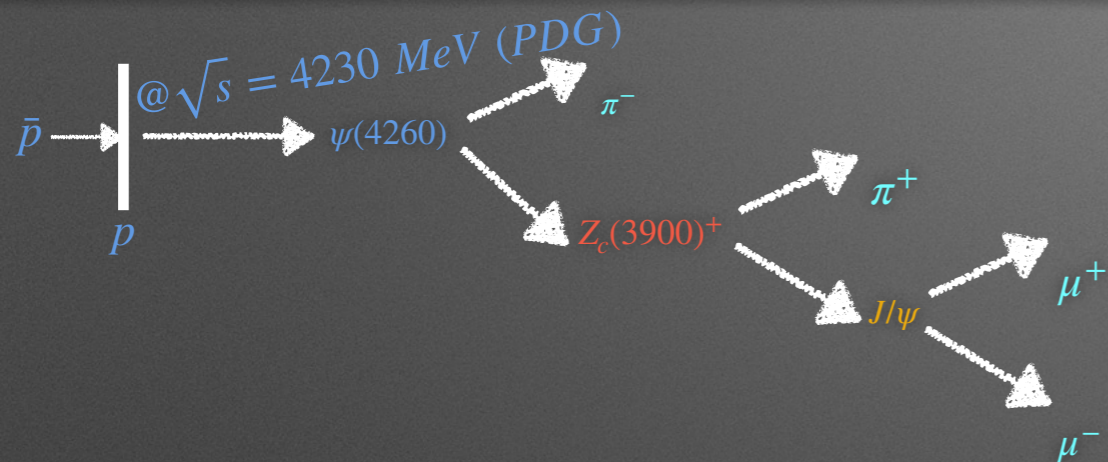


Updates on Zc3900 Study

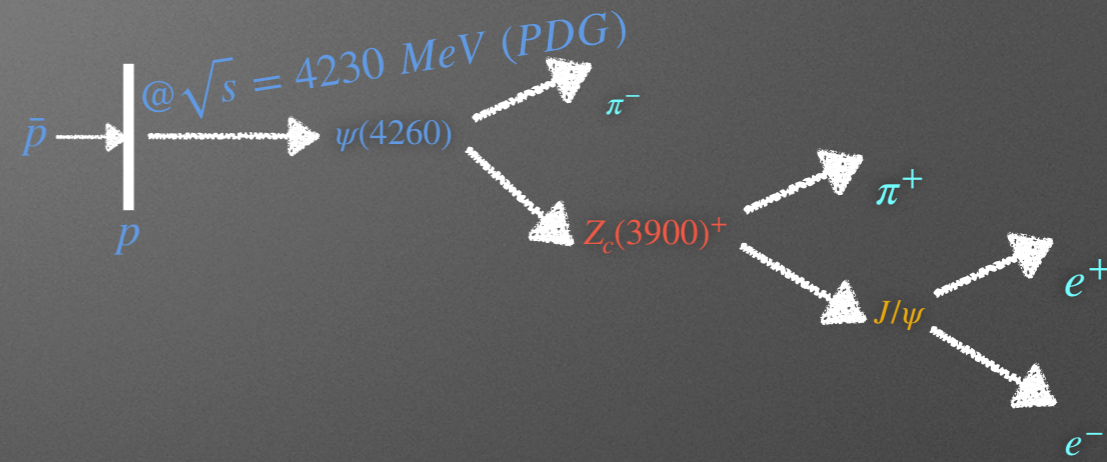
Ali YILMAZ, on behalf of PANDA_TR Group

PWG Meeting October 06, 2021

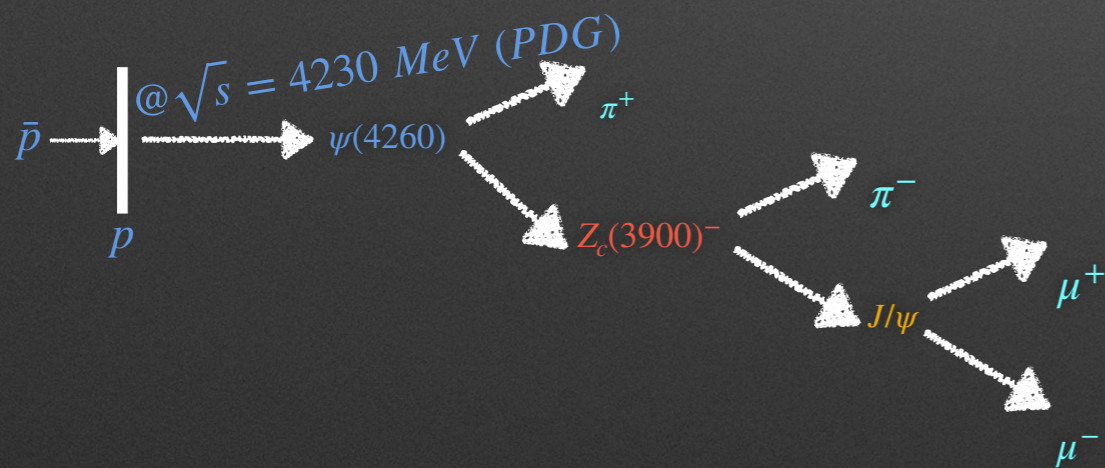
Decay Chain



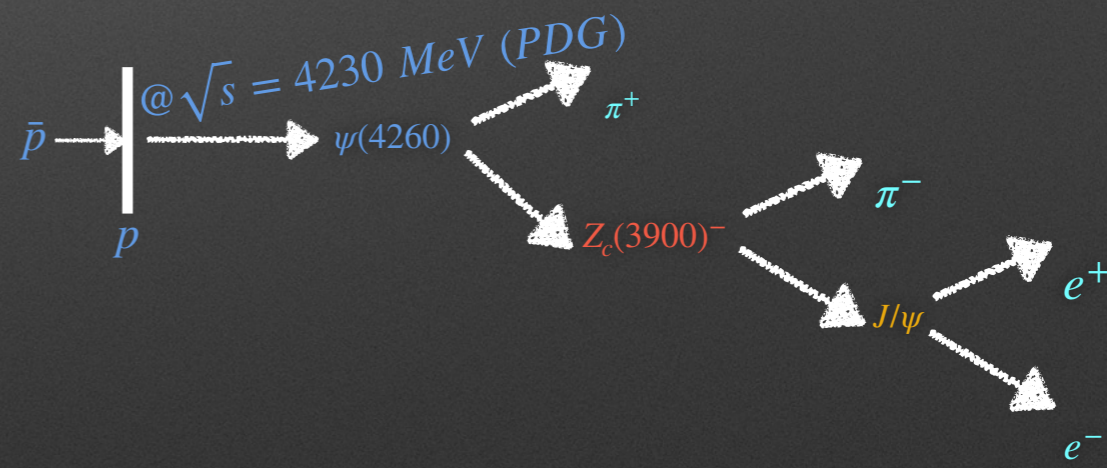
Generated event: ~ 1M



Generated event: ~ 1M

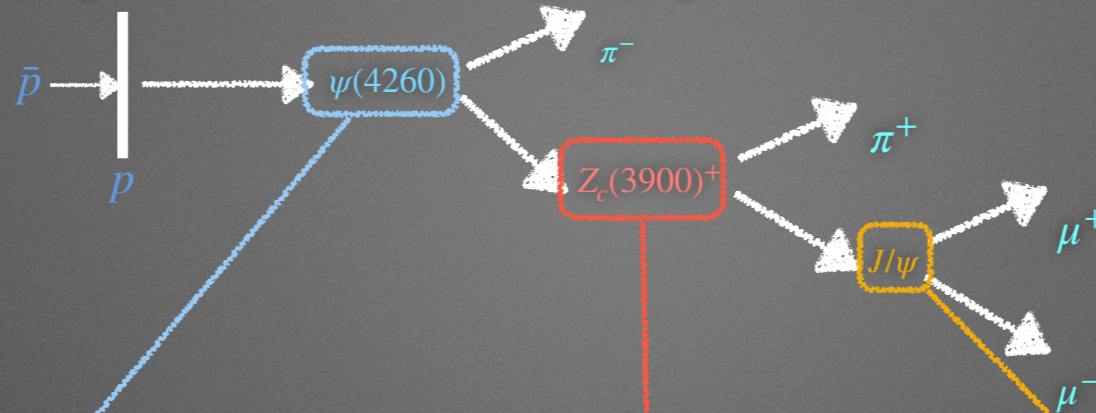


