

Progress Report

Signal MC Study

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Fitting Parameter Search

- **Decay channels**
 - $\Xi_c(2970)^+ \rightarrow \Xi_c(2645)^0 \pi_1^+ \rightarrow \Xi_c^+ \pi_2^- \pi_1^+$
 - Double Gaussian
 - $\Xi_c(2970)^+ \rightarrow \Xi_c' \pi^+ \rightarrow \Xi_c^0 \gamma \pi^+$
 - Gaussian + Crystal ball function

Fitting Parameter Search

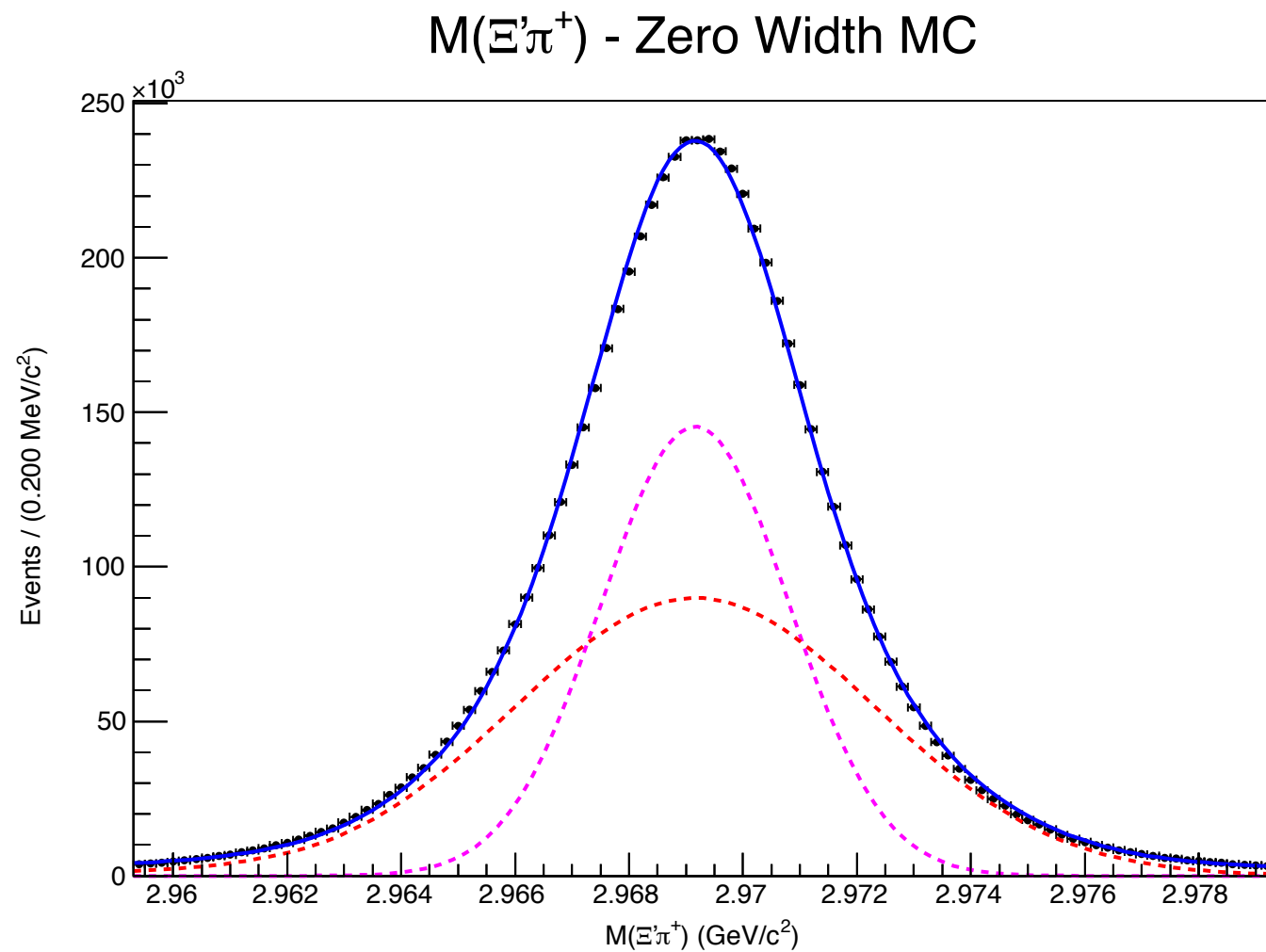
- I worked for $\Xi_c(2970)^+ \rightarrow \Xi_c'^0 \pi^+ \rightarrow \Xi_c^0 \gamma \pi^+$.
- $\Xi_c^0 \rightarrow \Xi^- \pi^+ / \Omega^- K^+$
- I mixed the MC data following relative branching ratio of the upper two.

