

Check of particle identification  
at SPD (with ToF only)

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The idea is to check PID using decayed VO particles:  $\phi \rightarrow K^+K^-$ ,  $K_s^0 \rightarrow \pi^+\pi^-$ ,  $\Lambda \rightarrow p\pi^-$

Generation: Pythia 8; (p+p) at 27 GeV; Hard QCD

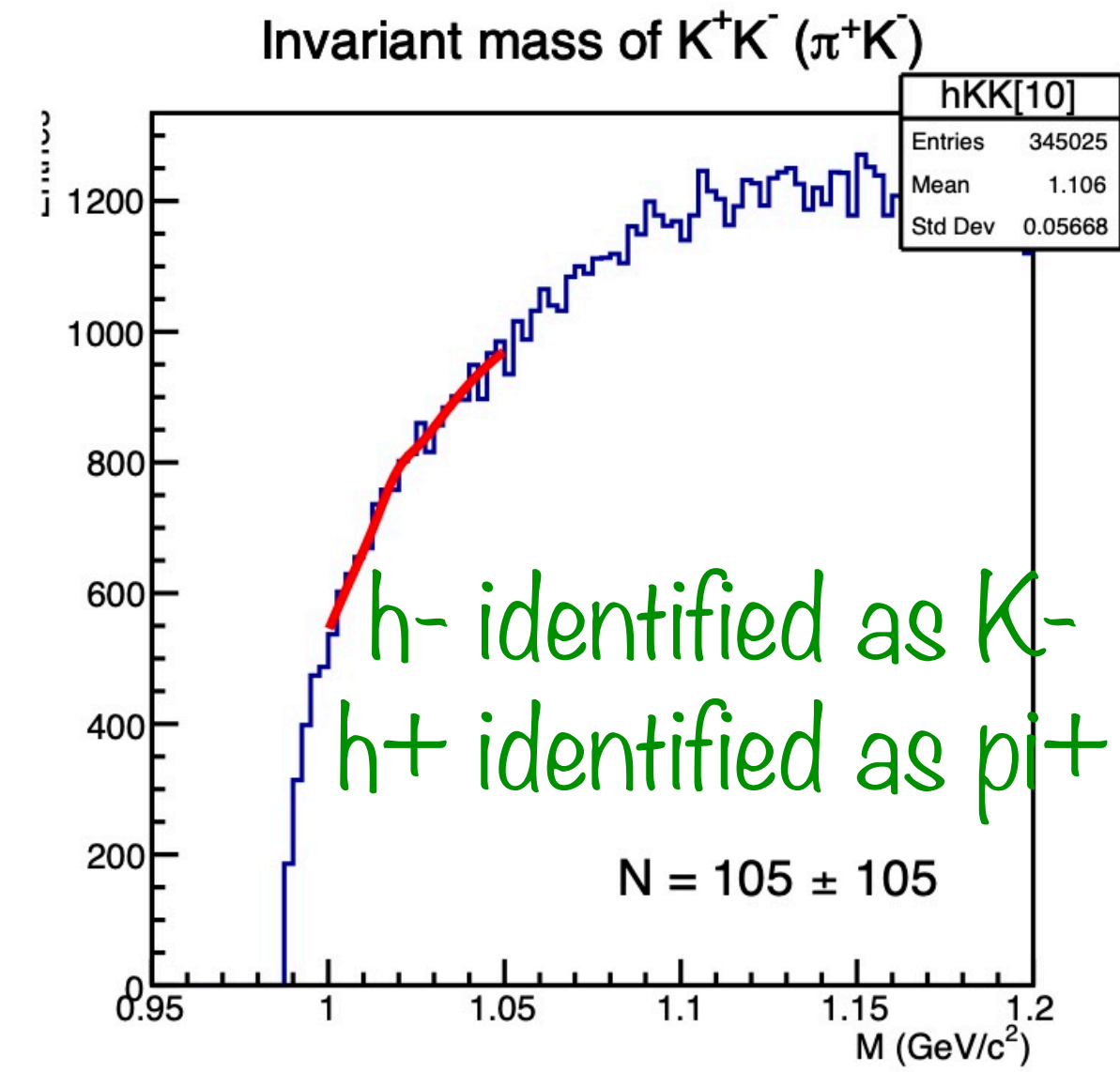
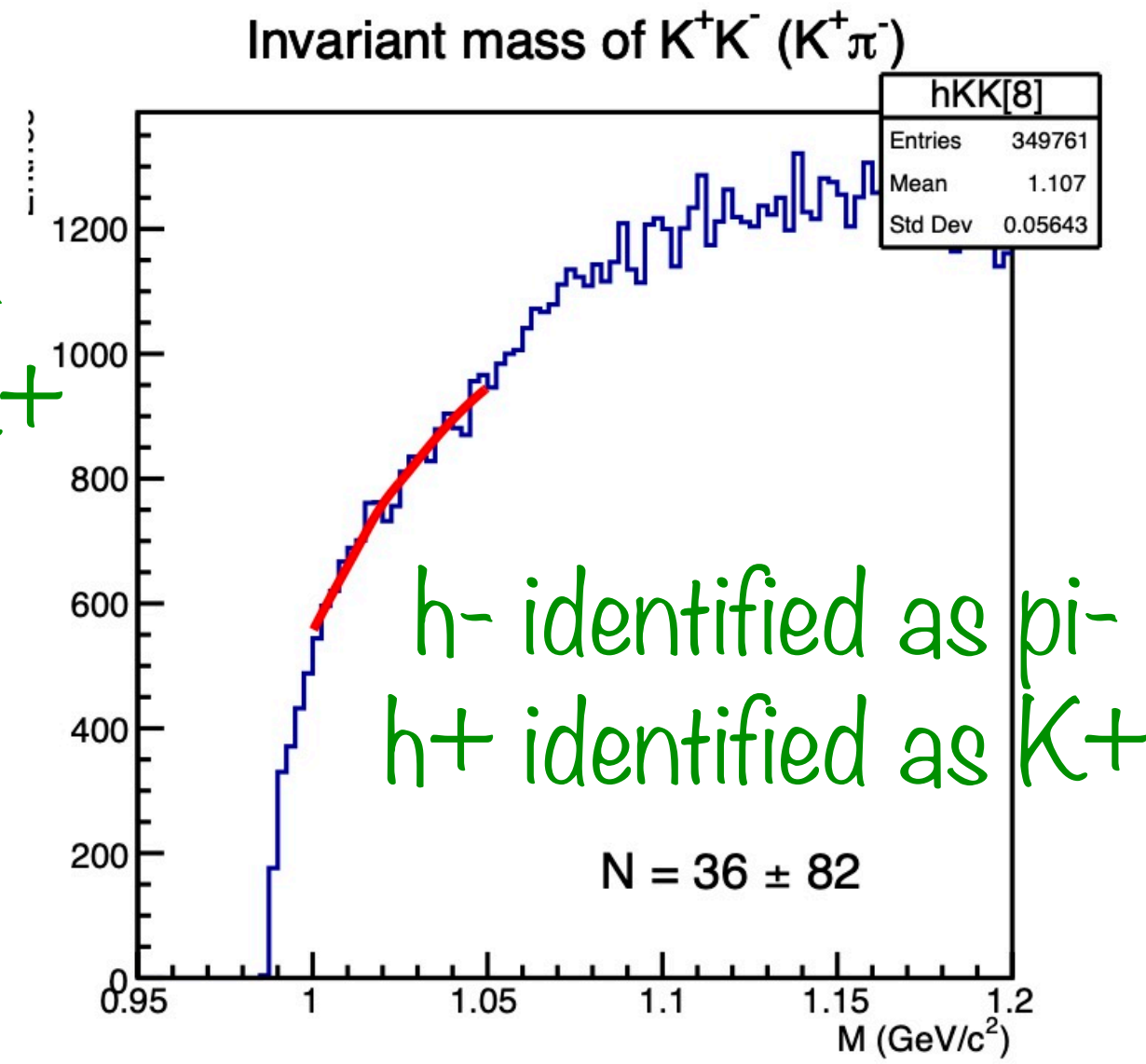
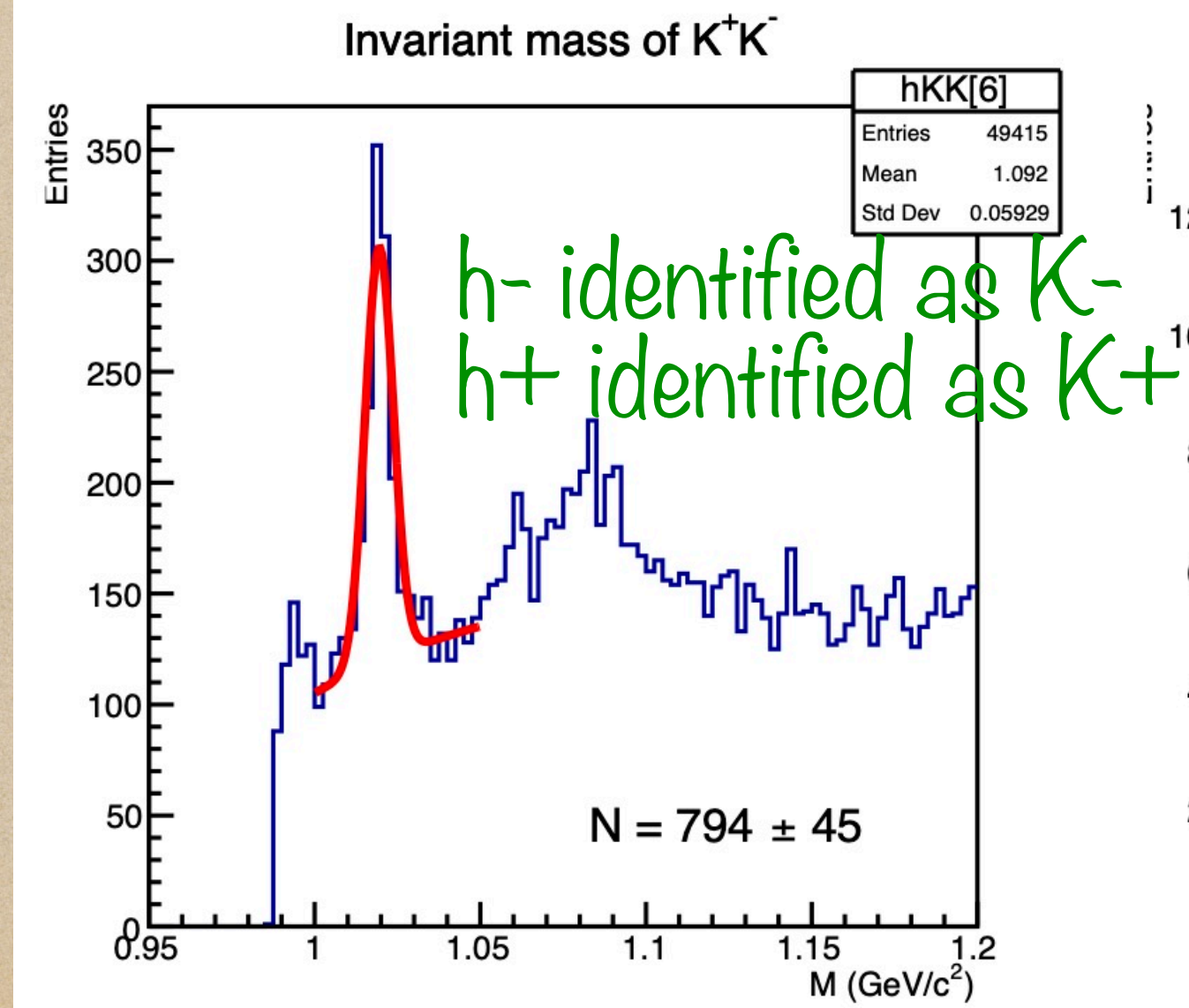
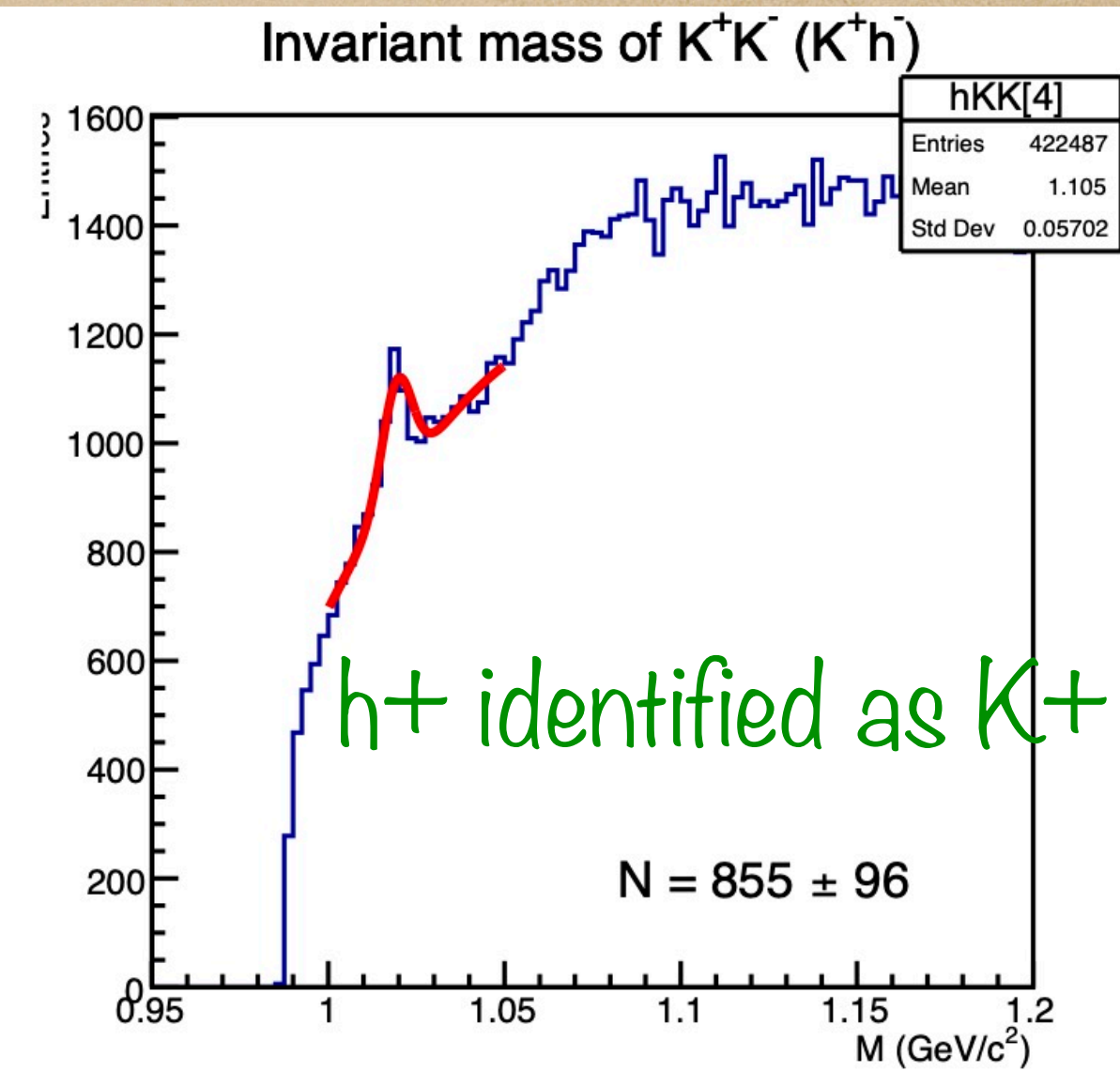