Generated event: ~ 1M



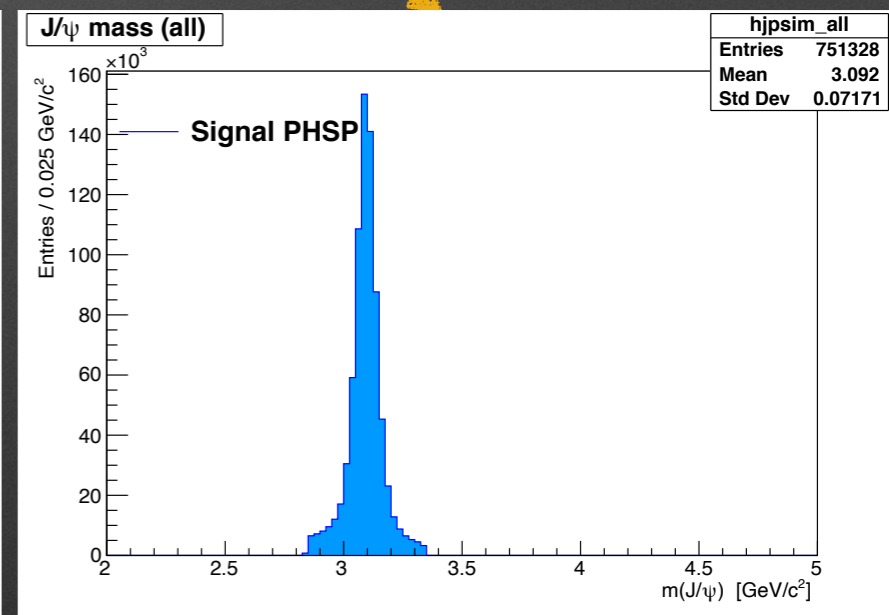
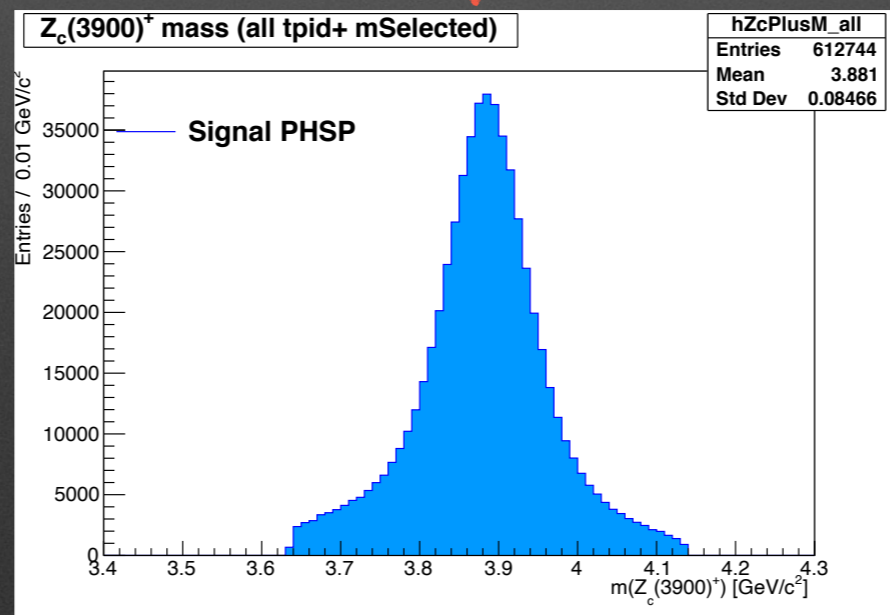
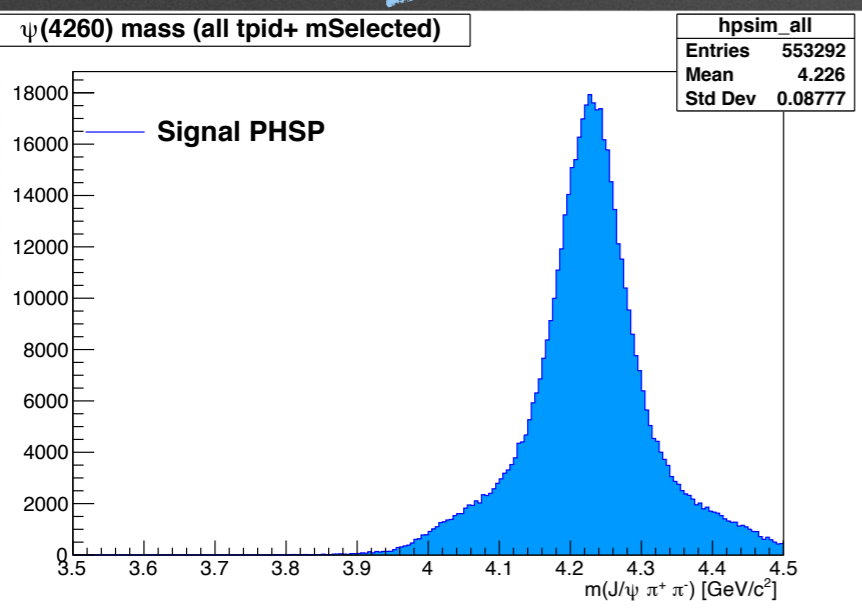
Generated event: ~ 1M

Analysis: mass: all



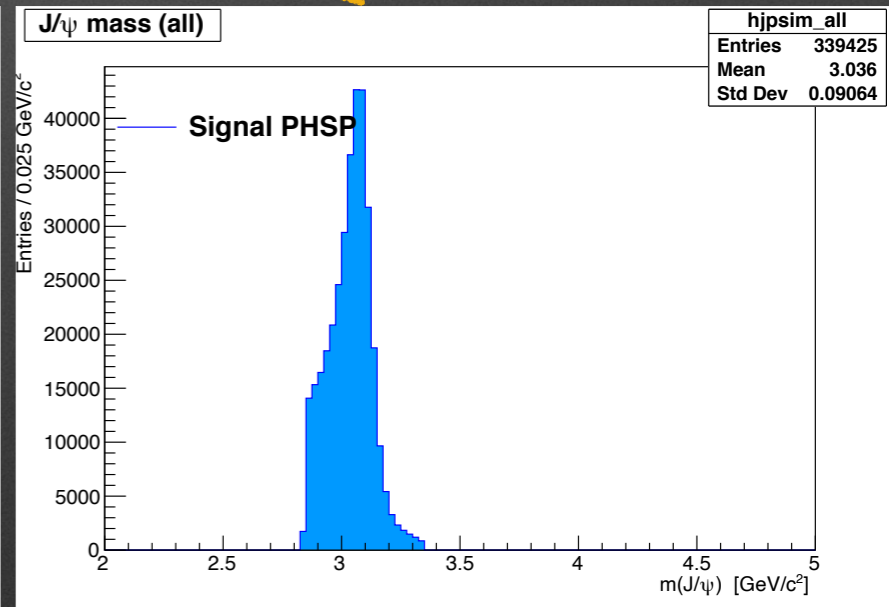
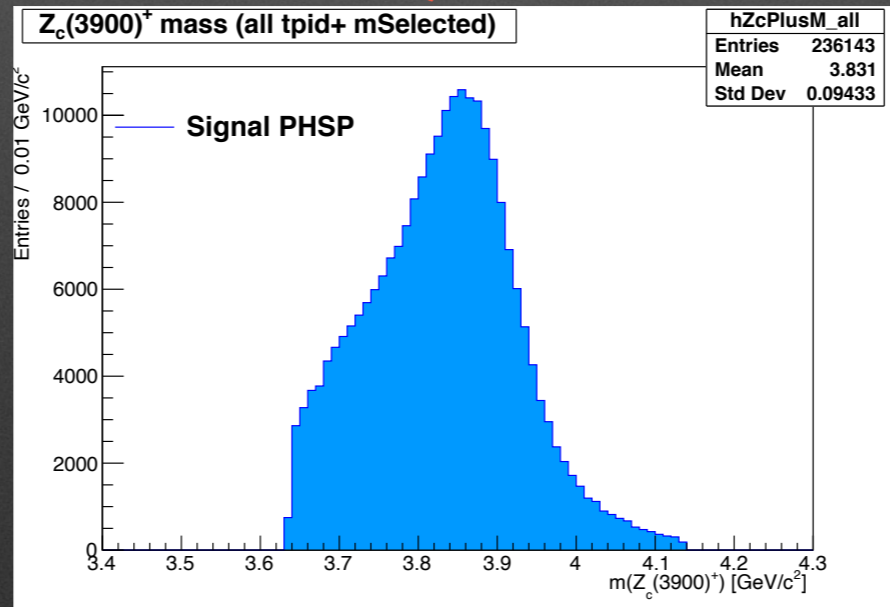
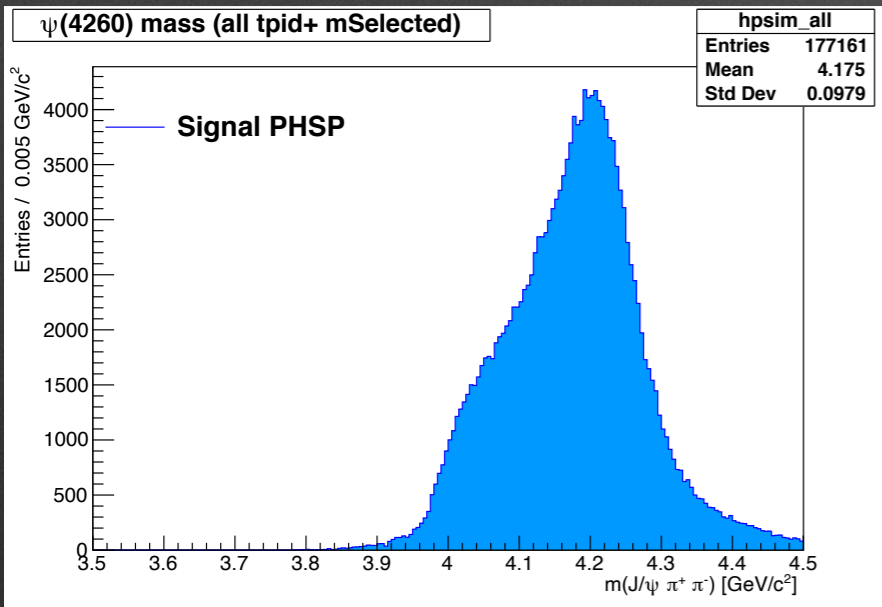
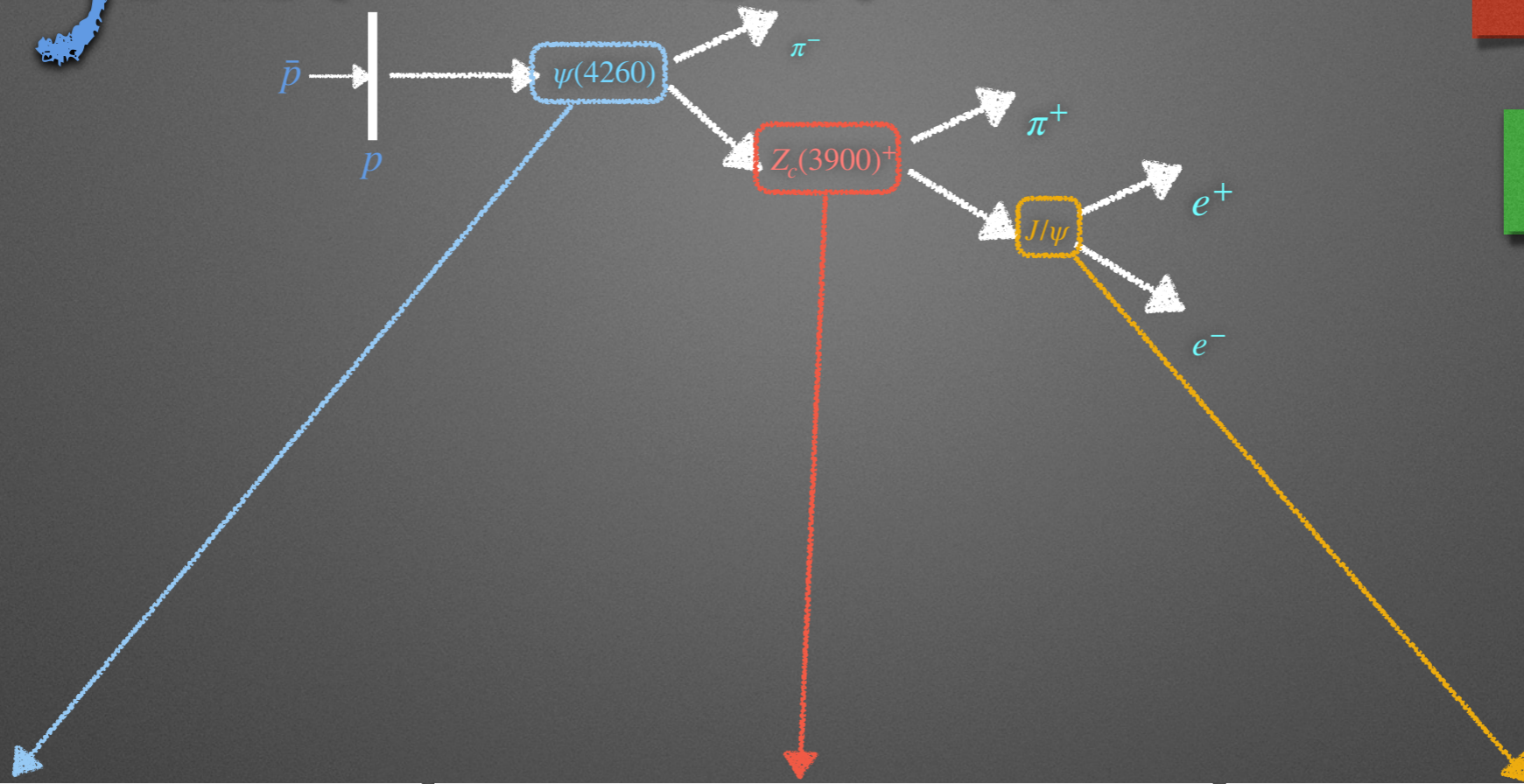
$Z_c^+(3900)$

