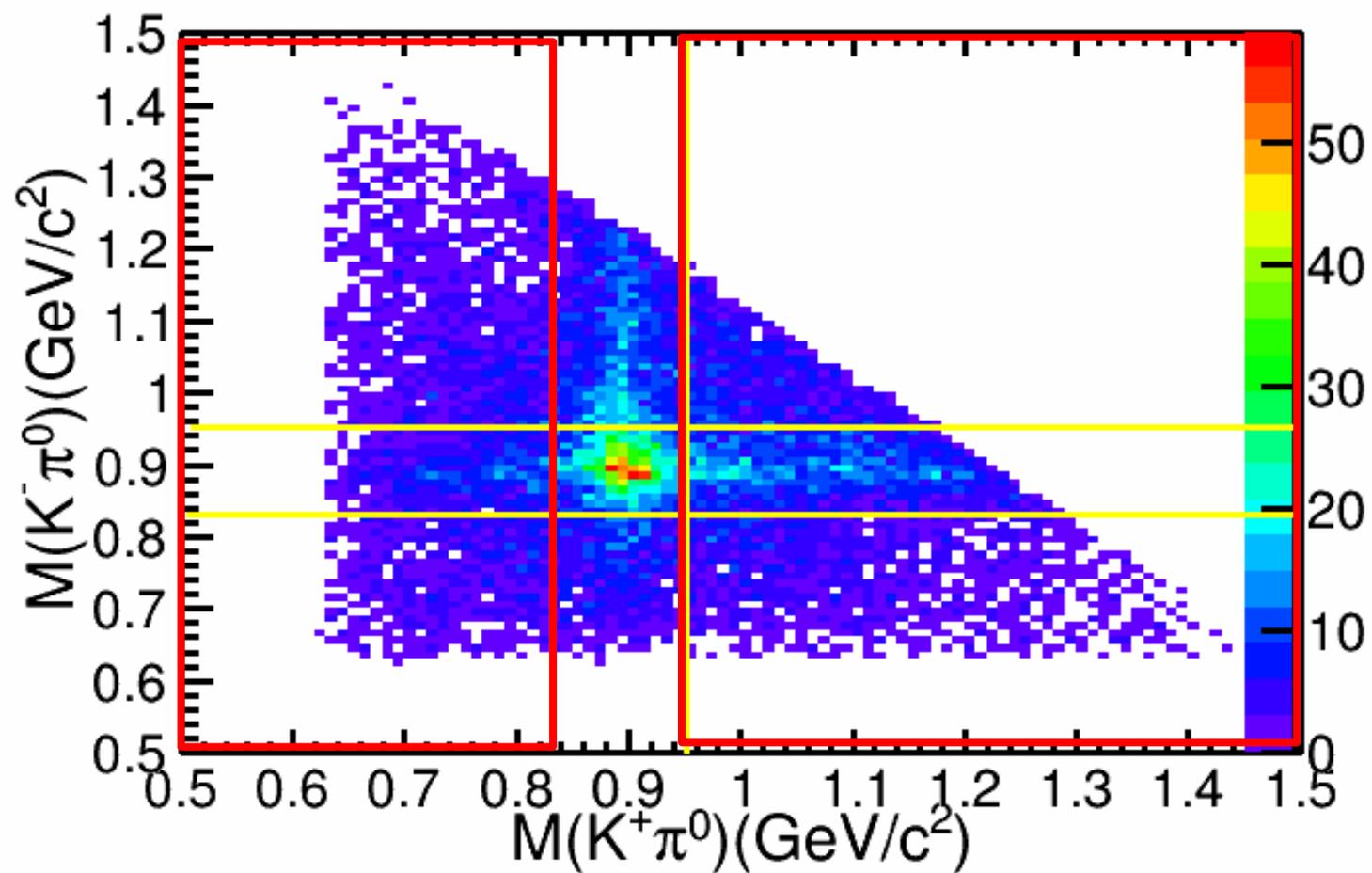


Summary & outlook

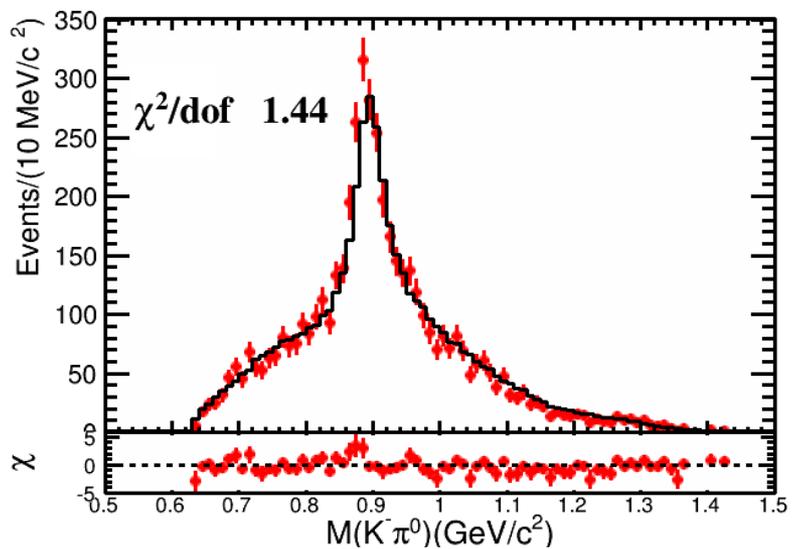
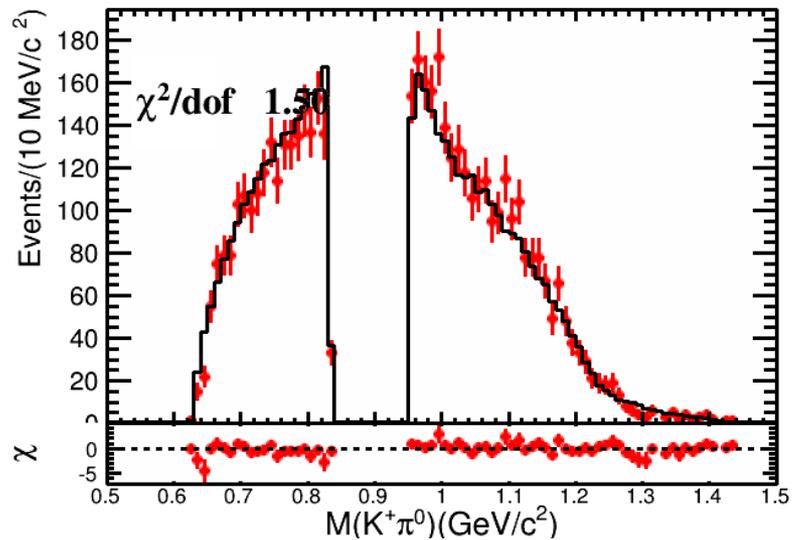
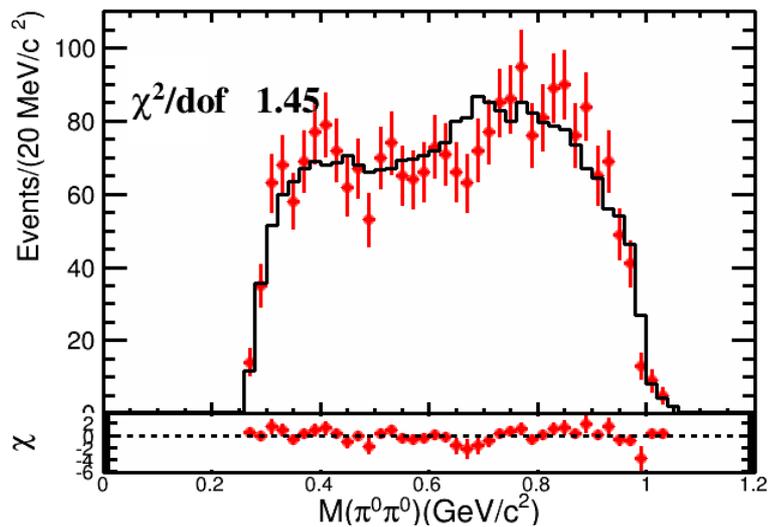
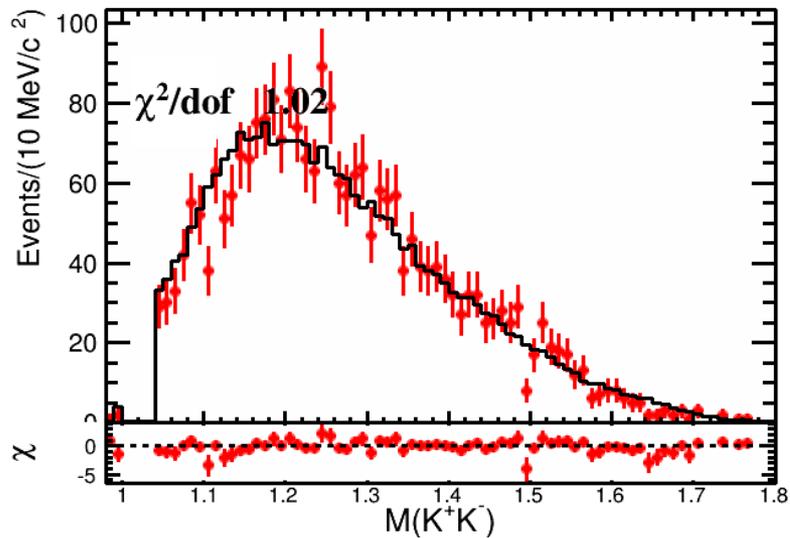