Γ_8	$\Xi^- \pi^+$	DEFINED AS 1
Γ_9	$\Xi^- \pi^+ \pi^+ \pi^-$	3.3 ± 1.4
Γ_{10}	$\Omega^- K^+$	0.297 ± 0.024

- The Mass peak fitting result of $\Xi_c(2970)$ and efficiency were obtained from the mixed sample.

Fitting Parameters

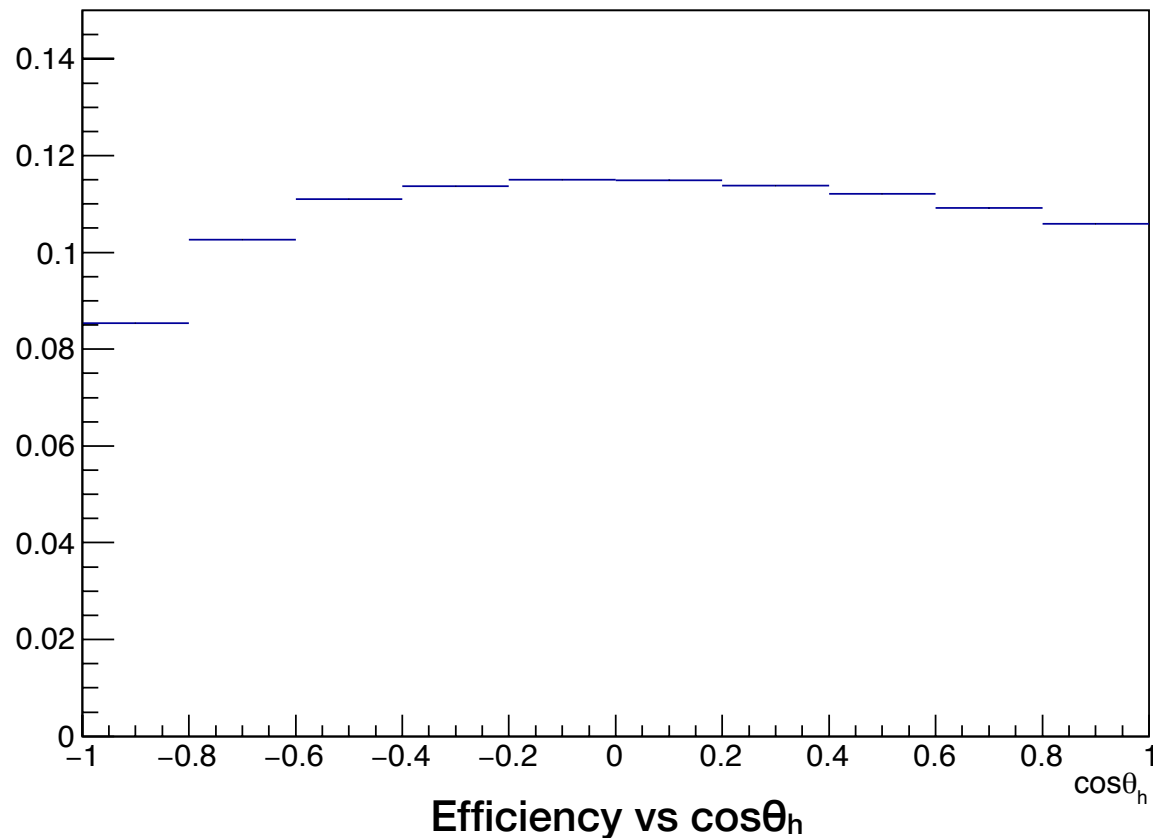
$\Xi_c(2970)^+ \rightarrow \Xi_c'^0 \pi^+$ (global)