μ channel



Analysis: mass: all

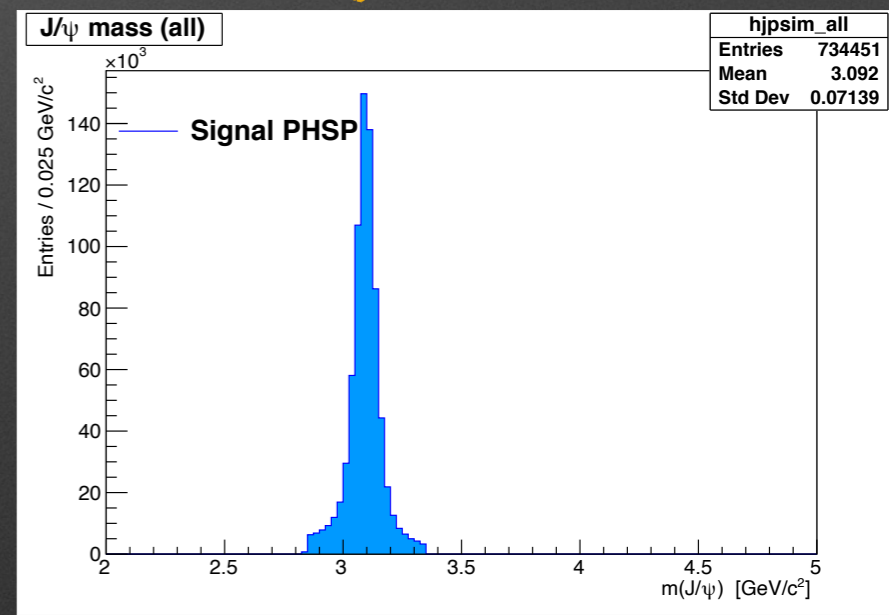
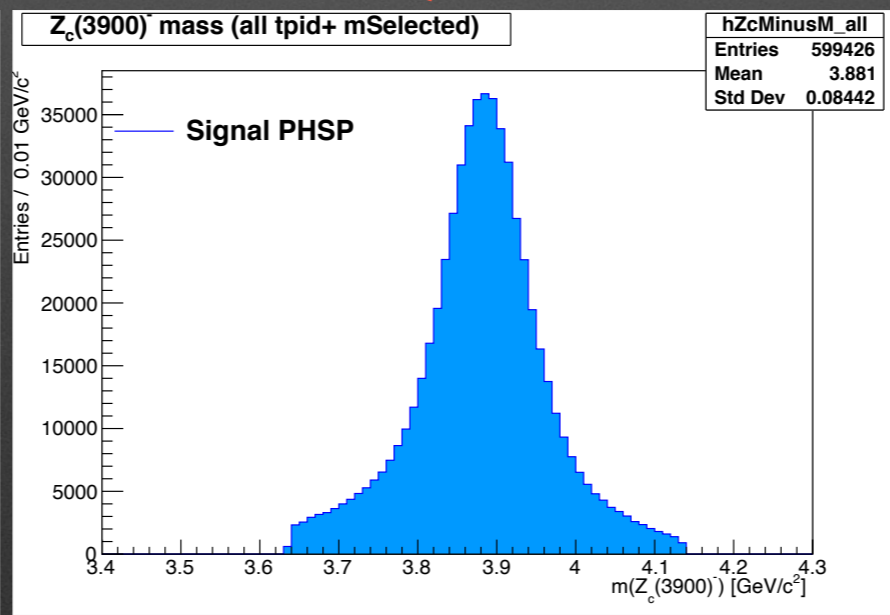
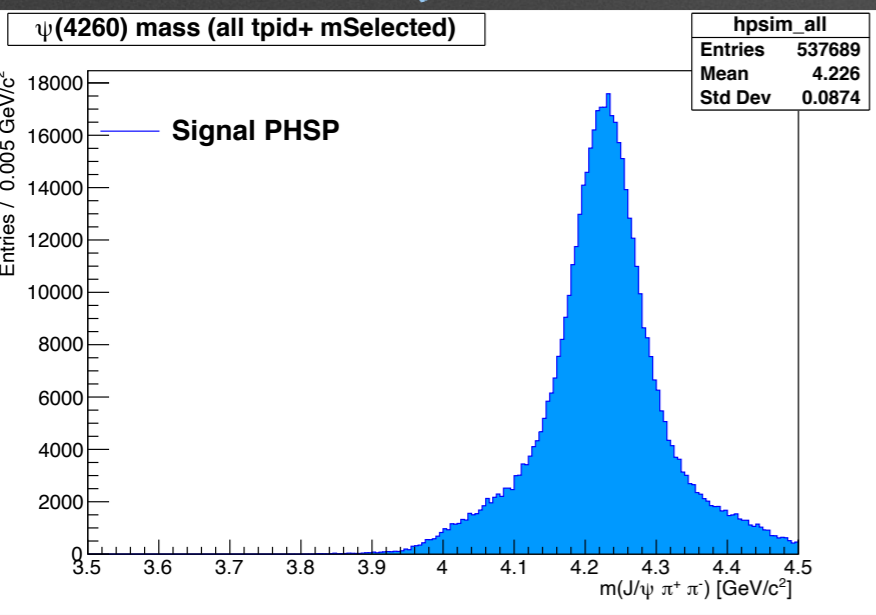
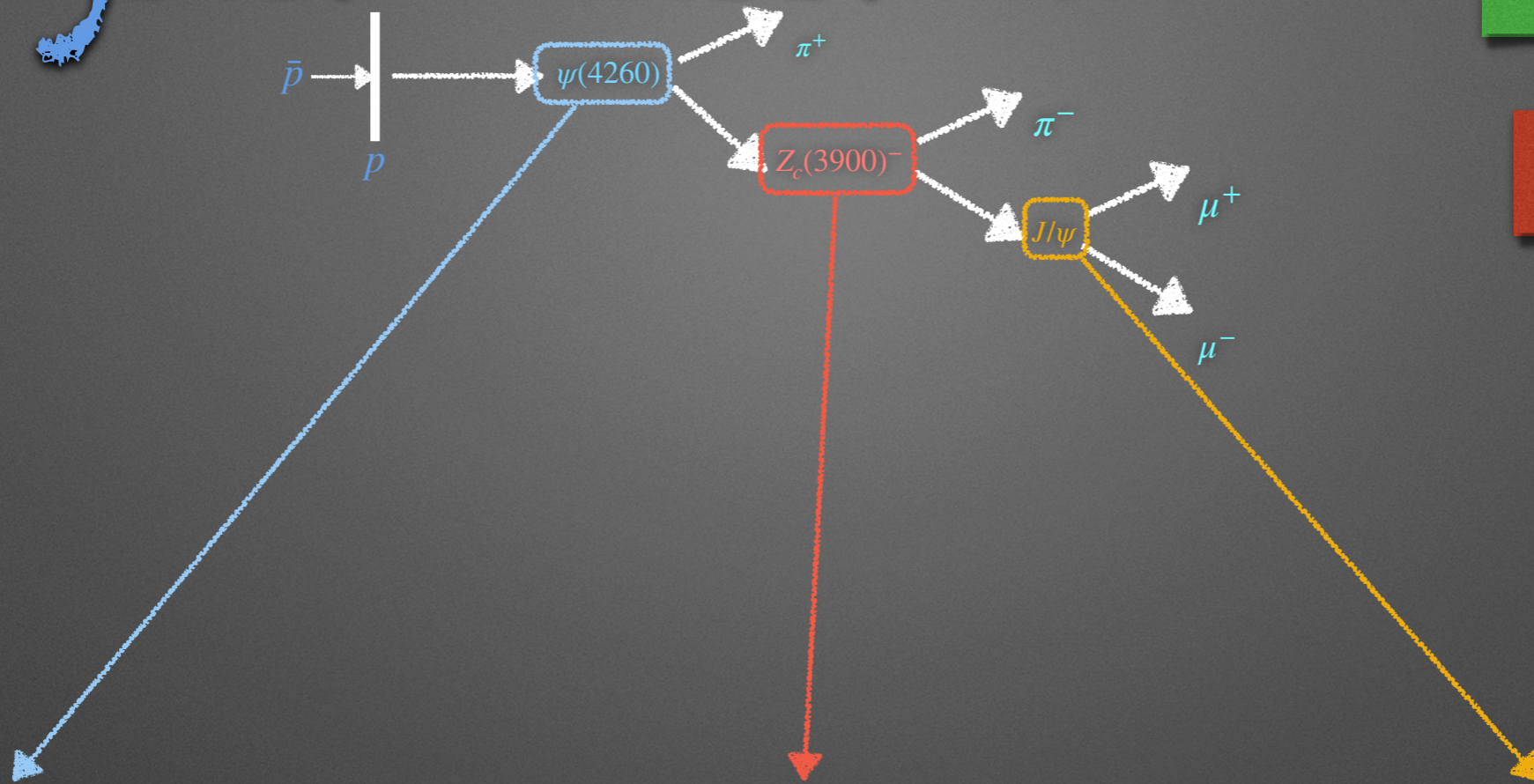
$Z_c^+(3900)$
 e channel