- Comparing the distributions in different region, the deviation between data and fitting is from the $K^* K \pi^0$ contribution.
- Consider more intermediate states contribution, and scan the width and mass of $K^{(*)}$ resonance

Back up

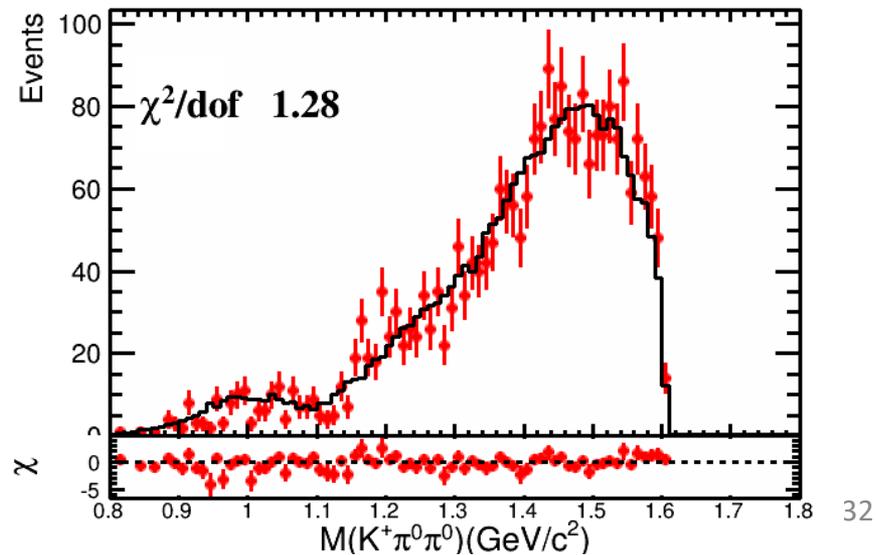
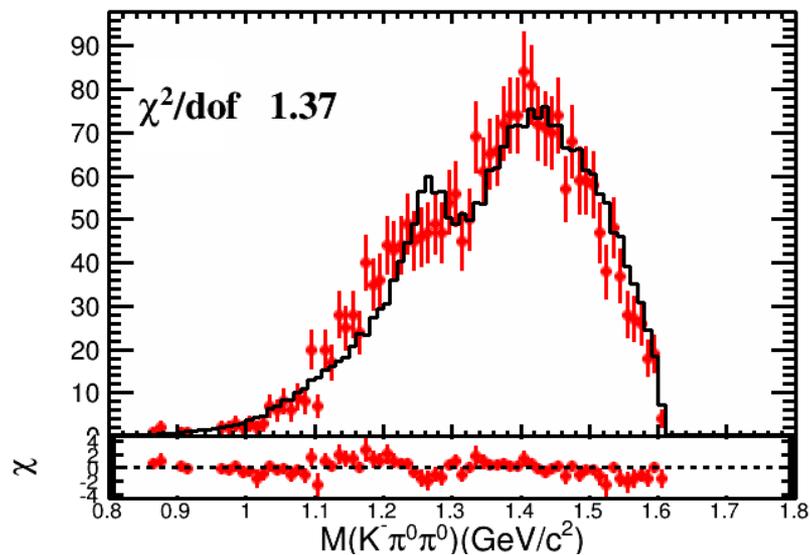
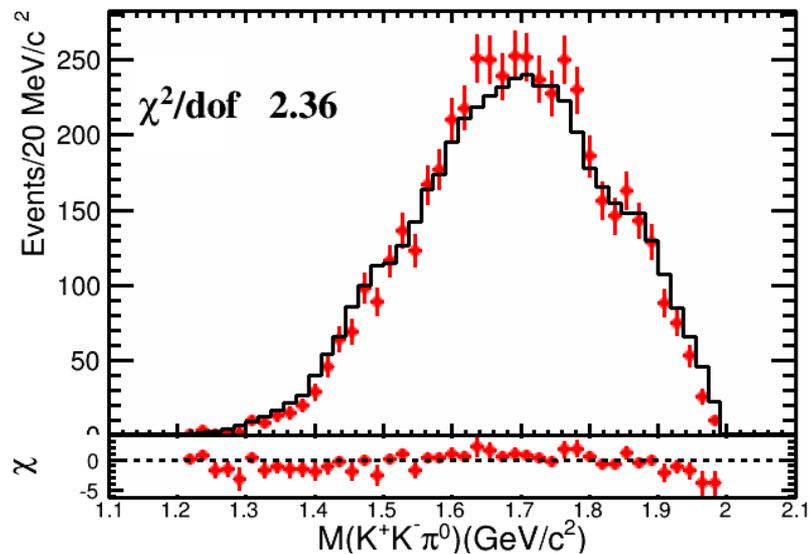
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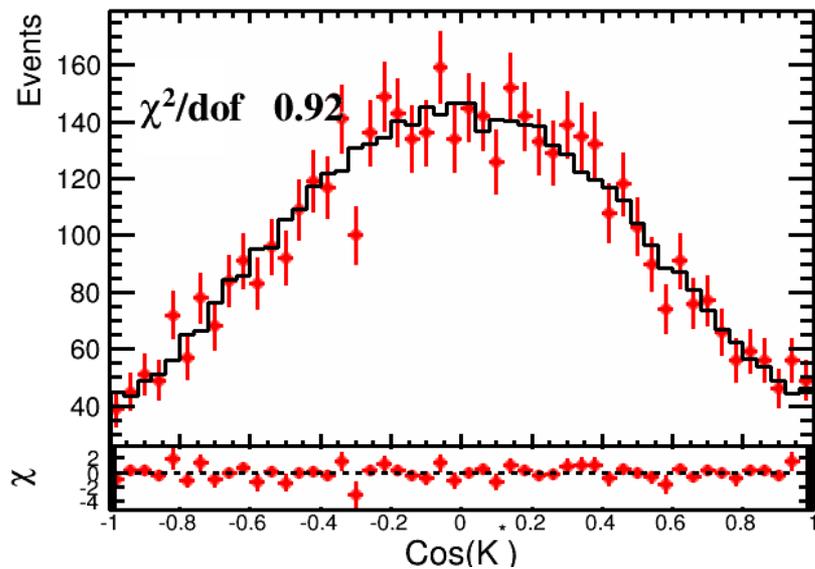