Efficiency

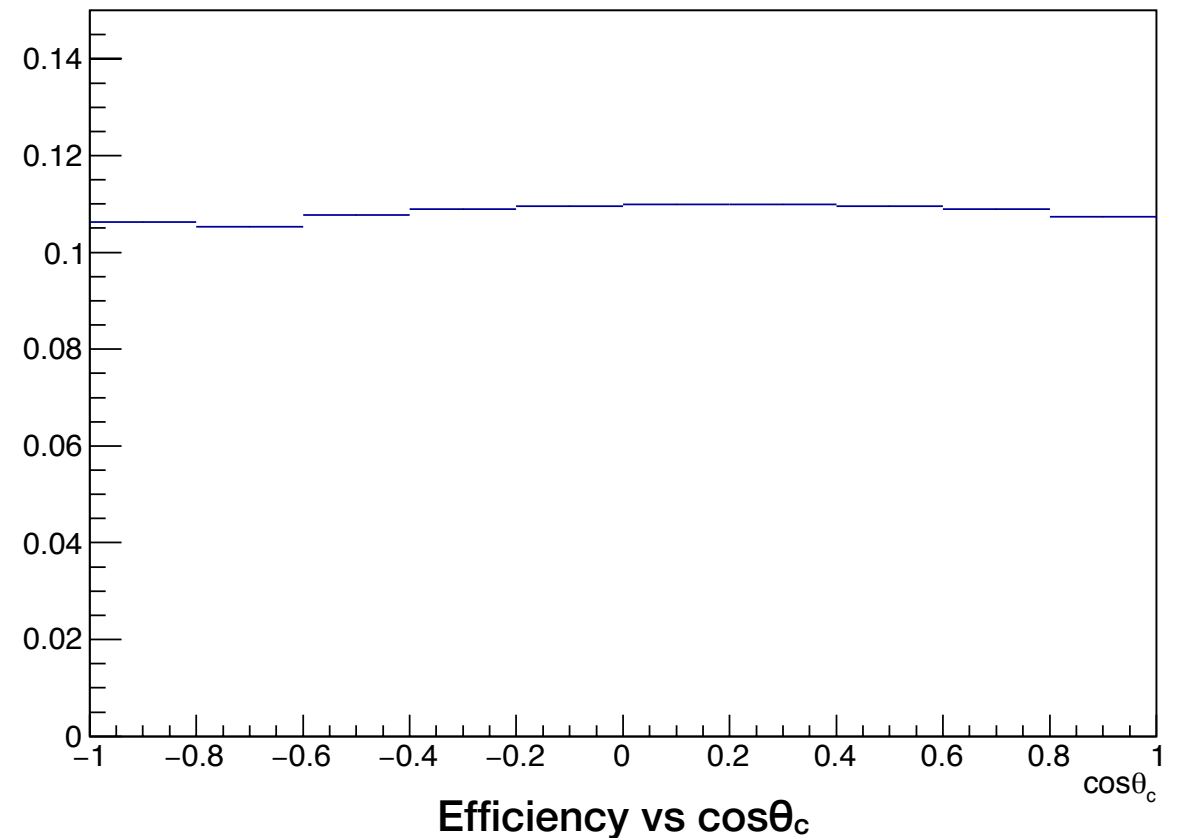
in $\Xi_c(2970)^+ \rightarrow \Xi_c' \pi^+ \rightarrow \Xi_c^0 \gamma \pi^+$

Efficiency



$\Xi_c(2970)^+ \rightarrow \Xi_c'^0 \pi^+ \rightarrow \Xi_c^0 \gamma \pi^+$

Efficiency (inter)