Analysis: mass: all

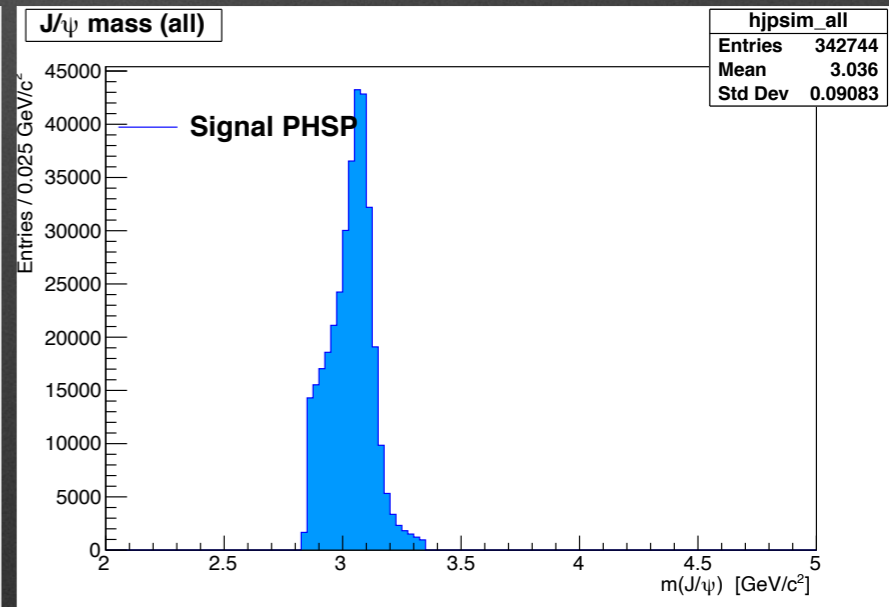
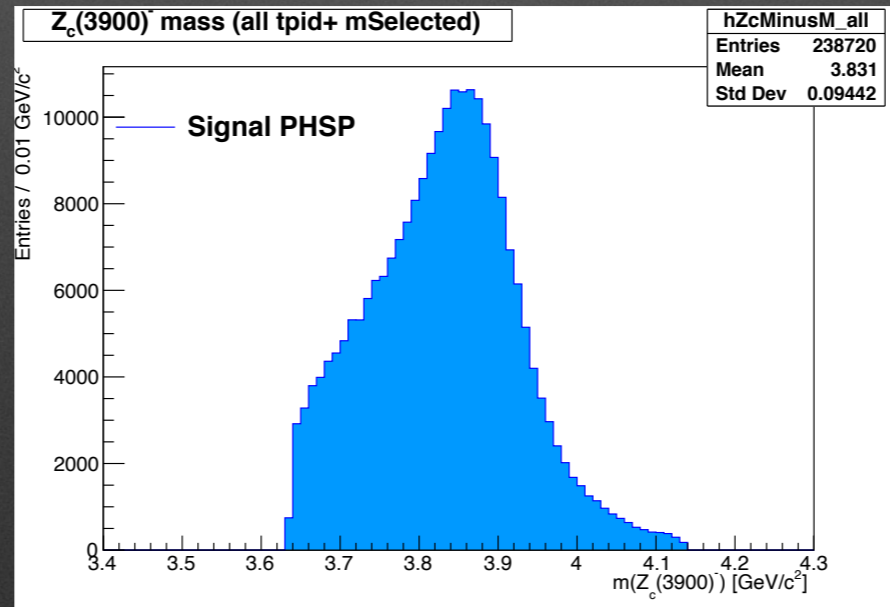
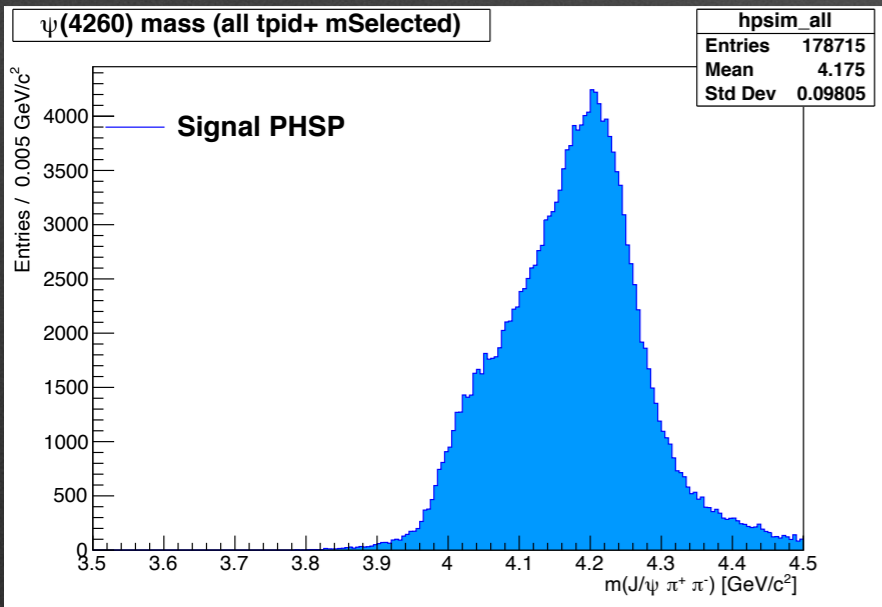
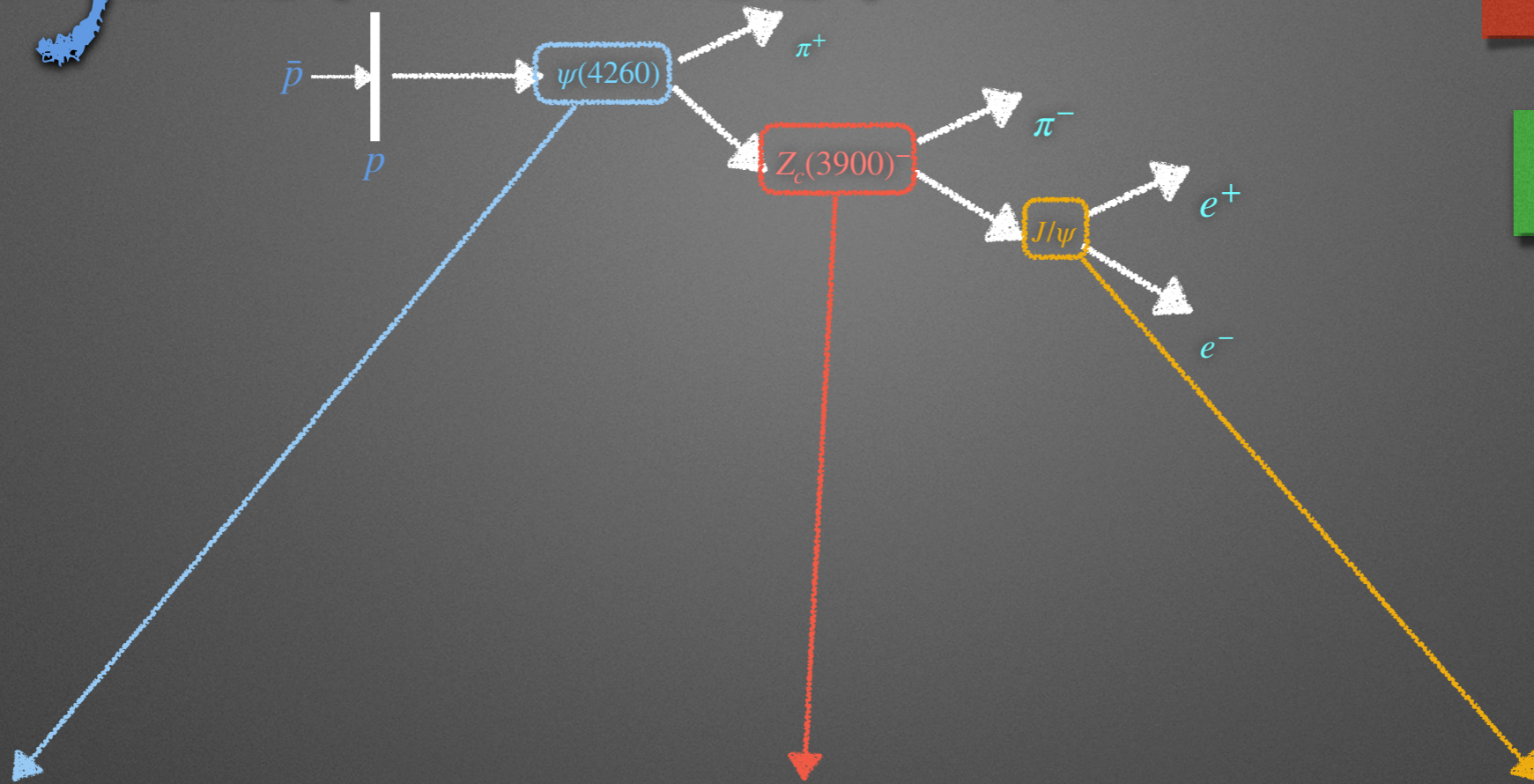
$Z_c^-(3900)$