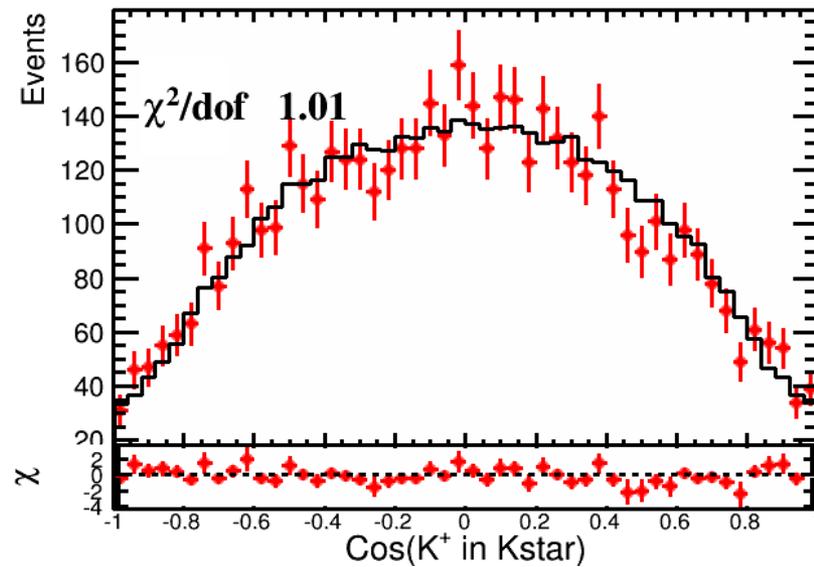
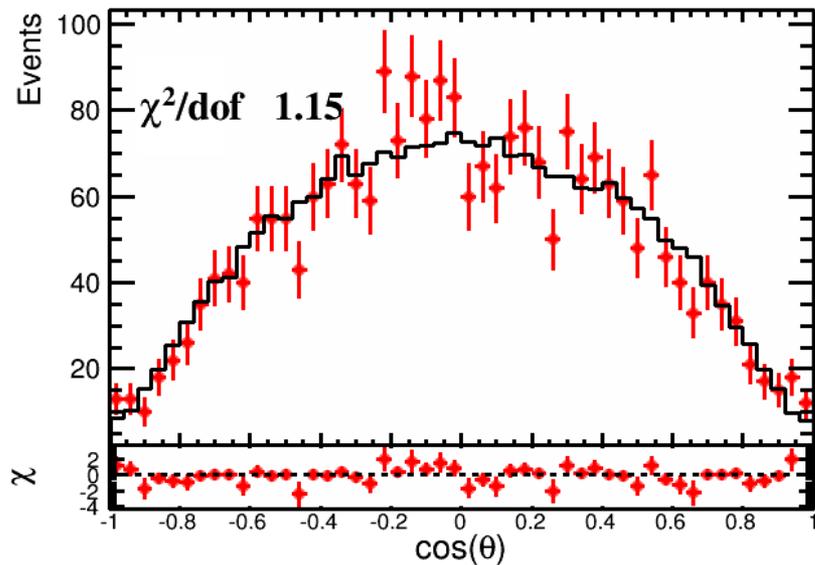
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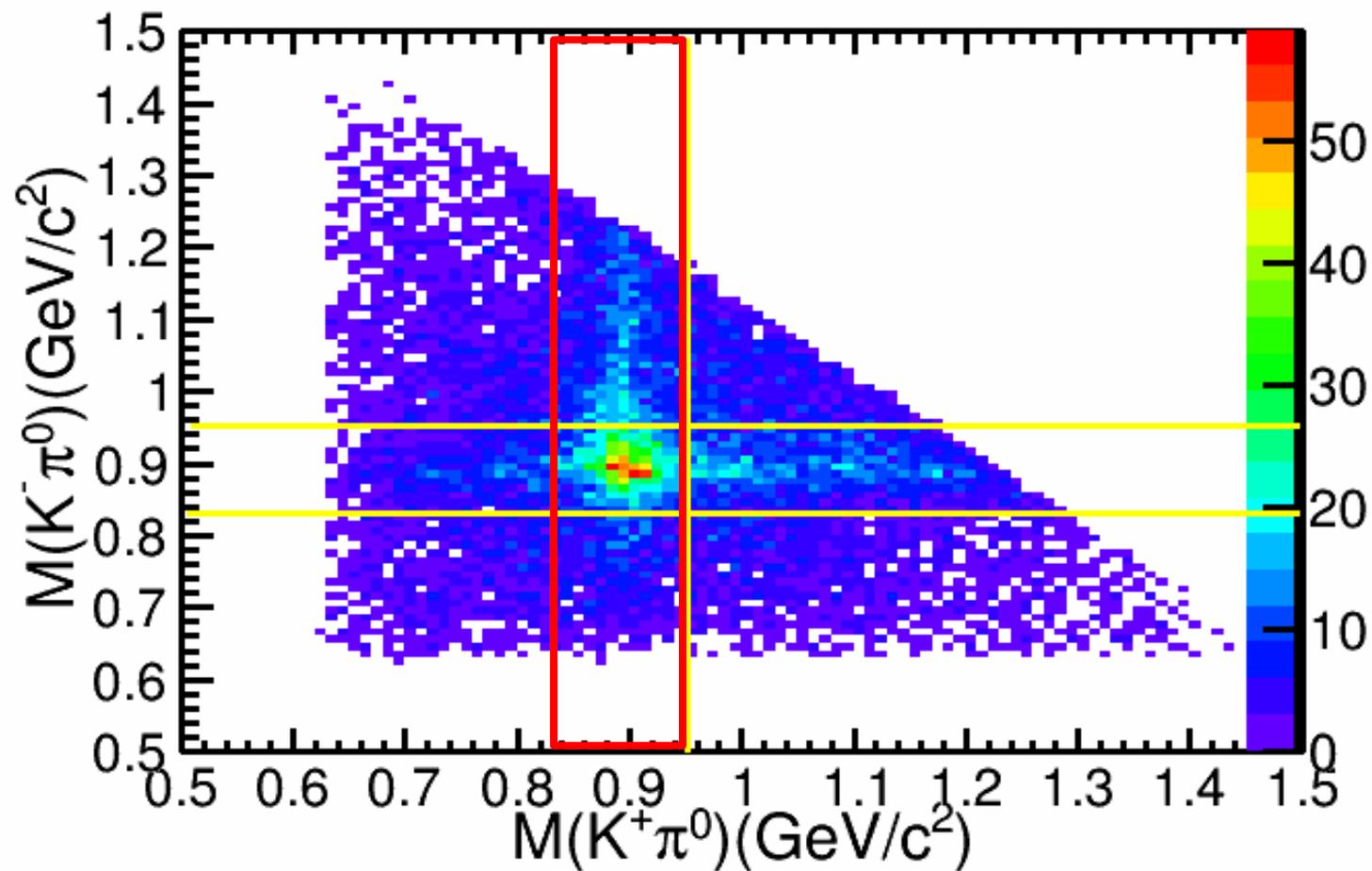


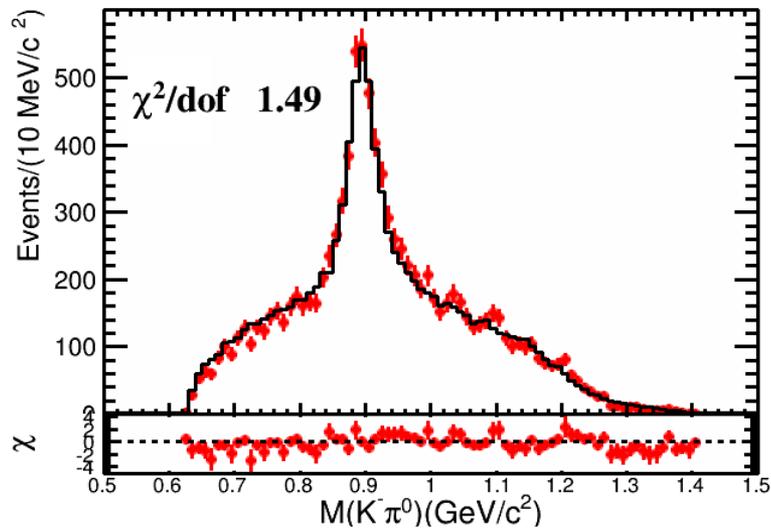