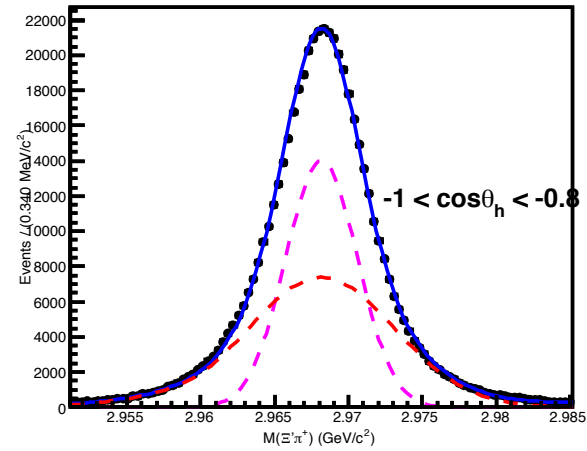
$\Xi_c(2970)^+ \rightarrow \Xi_c'^0 \pi^+ \rightarrow \Xi_c^0 \gamma \pi^+$

θ_h : angle bet.
 boost direction of $\Xi_c(2970)$ in CM frame
 and
 boost direction of π_1 in $\Xi_c(2970)$'s rest frame.
 θ_c : angle bet.
 boost direction of $\Xi_c(2645)/\Xi_c'$ in $\Xi_c(2970)$'s rest frame
 and
 boost direction of π_2/γ in $\Xi_c(2645)/\Xi_c'$'s rest frame.

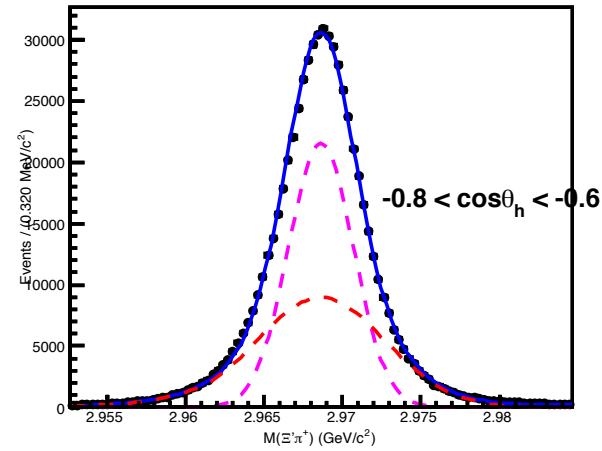
Fitting Parameters

- $\cos\theta_h$ in $\Xi_c(2970)^+ \rightarrow \Xi_c'^0 \pi^+ \rightarrow \Xi_c^0 \gamma \pi^+$