μ channel



Analysis: mass: all

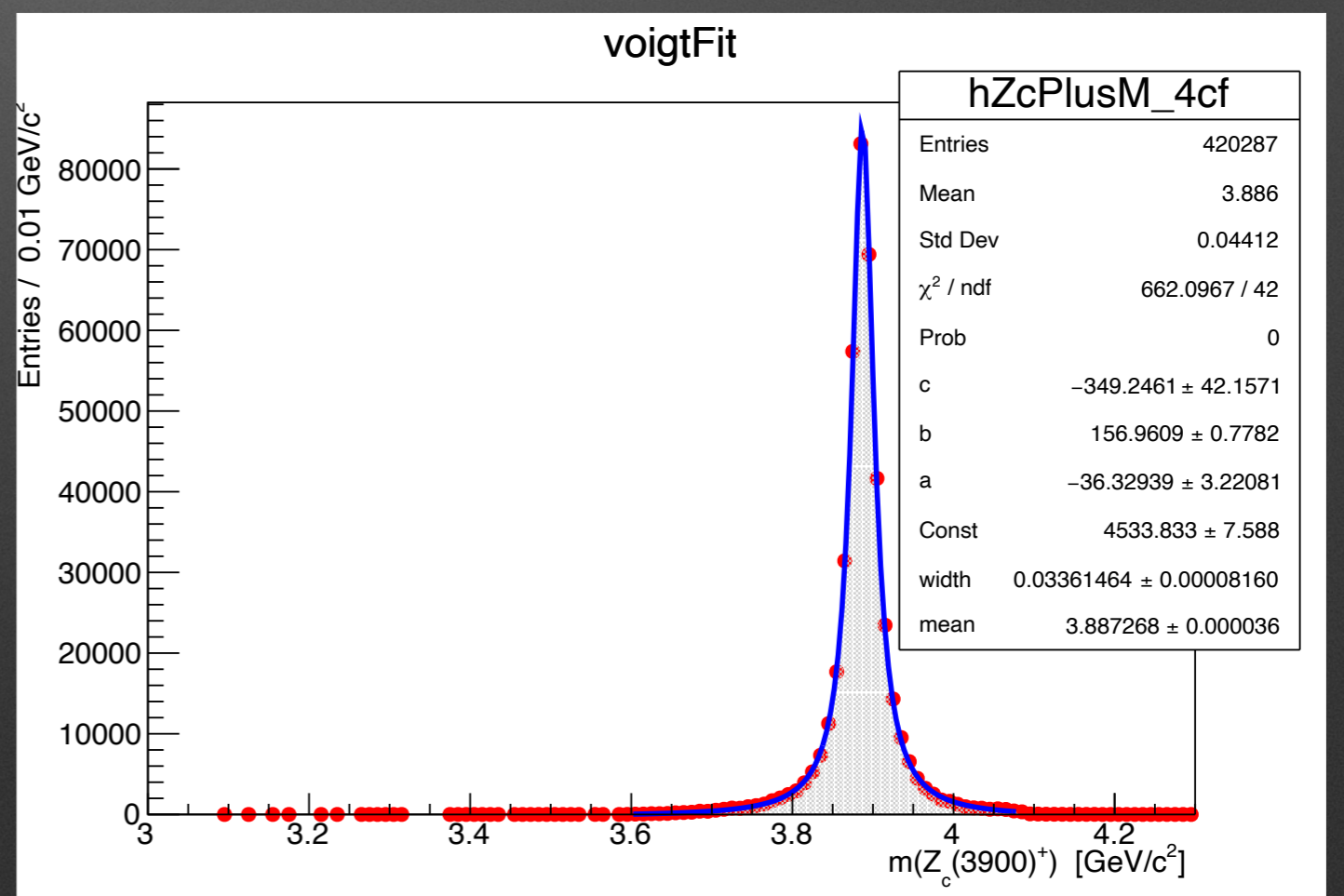
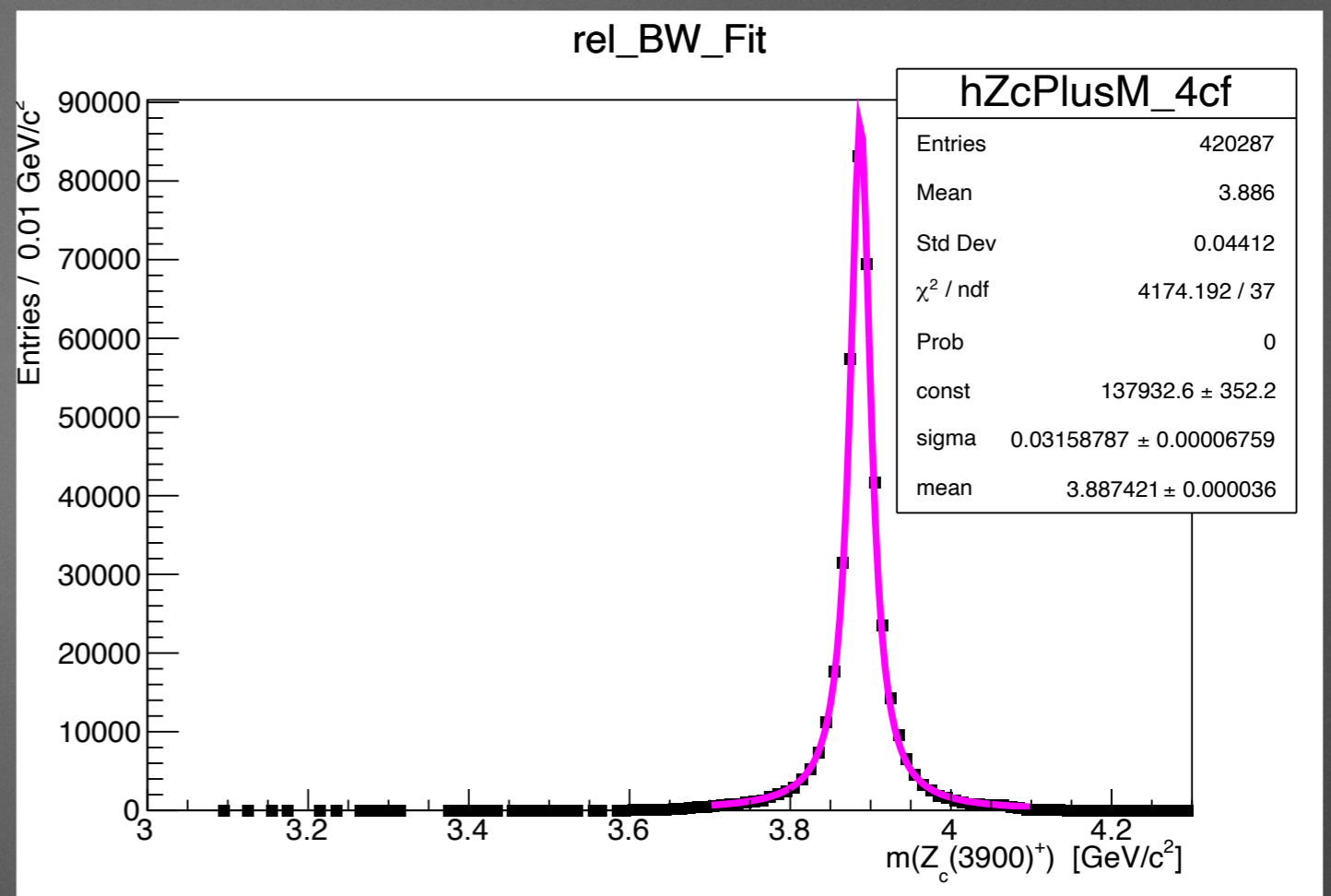
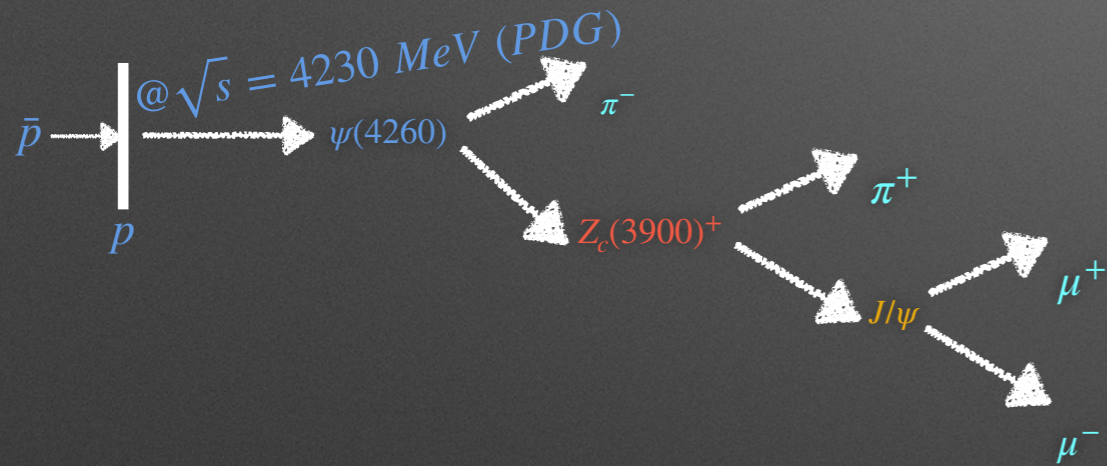
$Z_c^-(3900)$
 e channel