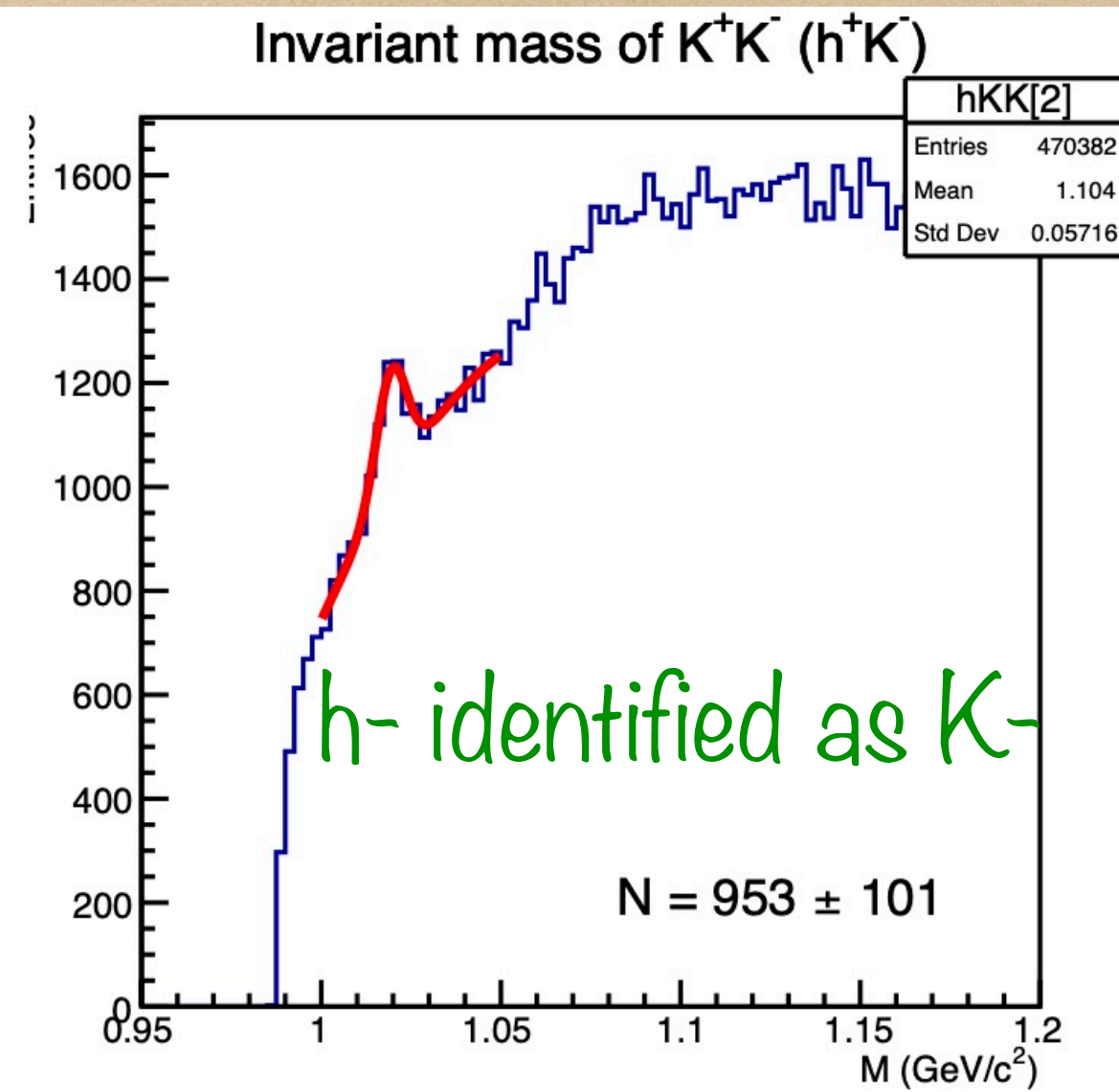
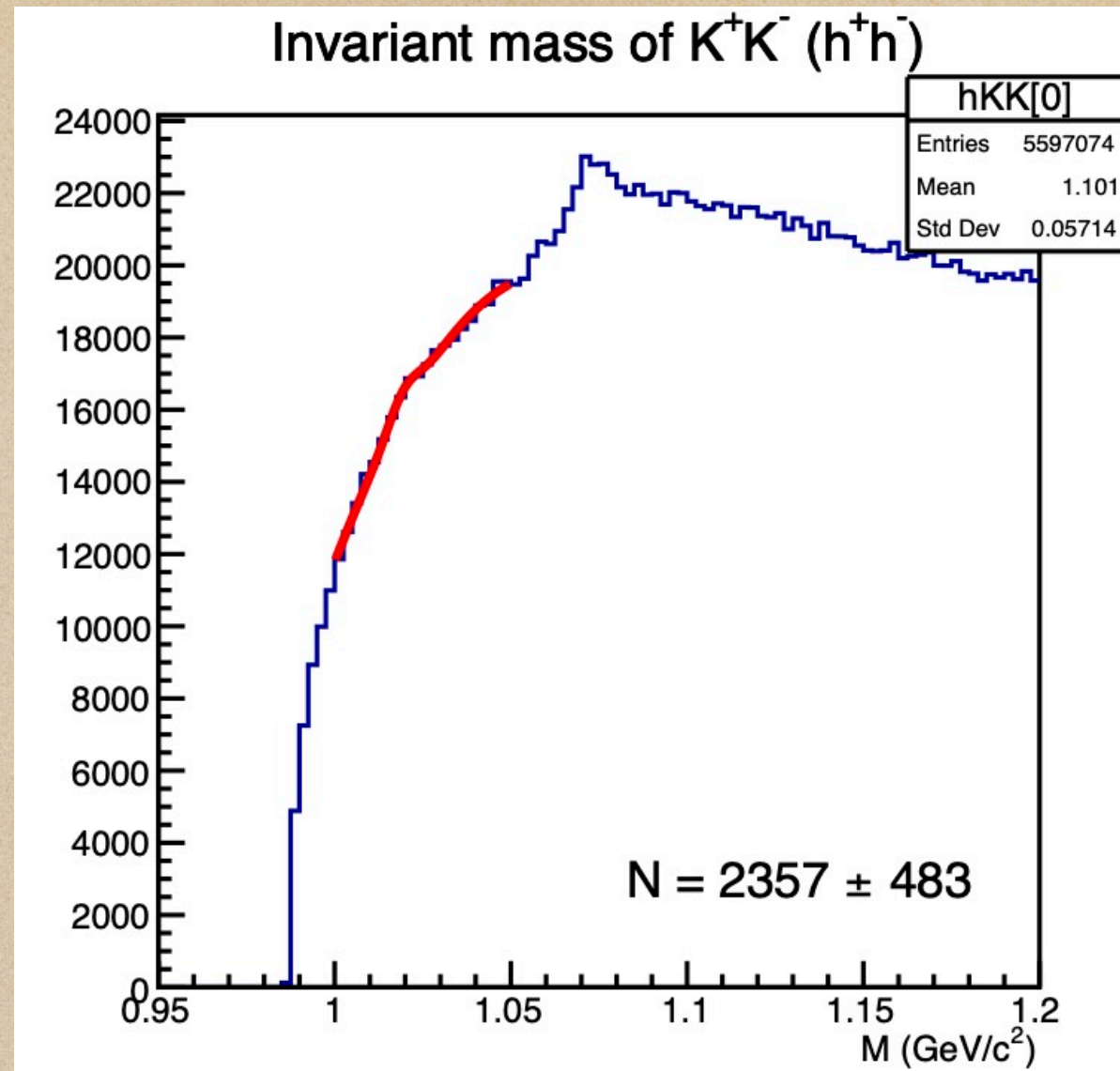
Reconstruction: SpdMCTracksFinder, SPDMCVerticesFinder, SpdRCKFpartVOFinder