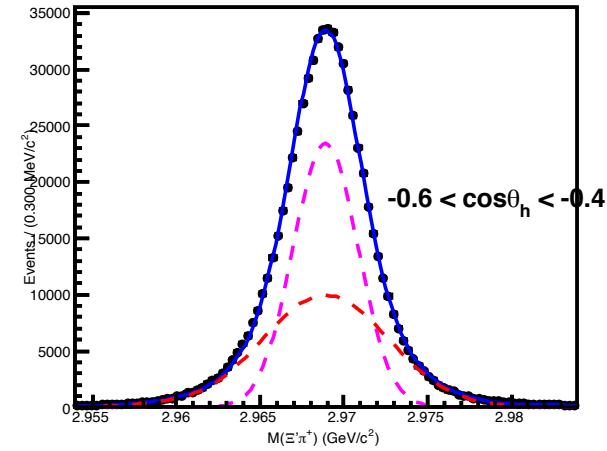
$M(\Xi'\pi^+) - \text{Zero Width MC}$



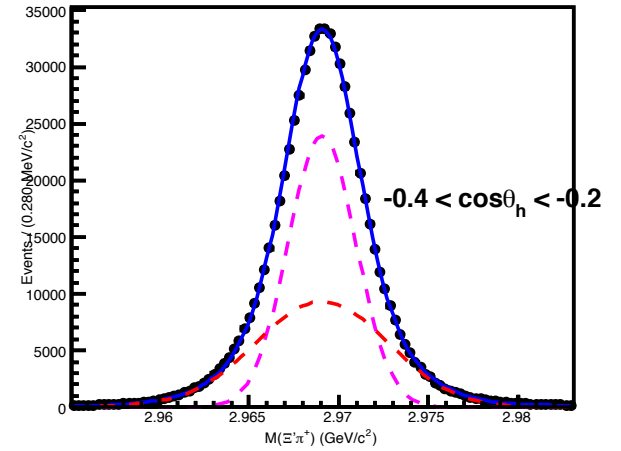
$M(\Xi'\pi^+) - \text{Zero Width MC}$



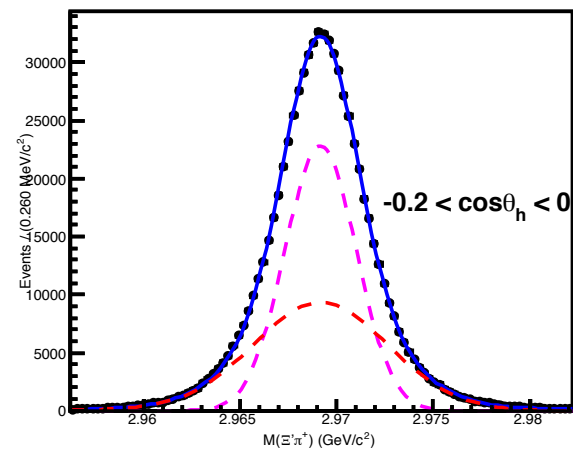
$M(\Xi'\pi^+) - \text{Zero Width MC}$



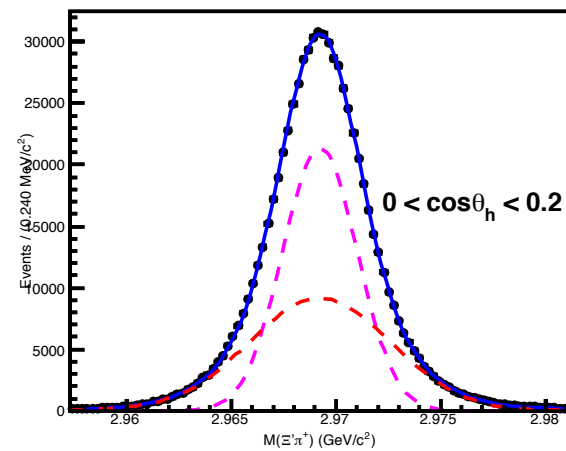
$M(\Xi'\pi^+) - \text{Zero Width MC}$



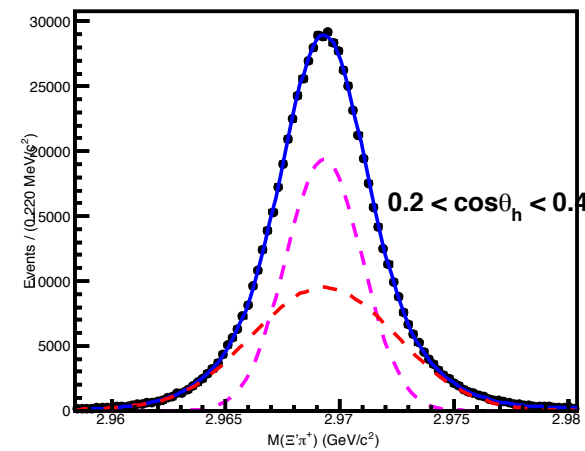
$M(\Xi'\pi^+) - \text{Zero Width MC}$



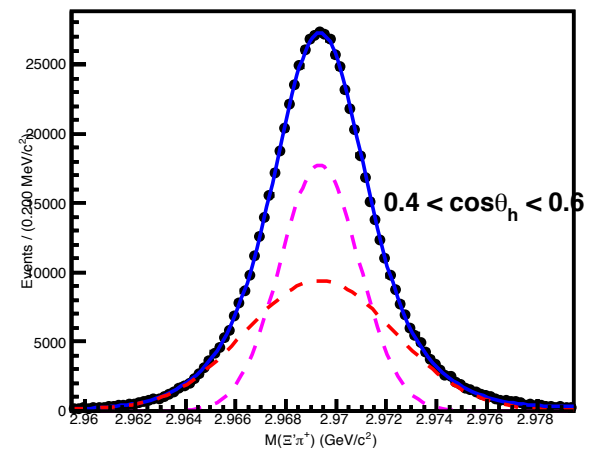