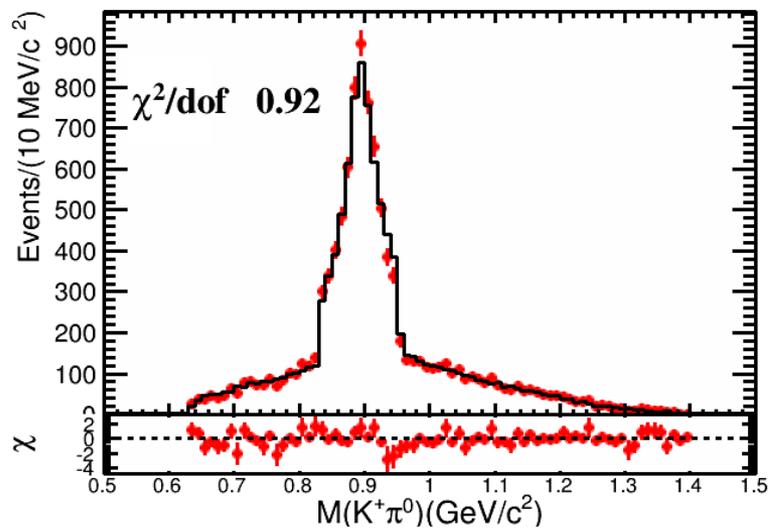
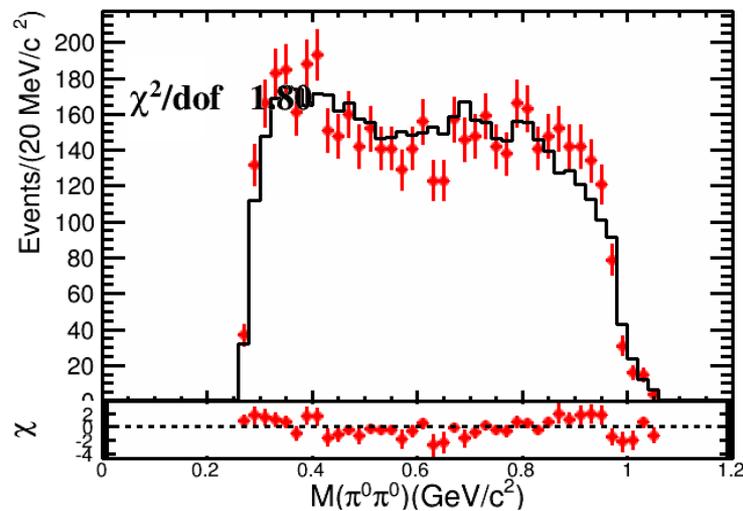
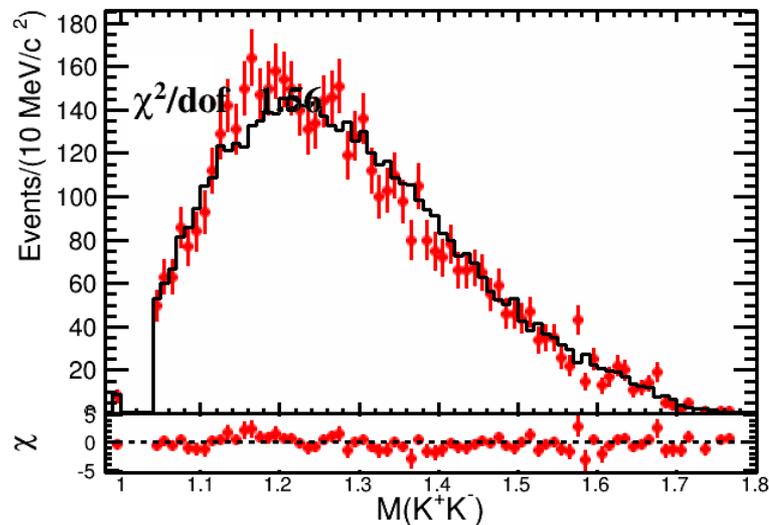
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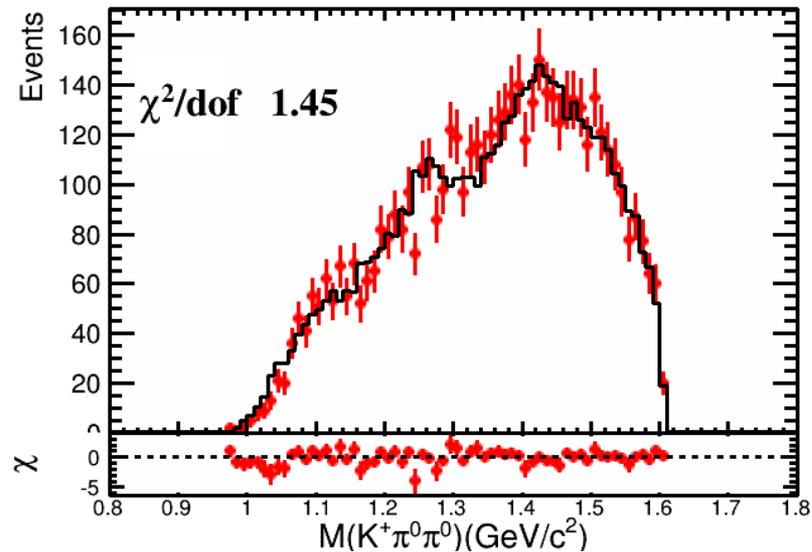