track\_finder->CheckMaxPartGeneration(true,3); //primary+secondary and so on

Selection criteria:

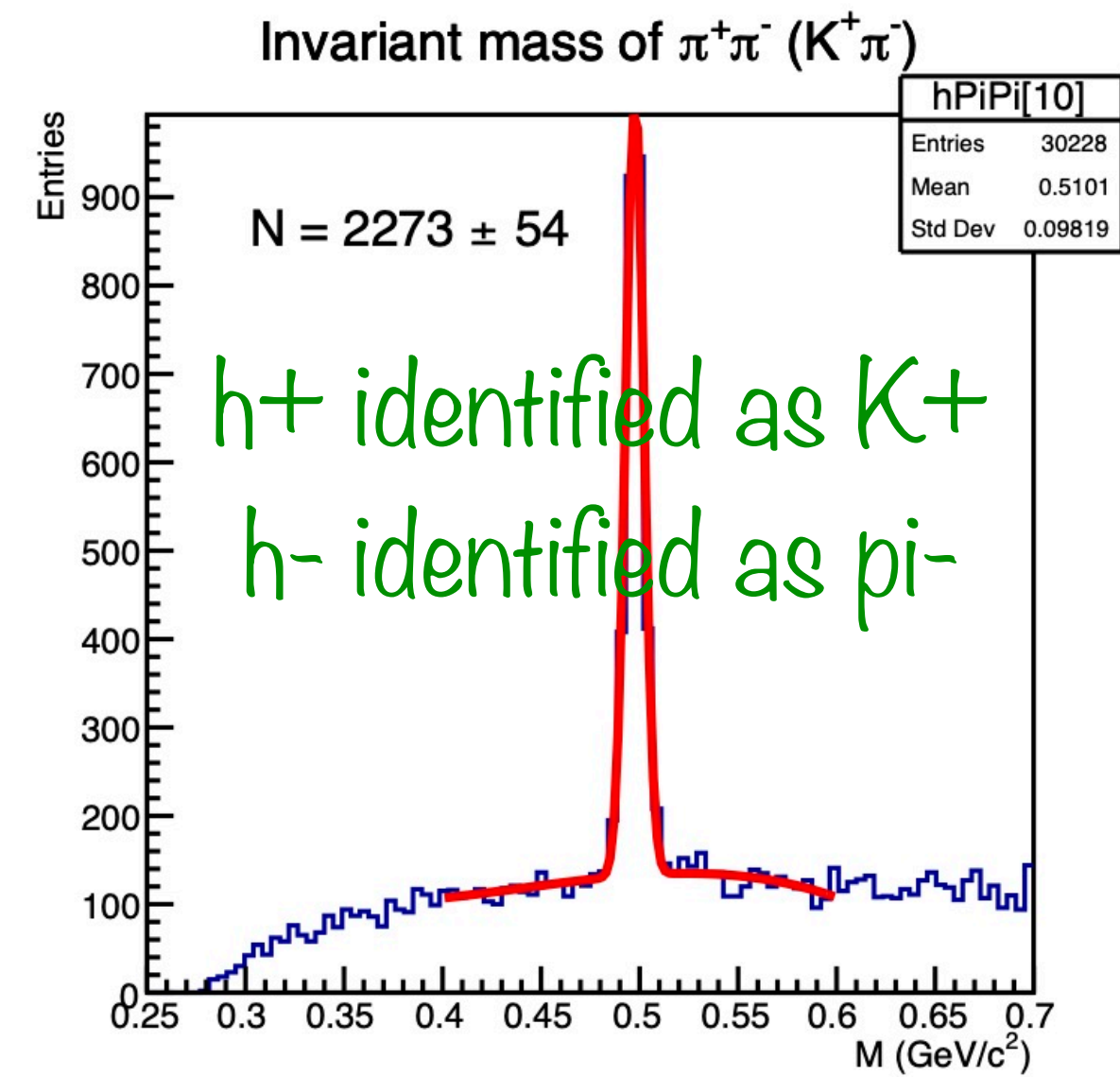