$M(\Xi'\pi^+) - \text{Zero Width MC}$



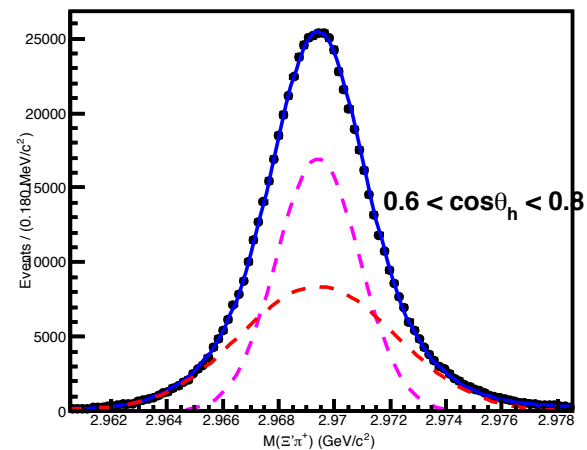
$M(\Xi'\pi^+) - \text{Zero Width MC}$



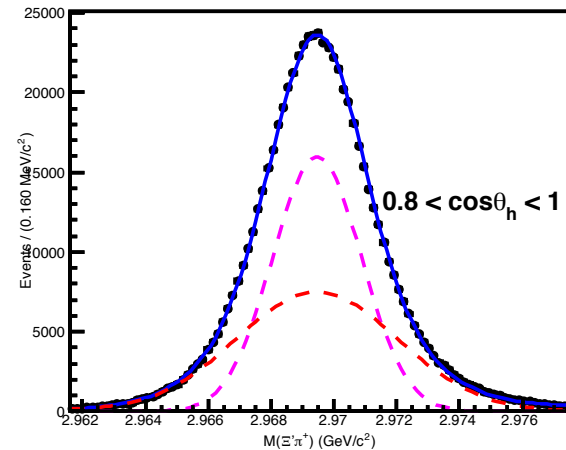
$M(\Xi'\pi^+) - \text{Zero Width MC}$



$M(\Xi'\pi^+) - \text{Zero Width MC}$



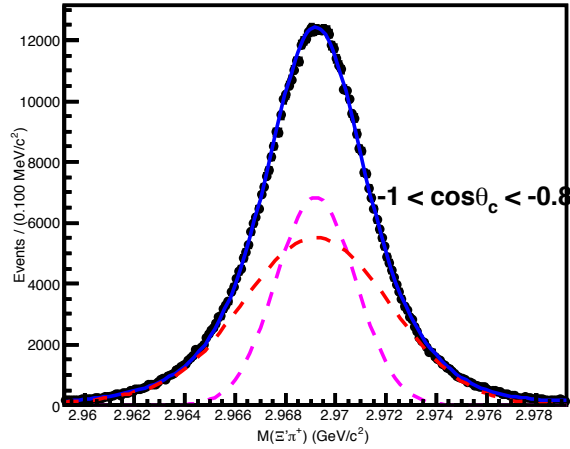
$M(\Xi'\pi^+) - \text{Zero Width MC}$



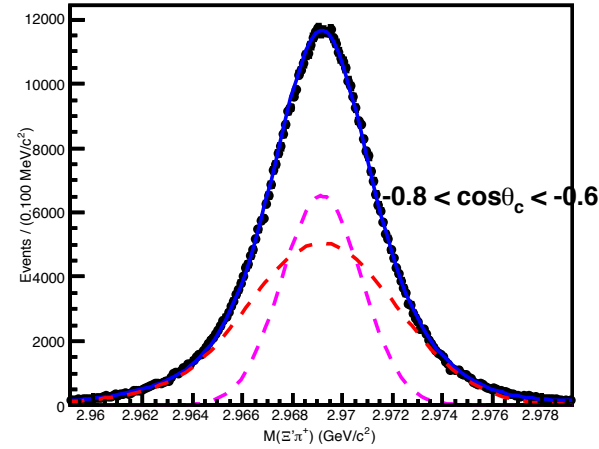
Fitting Parameters

- $\cos\theta_c$ in $\Xi_c(2970)^+ \rightarrow \Xi_c'^0 \pi^+ \rightarrow \Xi_c^0 \gamma \pi^+$