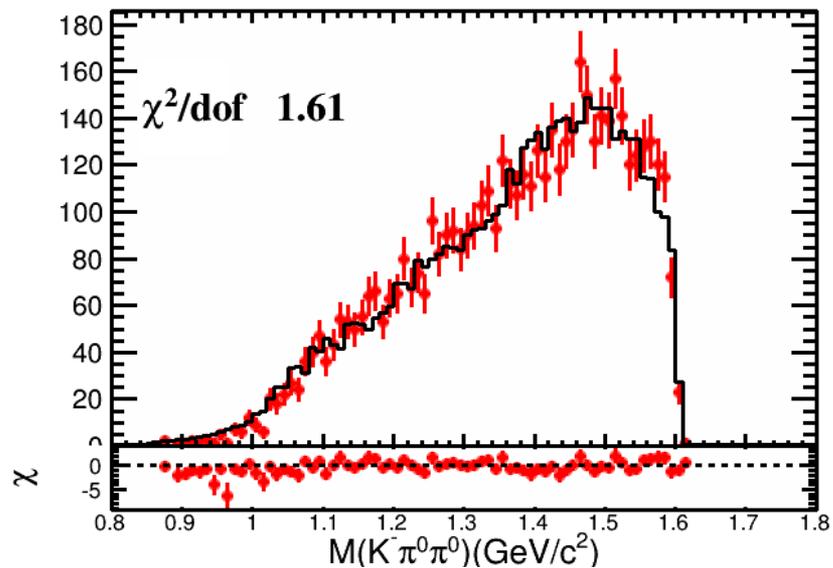
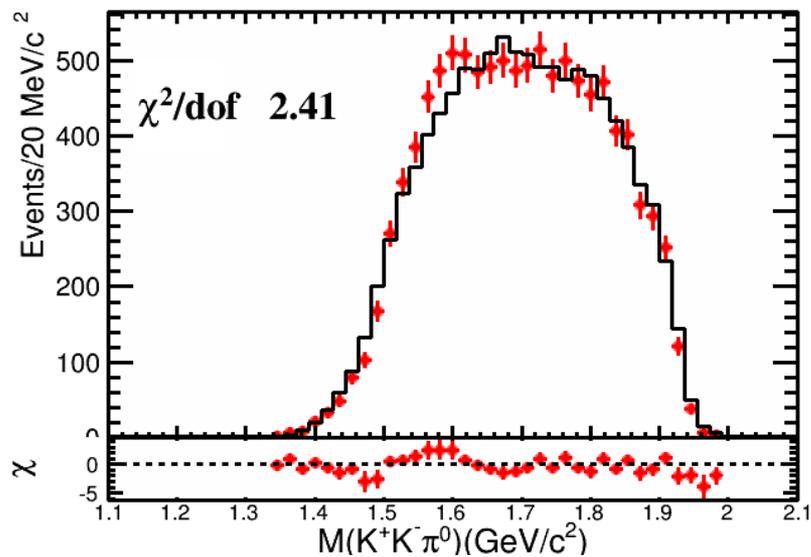


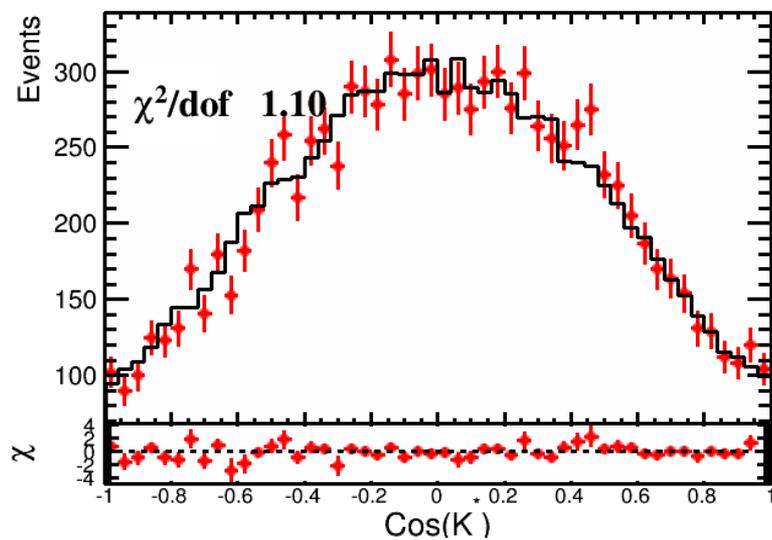
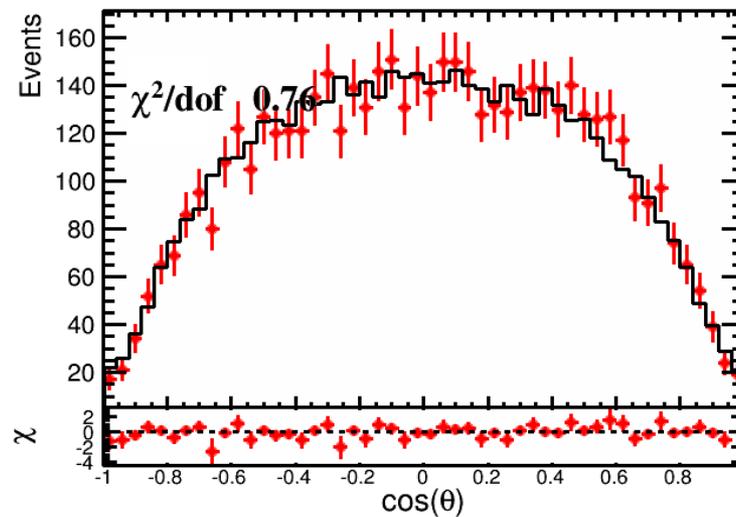
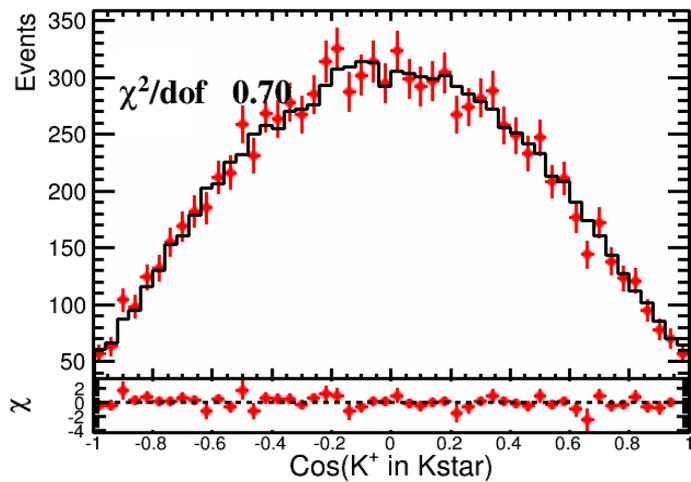