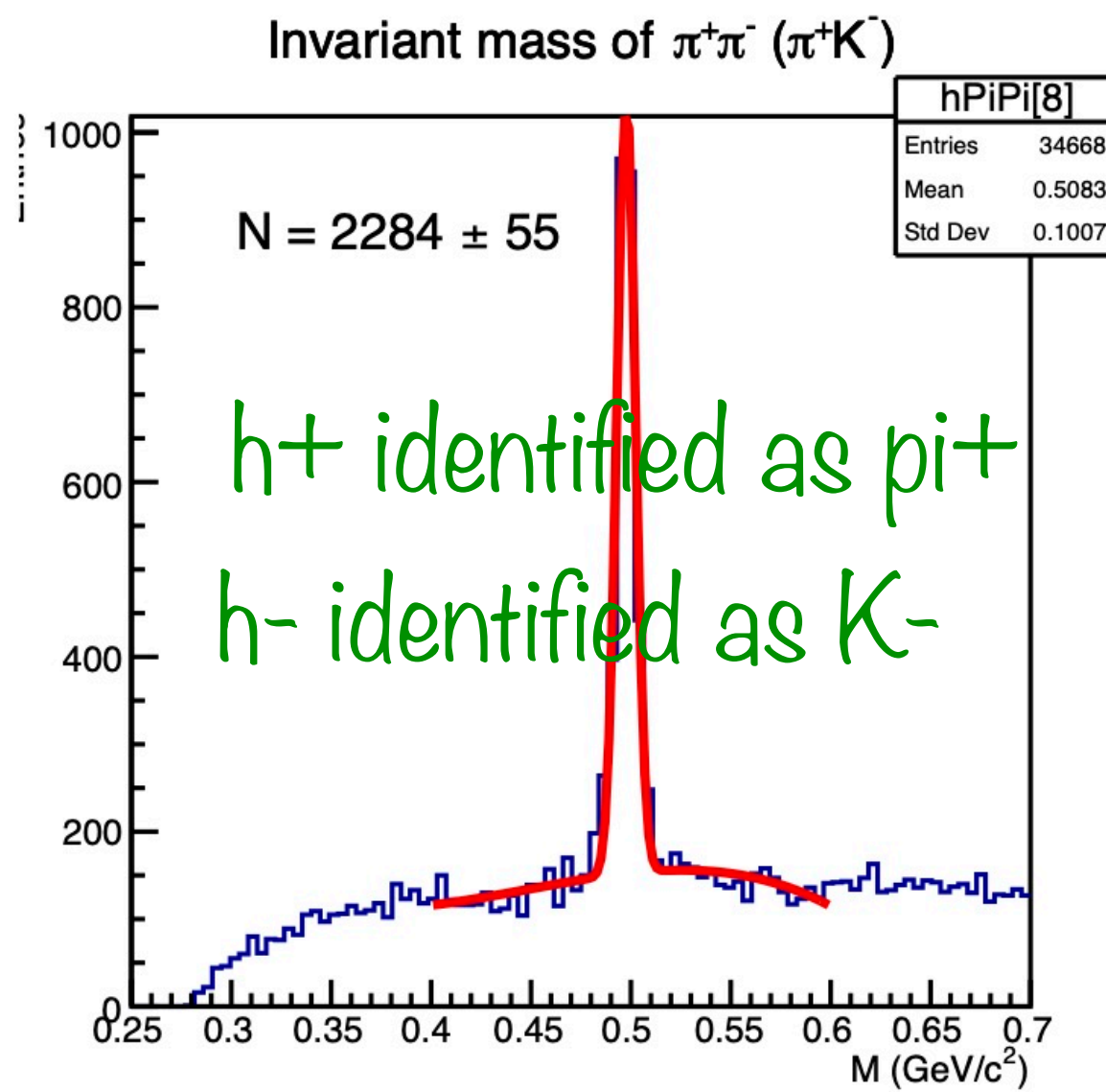
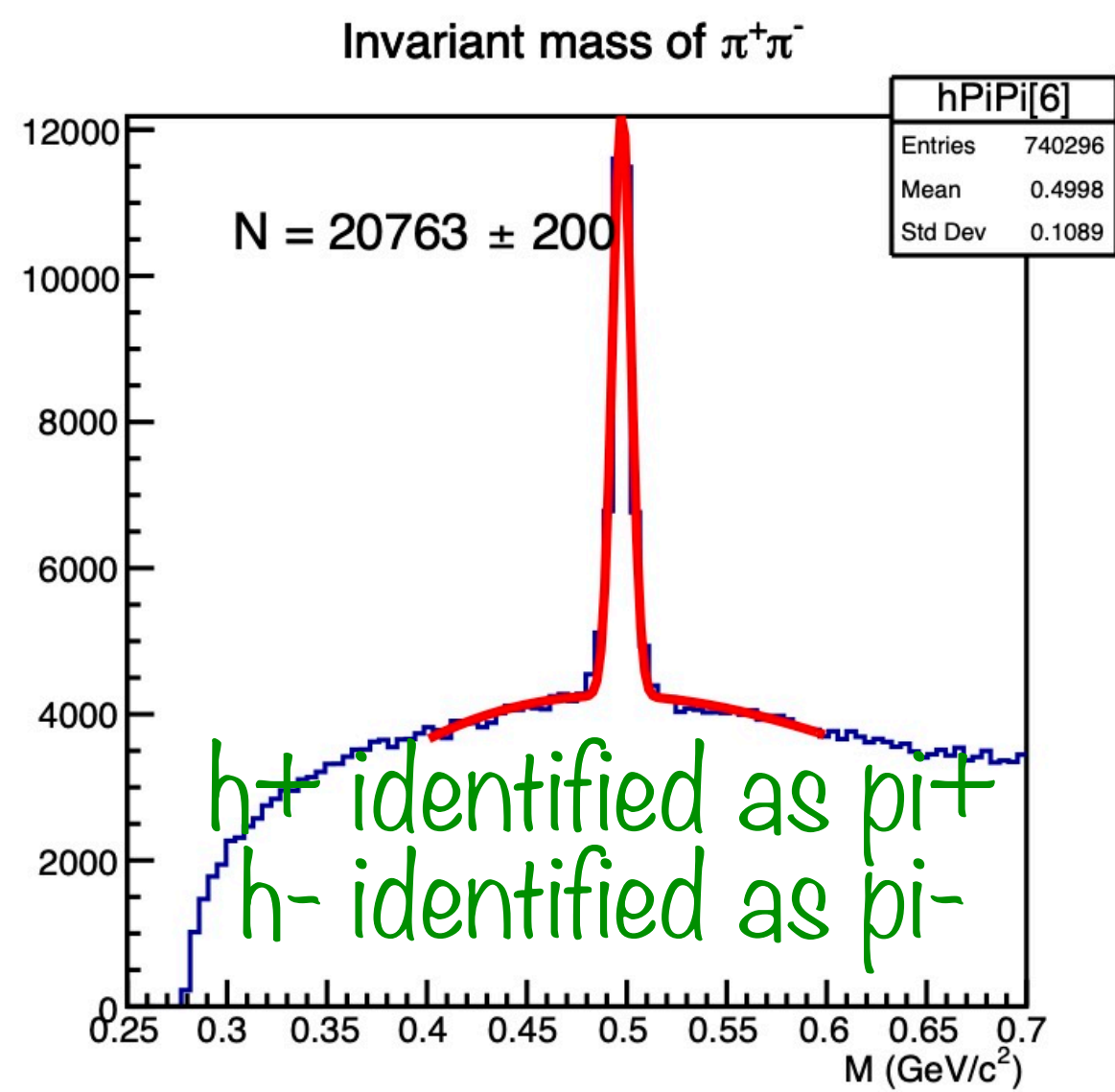
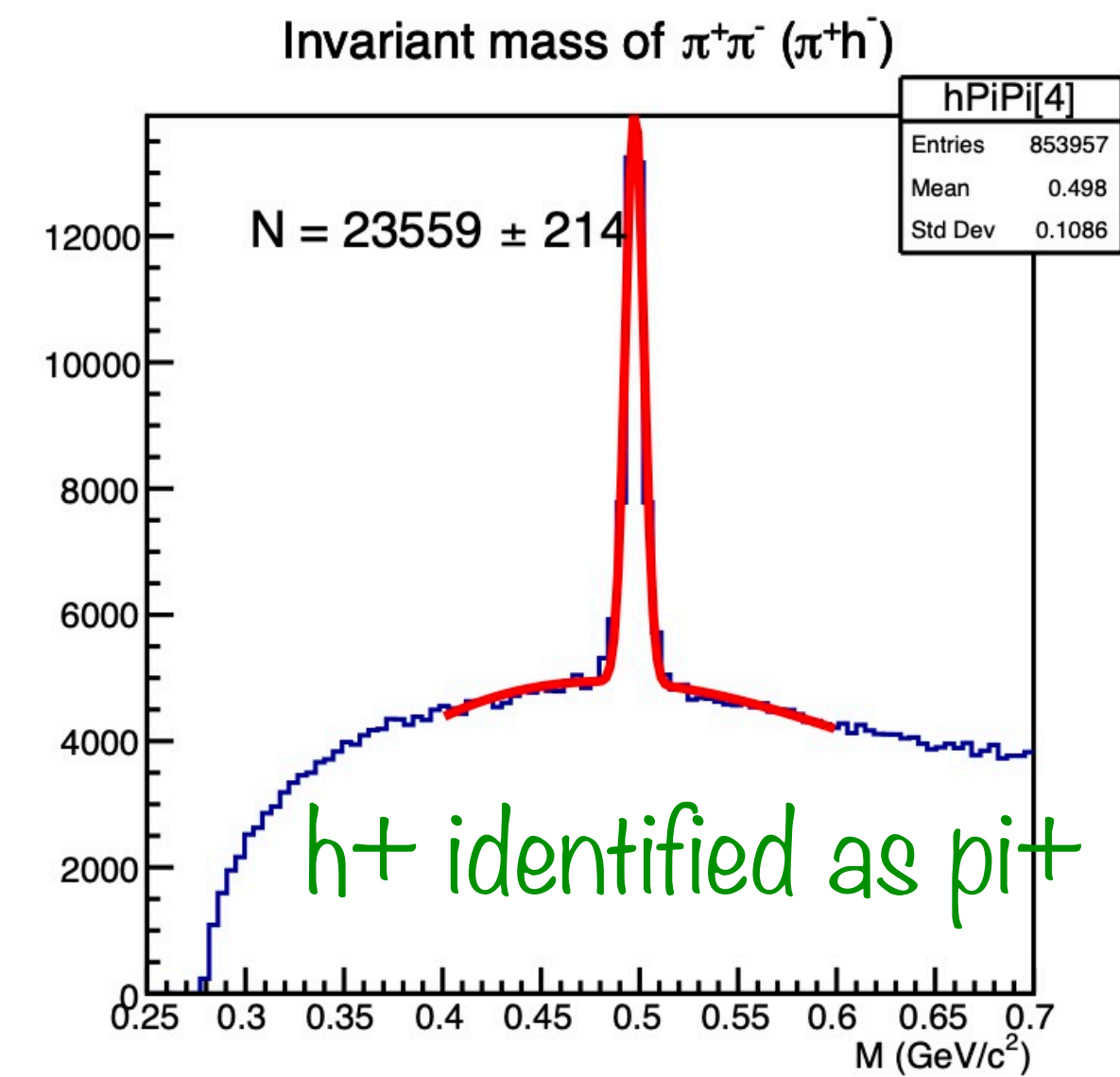