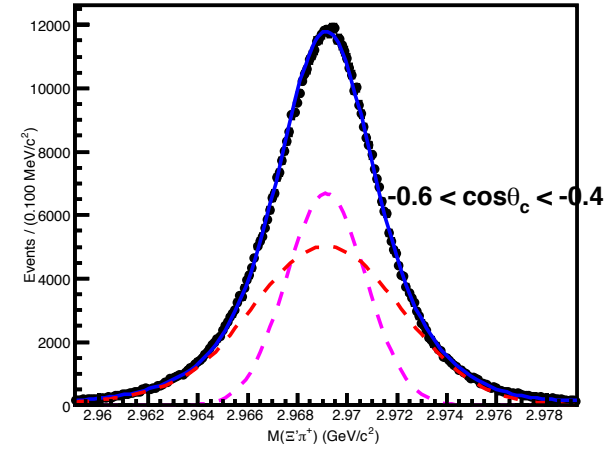
$M(\Xi'\pi^+) - \text{Zero Width MC}$



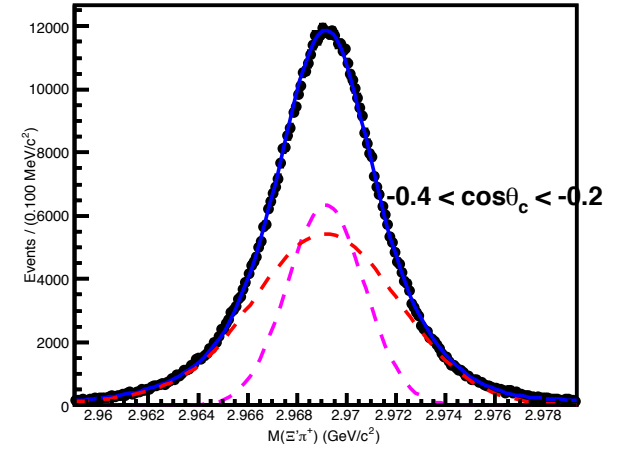
$M(\Xi'\pi^+) - \text{Zero Width MC}$



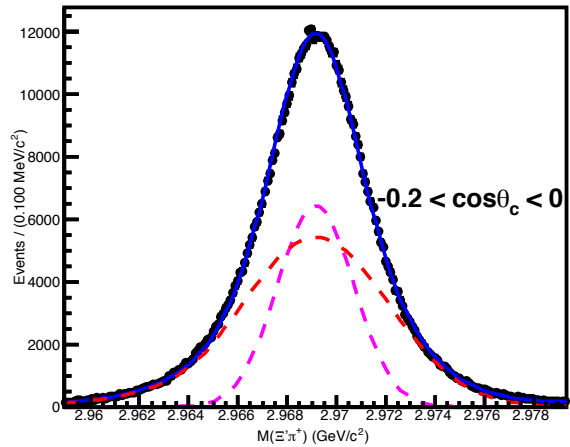
$M(\Xi'\pi^+) - \text{Zero Width MC}$



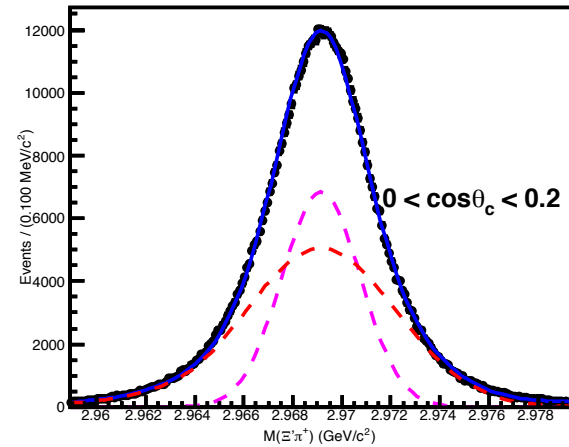
$M(\Xi'\pi^+) - \text{Zero Width MC}$



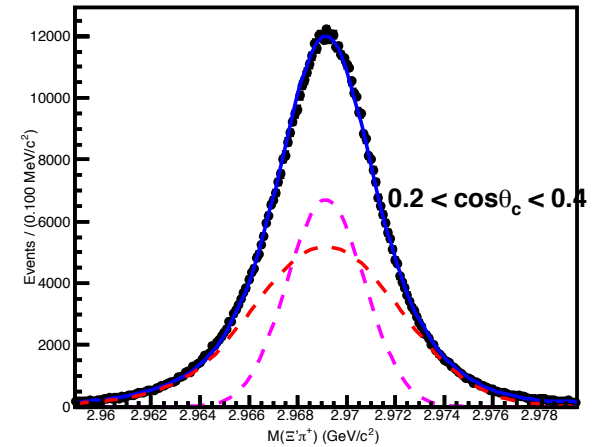
$M(\Xi'\pi^+) - \text{Zero Width MC}$



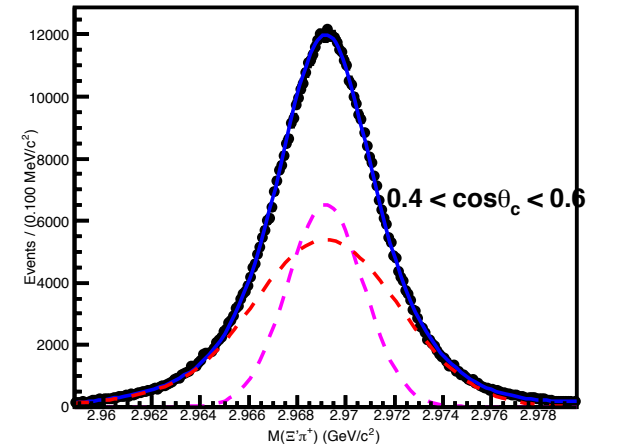
$M(\Xi'\pi^+) - \text{Zero Width MC}$



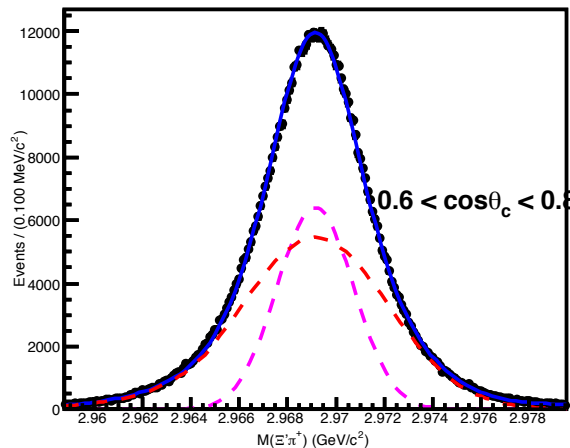