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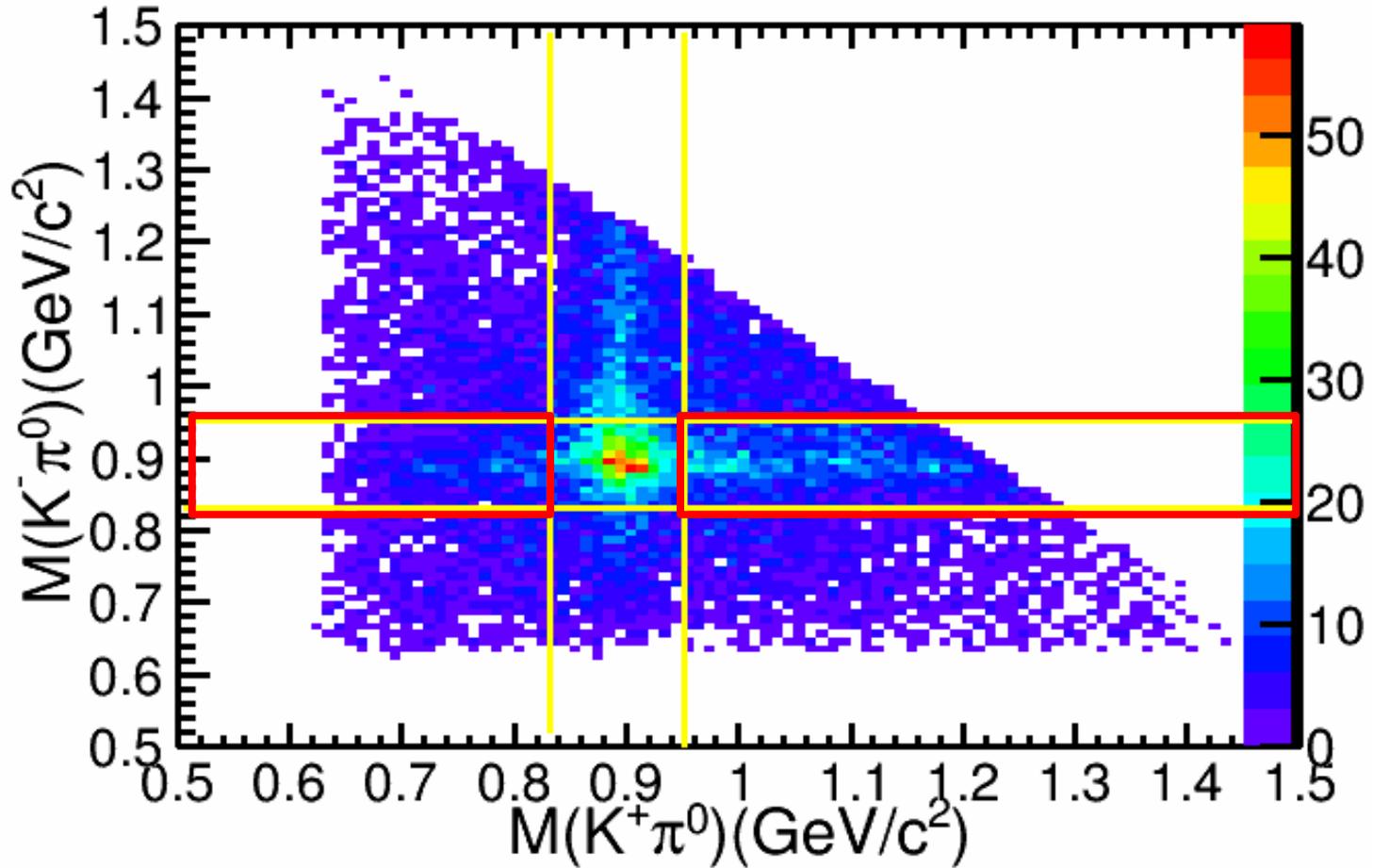




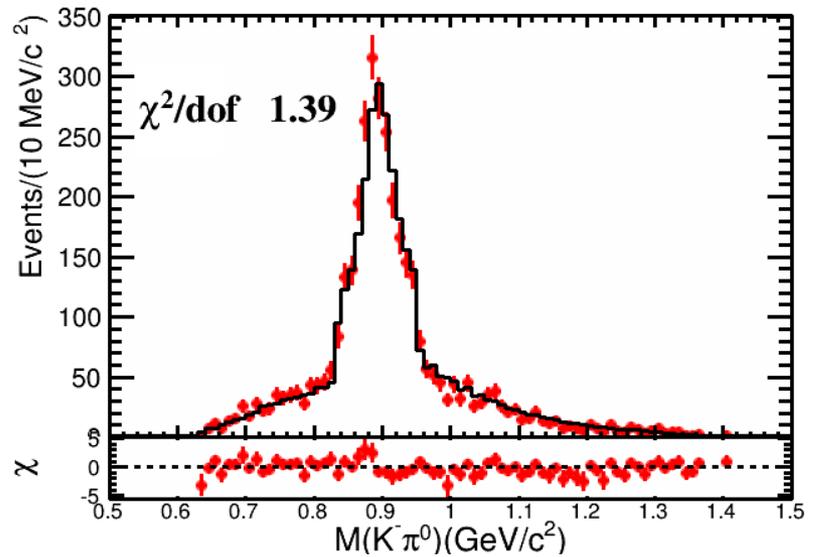
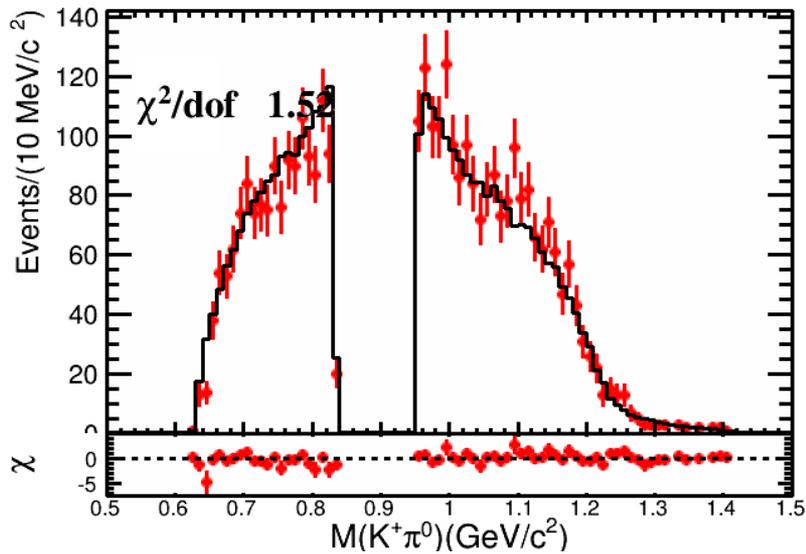
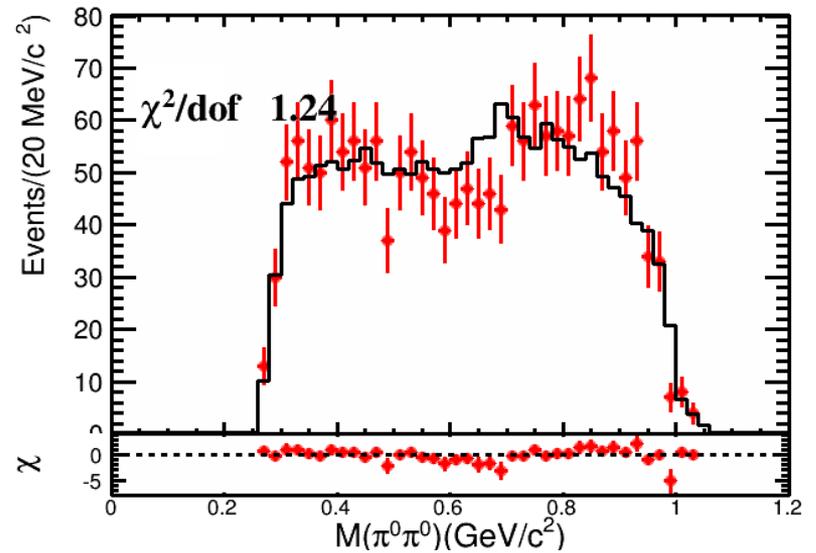
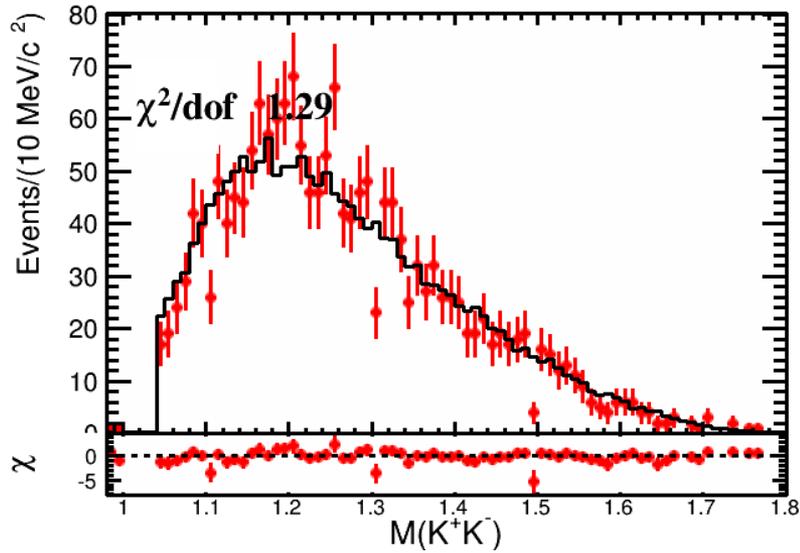