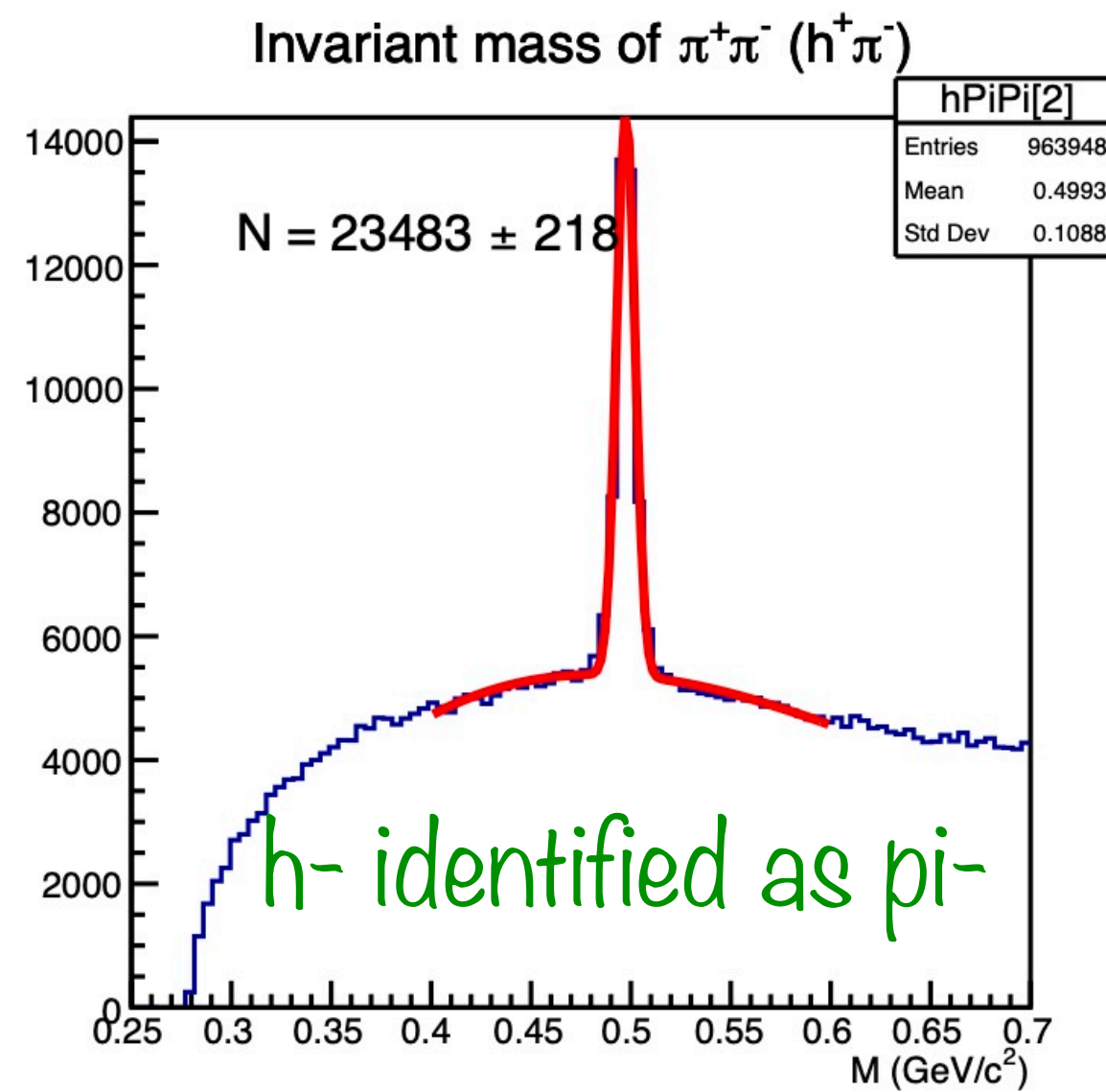
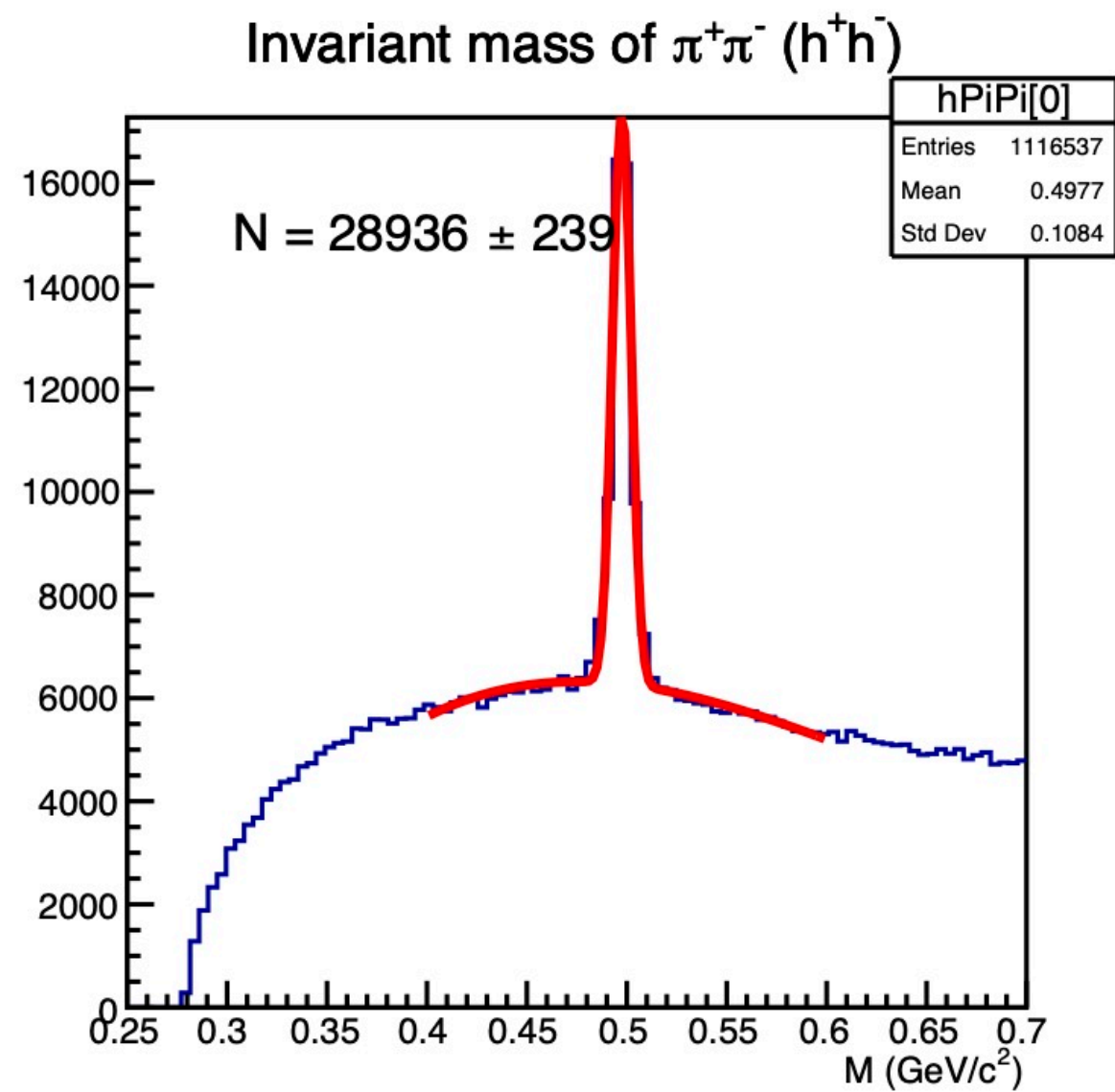
Tracks are identified in ToF as pion, kaon or proton (maximum LH)