$M(\Xi'\pi^+) - \text{Zero Width MC}$



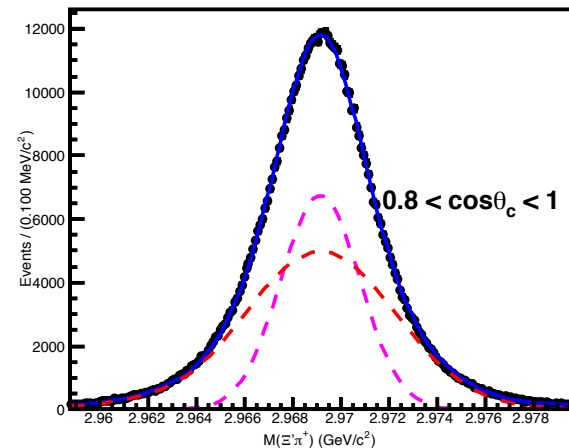
$M(\Xi'\pi^+) - \text{Zero Width MC}$



$M(\Xi'\pi^+) - \text{Zero Width MC}$



$M(\Xi'\pi^+) - \text{Zero Width MC}$



Summary

- **All MC studies were finished.**
- **The result will be summarized and reported at next Charm Group Meeting (3/25, next Monday 5pm).**
 - **Calling for referee committee.**
- **To do**
 - **Preparing Belle note draft.**
 - **Organizing and cleaning the codes and histograms.**

END