BW vs Voigt fit

$Z_c^+(3900)$

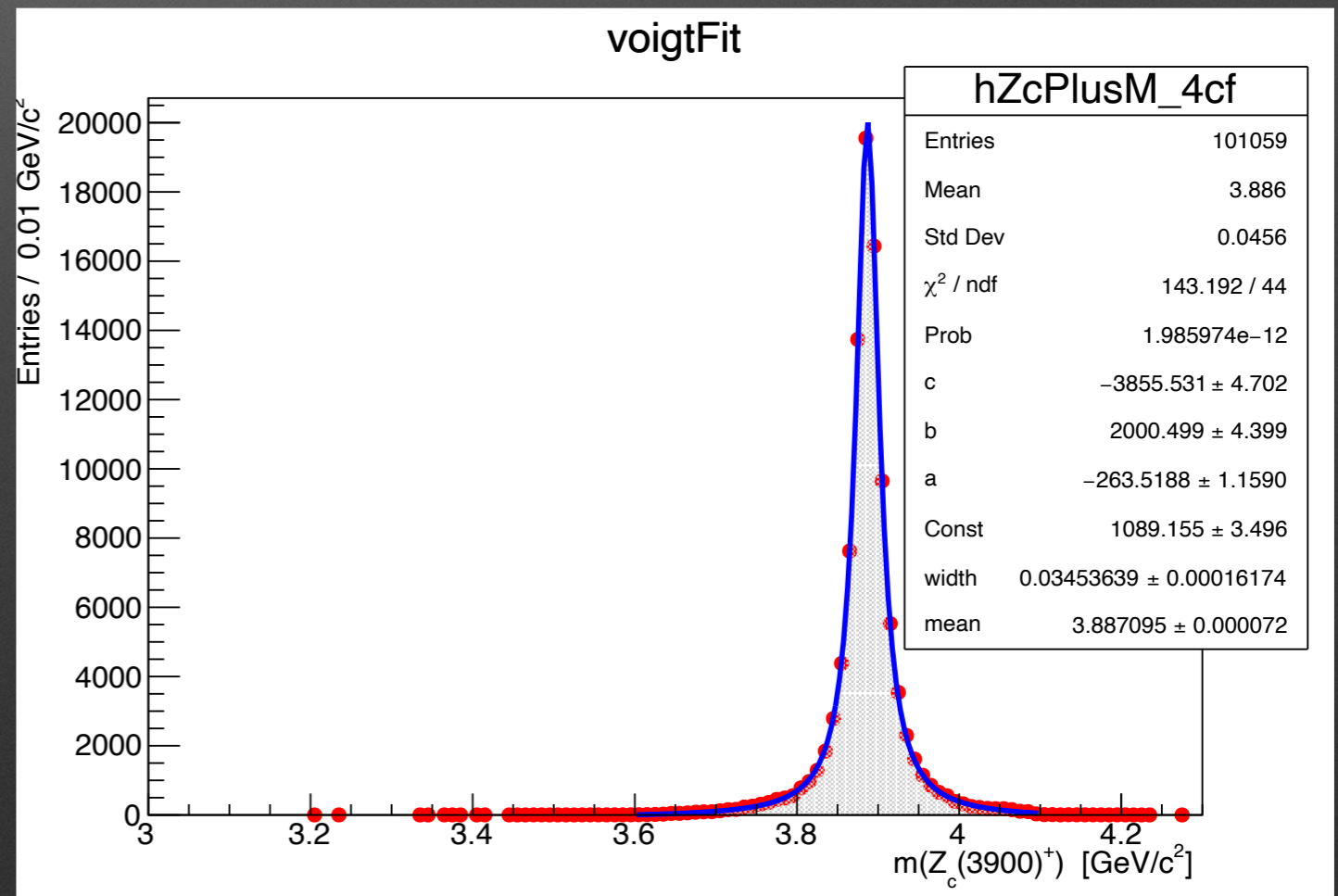
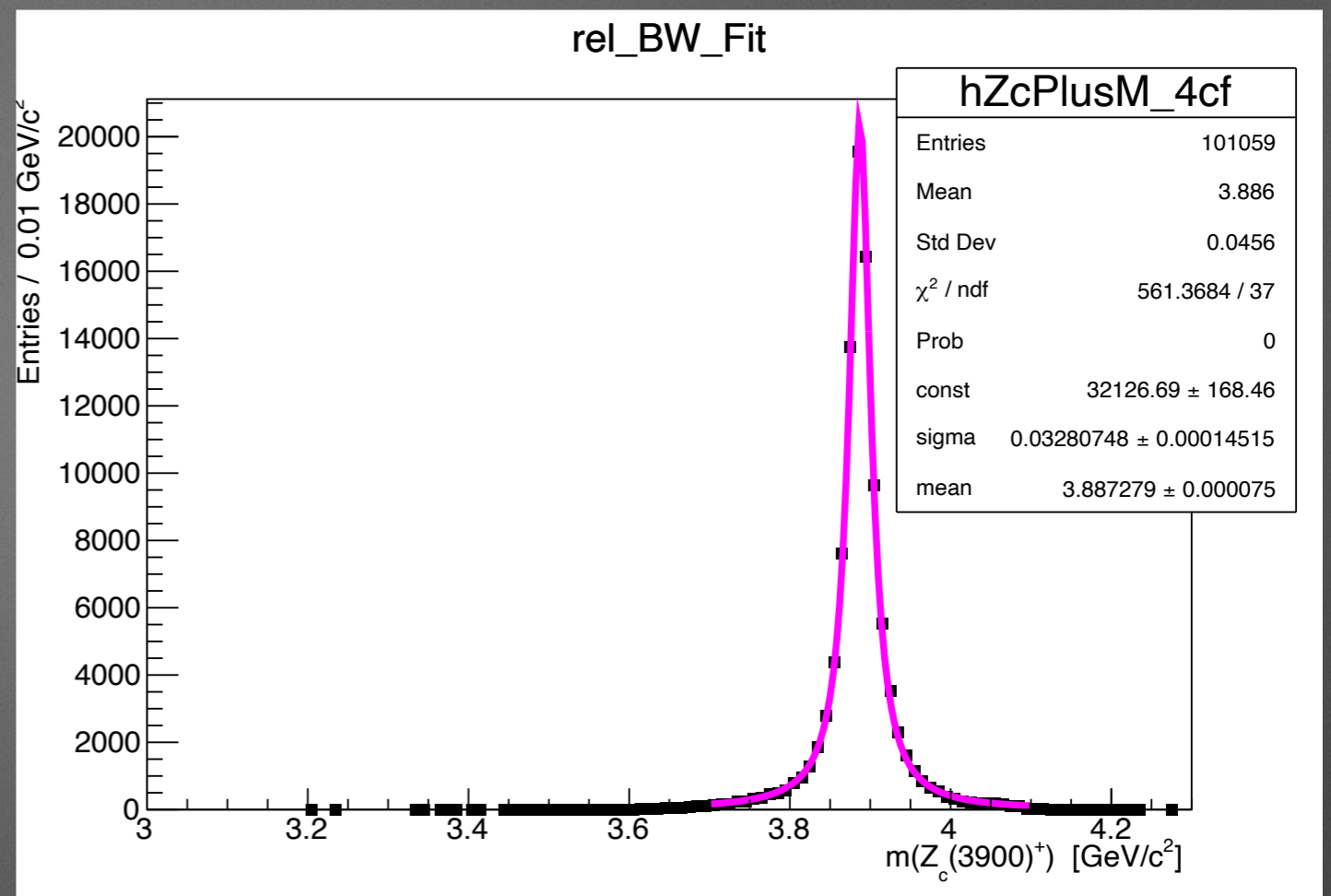
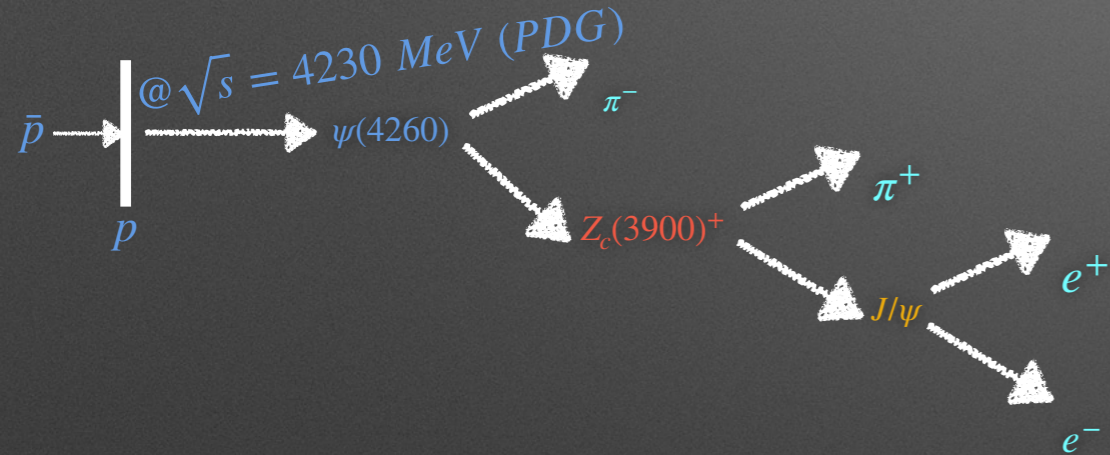
μ channel