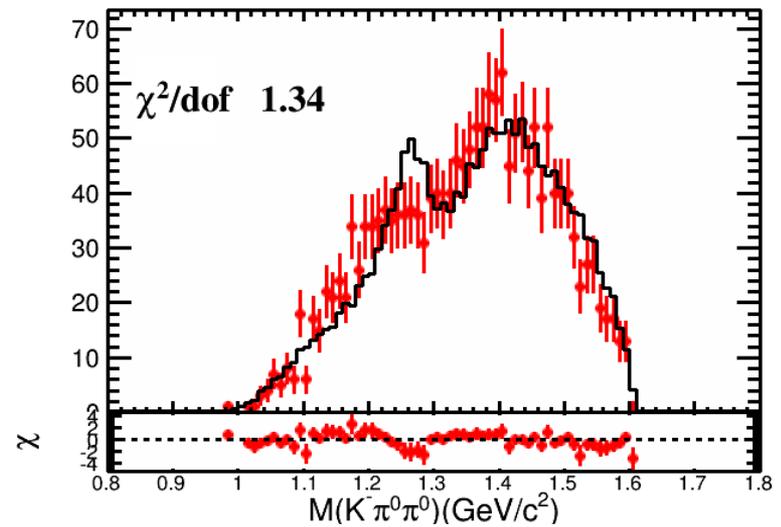
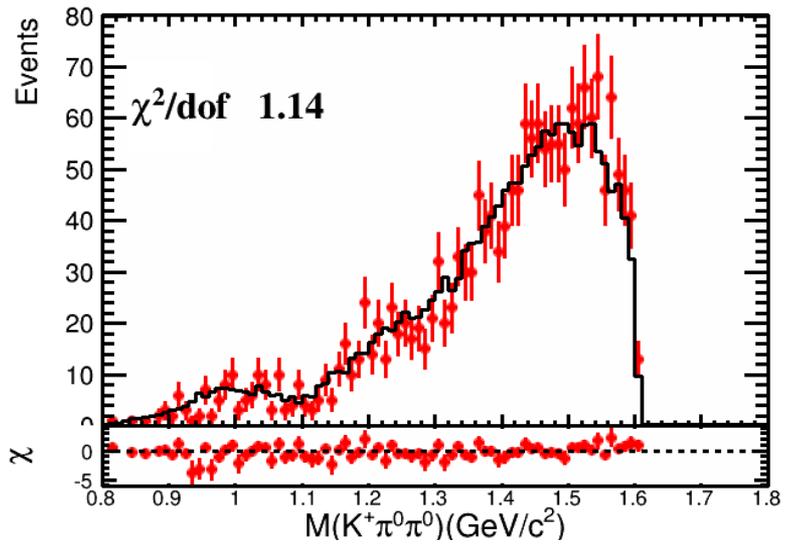
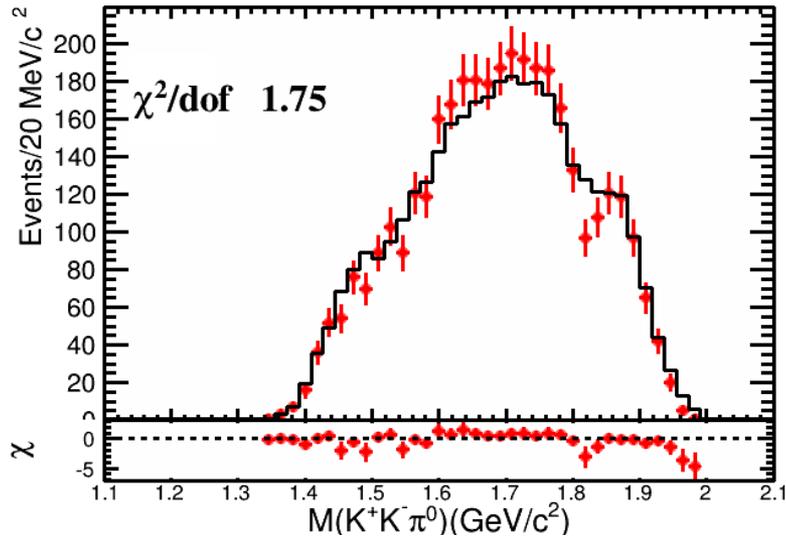
Kstarp nokstarm



Kstarm nokstarp



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