BW vs Voigt fit

$Z_c^+(3900)$

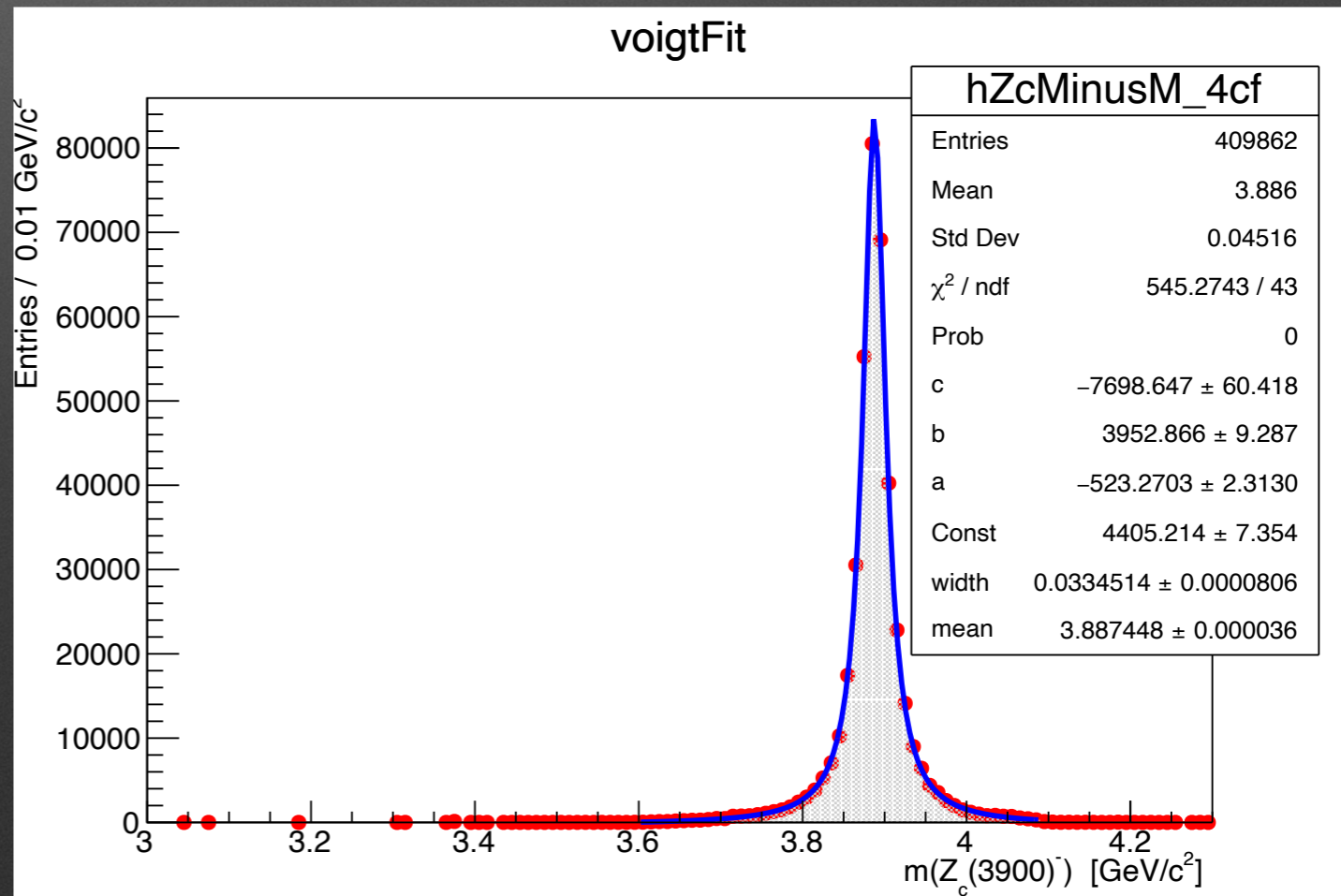
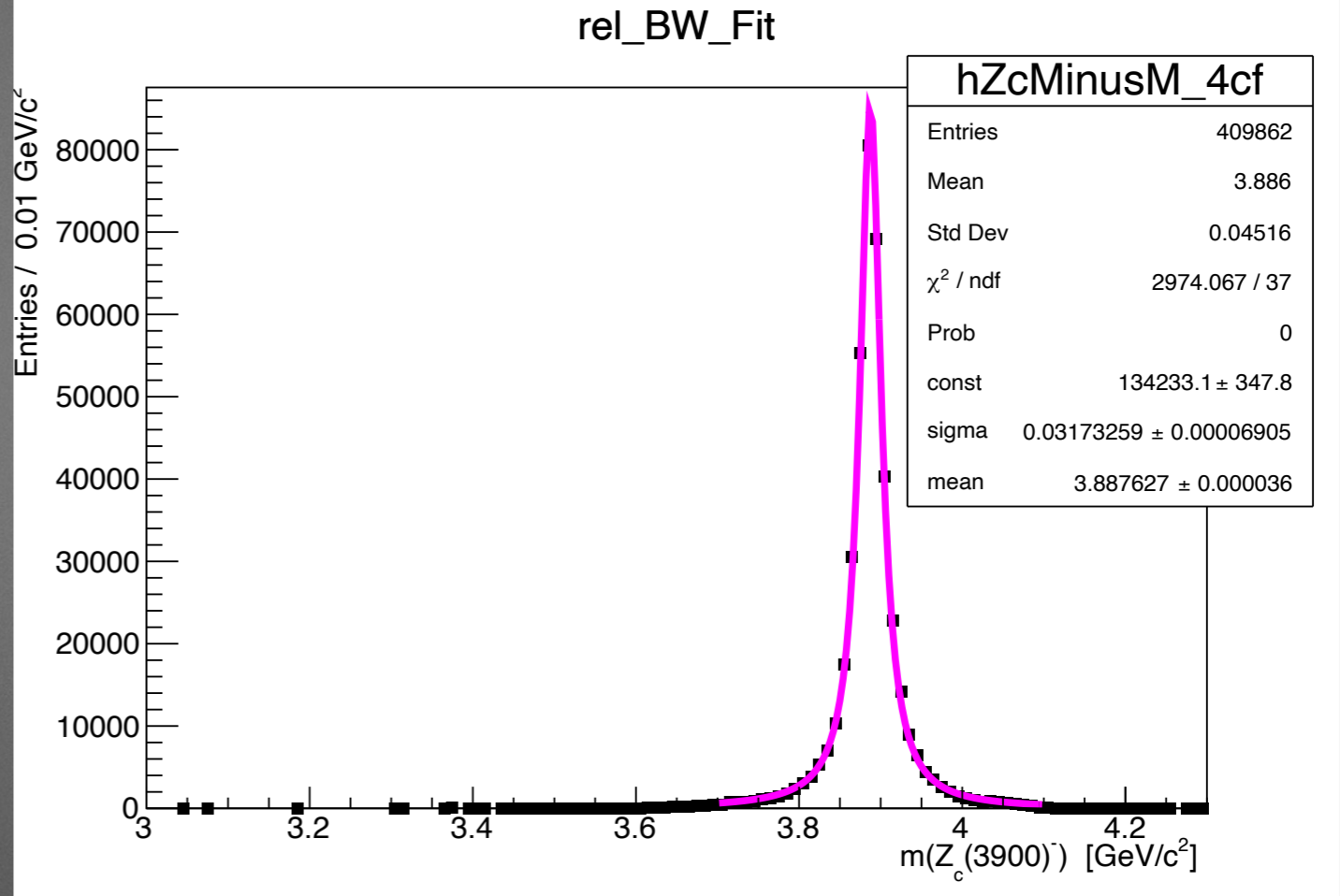
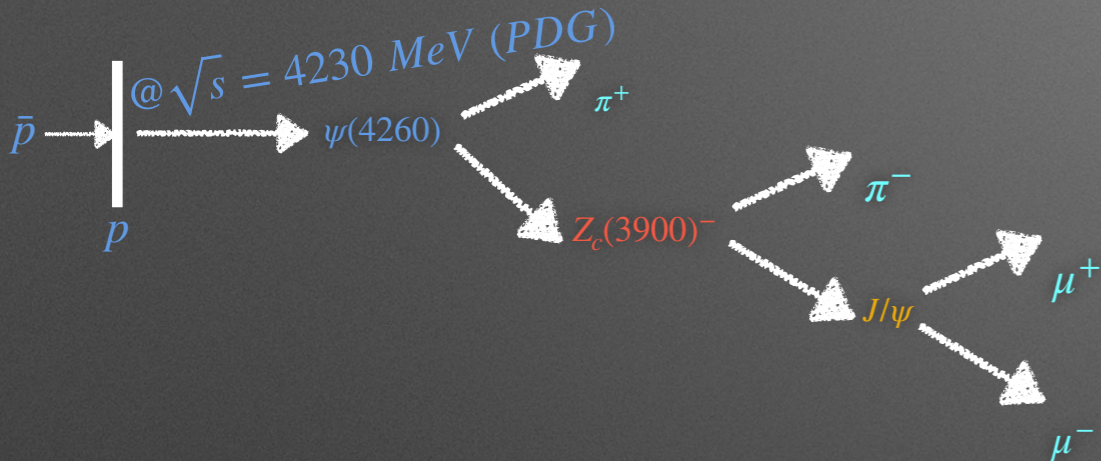
e channel



BW vs Voigt fit

$Z_c^-(3900)$

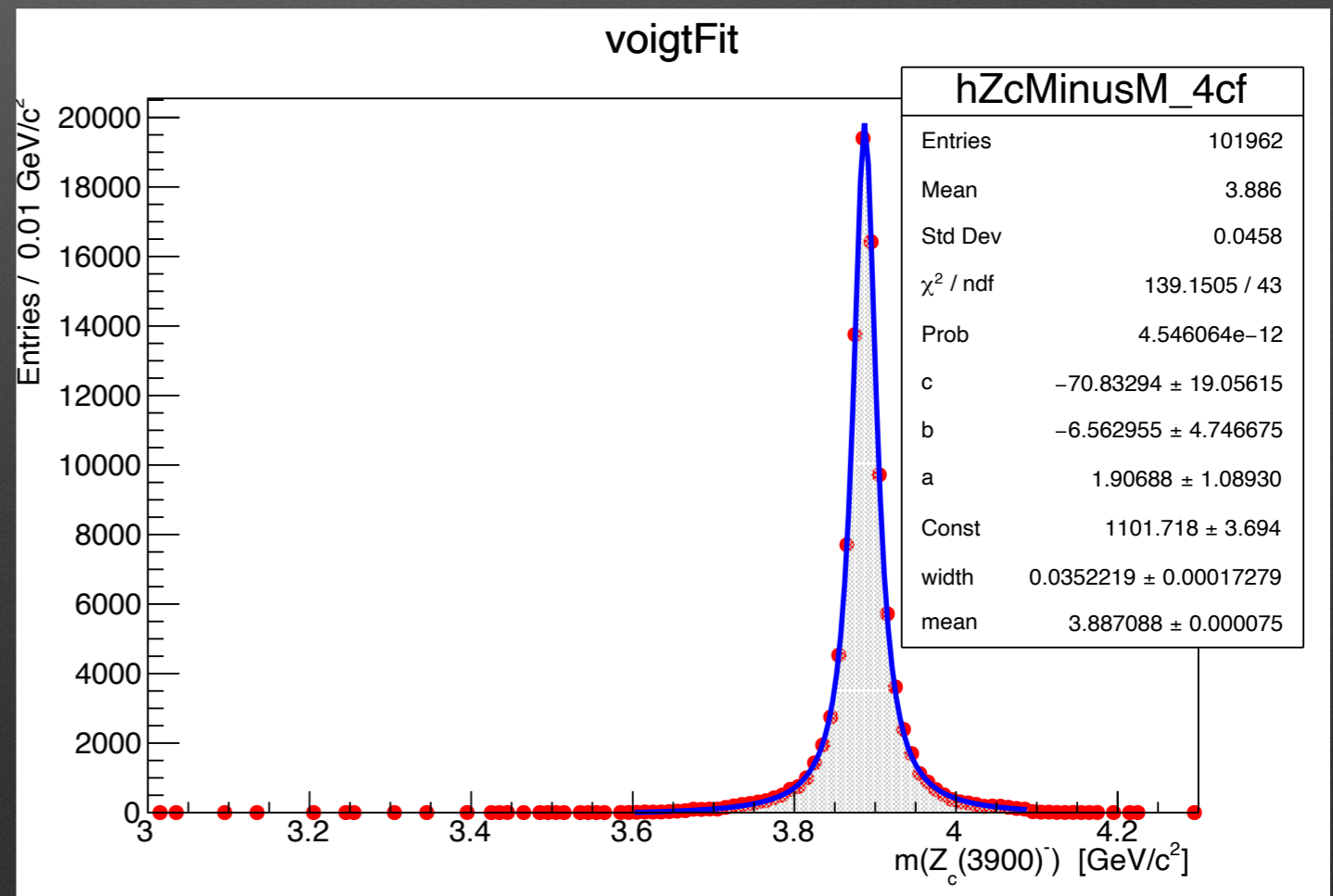
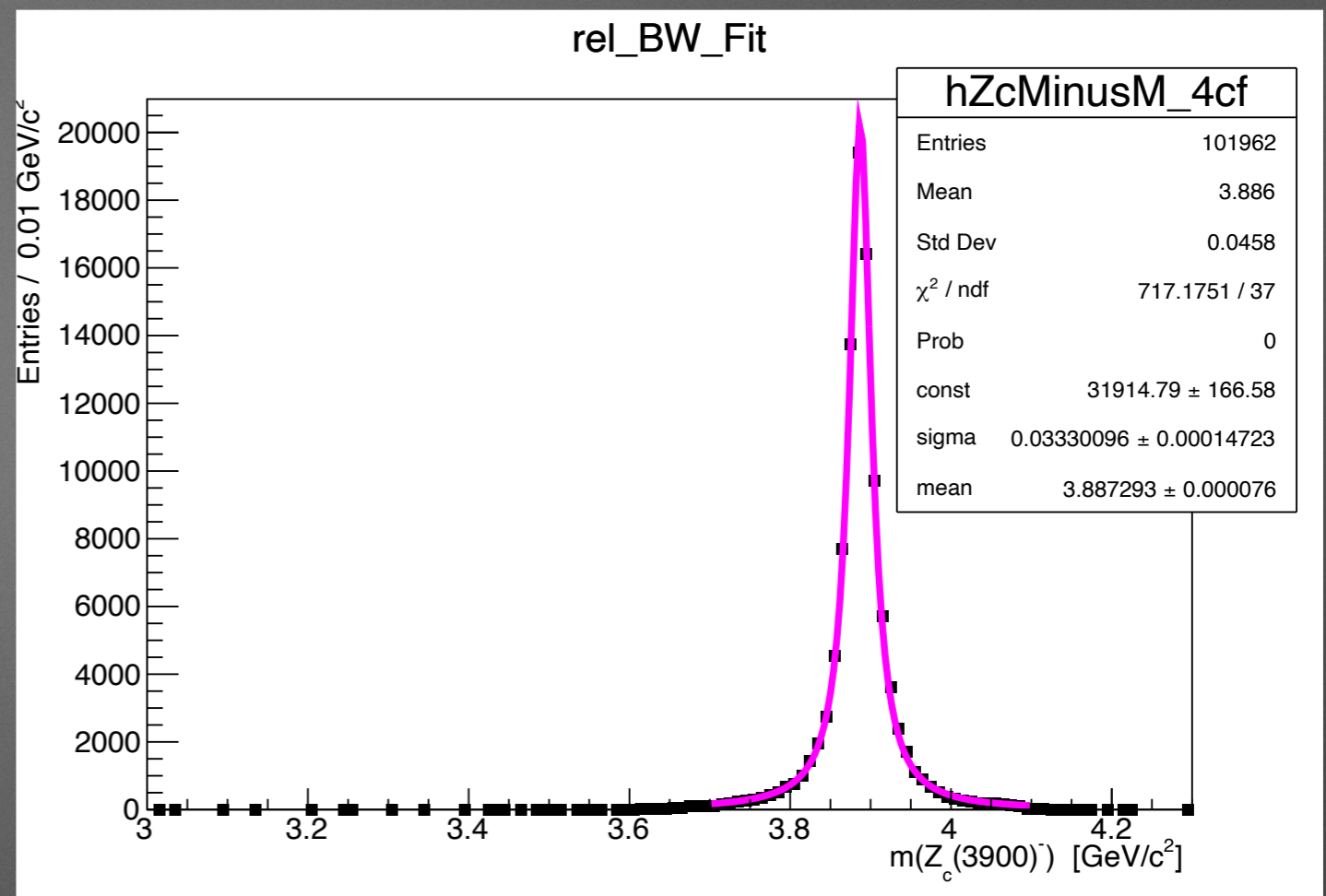
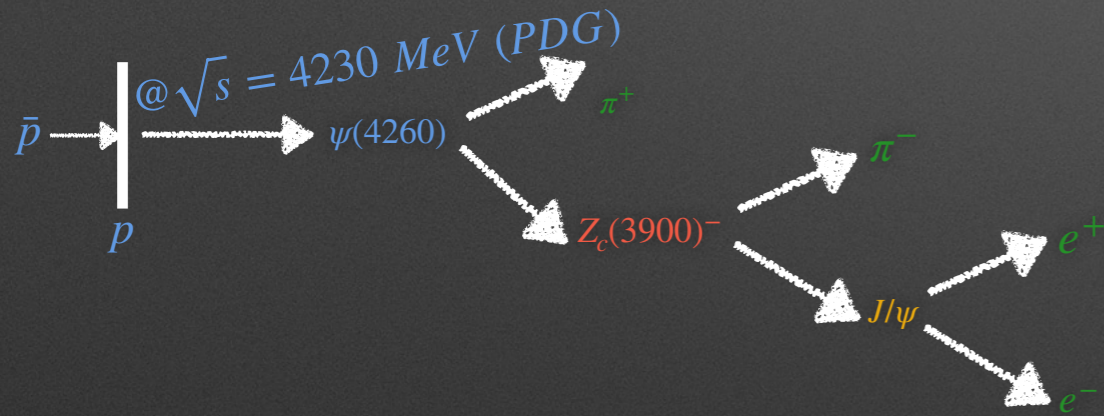
μ channel



BW vs Voigt fit

$Z_c^-(3900)$

e channel

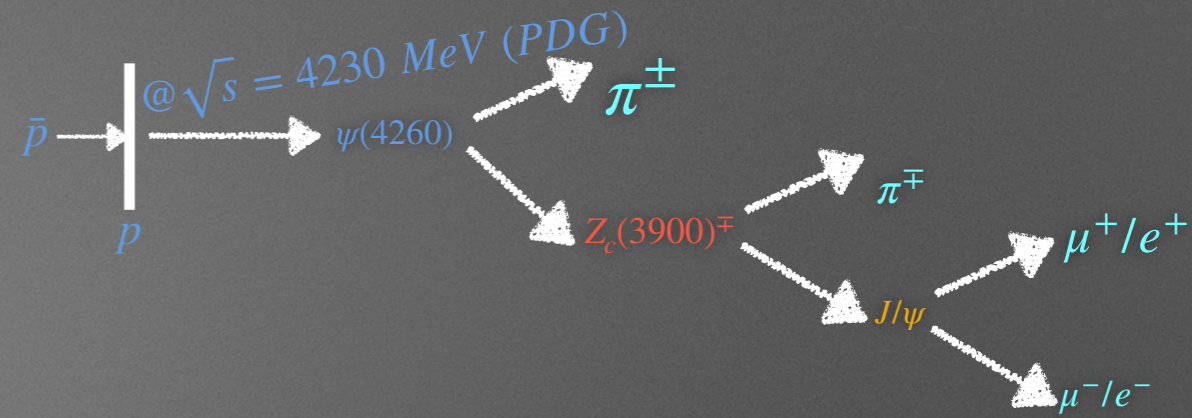


BW vs Voigt fit results

Zc(3900)

Charge	Plus				Minus			
	muChan		eChan		muChan		eChan	
Decay	Value	± Error	Value	± Error	Value	± Error	Value	± Error
FitMethod/ Values	Value	± Error	Value	± Error	Value	± Error	Value	± Error
BW_Mass	3,887421	0,000036	3,887279	0,000075	3,887627	0,000036	3,887293	0,000076
BW_Width	0,03158787	0,00006759	0,03280748	0,00014515	0,03173259	0,00006905	0,03330096	0,00014723
Voigt_Mass	3,887268	0,000036	3,887095	0,000072	3,887448	0,000036	3,8870088	0,000075
Voigt_Width	0,03361464	0,0008160	0,03453639	0,00016174	0,0334514	0,0000806	0,0352219	0,00017279

Summary:



- the production of the exotic charmonium-like state $Z_c(3900)$ in $p\bar{p}$ collisions through the sequential process

$$\psi(4260) \rightarrow Z_c^\pm(3900)\pi^\mp, Z_c^\pm(3900) \rightarrow J/\psi\pi^\pm.$$

- $\psi(4260)$, $Z_c^\pm(3900)$ and J/ψ are reconstructed by the final state particles (μ^+e^+ , μ^-e^- , π^\pm).

$Z_c^+(3900)$

μ channel

$$: \frac{Z_c(3900)_{reco}}{N_{events} : (generated)} = \frac{420287}{1M} = 42,03 \% \text{ after 4C in signal channel}$$

$Z_c^+(3900)$

e channel

$$: \frac{Z_c(3900)_{reco}}{N_{events} : (generated)} = \frac{101059}{990K} = 10.21 \% \text{ after 4C in signal channel}$$

$Z_c^-(3900)$

μ channel

$$: \frac{Z_c(3900)_{reco}}{N_{events} : (generated)} = \frac{409862}{98K} = 41,82 \% \text{ after 4C in signal channel}$$

$Z_c^-(3900)$

e channel

$$: \frac{Z_c(3900)_{reco}}{N_{events} : (generated)} = \frac{101962}{1M} = 10,196 \% \text{ after 4C in signal channel}$$