# Invariant mass of $K^+K^-$



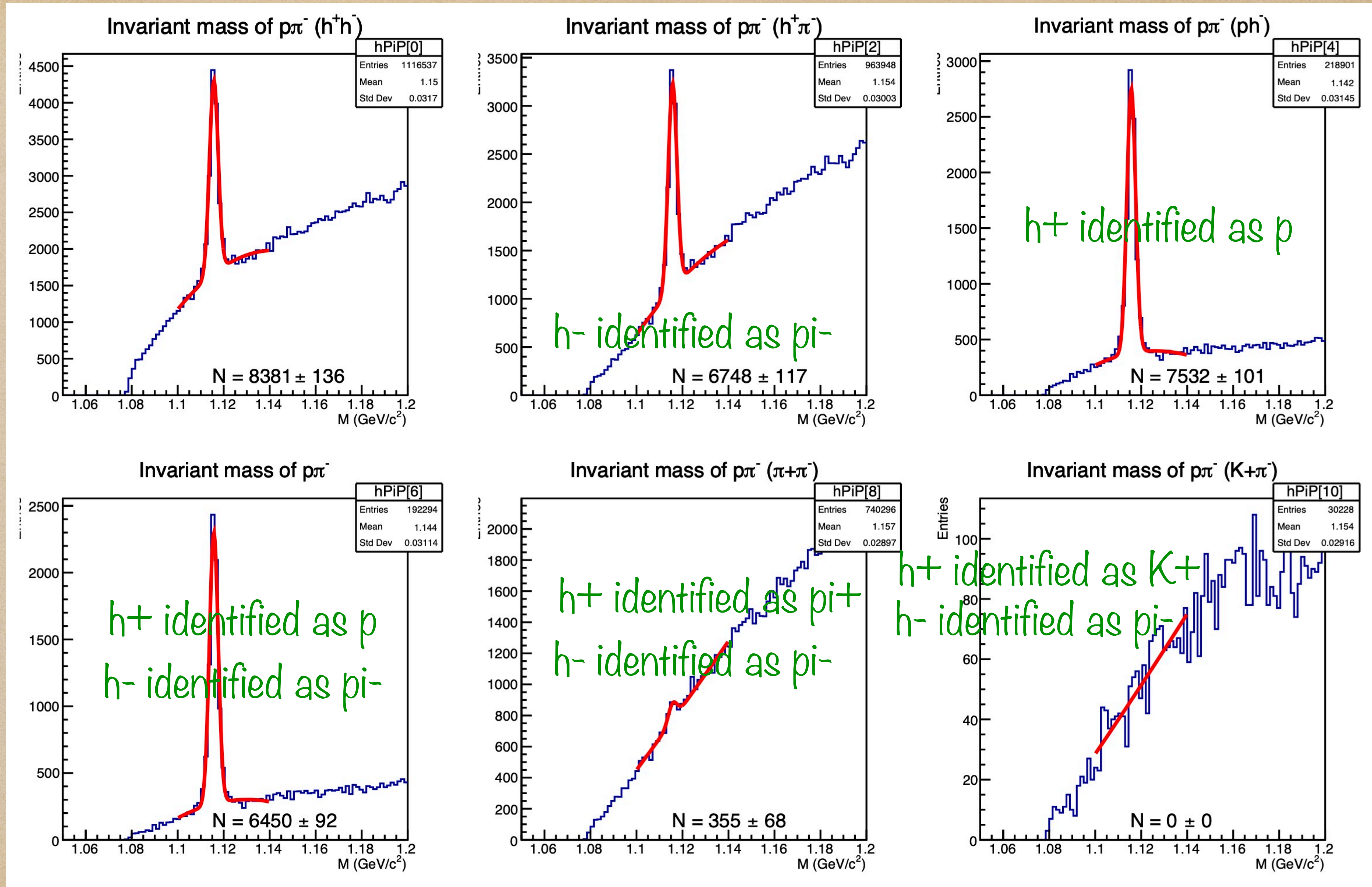
Fit: gaussian + bg (pol3)

# Invariant mass of $\pi^+\pi^-$



Fit: gaussian + bg (pol3)

# Invariant mass of $p \pi^-$



Fif: gaussian + pol3

	H+	H-
$\rho K \rightarrow K$	0.83	0.92
$\rho K \rightarrow \pi$	0.11	0.04
$\rho \pi \rightarrow \pi$	0.88	0.88
$\rho \pi \rightarrow K$	0.10	0.10
$\rho p \rightarrow p$	0.96	-
$\rho p \rightarrow \pi$	0.05	-
$\rho p \rightarrow K$	$\sim 0$	-

$\phi \rightarrow K^+ + K^-$

$$P^{K \rightarrow K} = \frac{N^{K \rightarrow K}}{N_K} = \frac{N_\phi(KK)}{N_\phi(KH)}$$

$$P^{K \rightarrow \pi} = \frac{N^{K \rightarrow \pi}}{N_K} = \frac{N_\phi(K\pi)}{N_\phi(KH)}$$

$K_s^0 \rightarrow \pi^+ + \pi^-$

$$P^{\pi \rightarrow \pi} = \frac{N^{\pi \rightarrow \pi}}{N_\pi} = \frac{N_{K_s^0}(\pi\pi)}{N_{K_s^0}(\pi H)}$$

$$P^{\pi \rightarrow K} = \frac{N^{\pi \rightarrow K}}{N_\pi} = \frac{N_{K_s^0}(\pi K)}{N_{K_s^0}(\pi H)}$$

$\Lambda \rightarrow p + \pi^-$

$$P^{p \rightarrow p} = \frac{N^{p \rightarrow p}}{N_p} = \frac{N_\Lambda(\pi p)}{N_\Lambda(\pi H)}$$

$$P^{p \rightarrow K} = \frac{N^{p \rightarrow K}}{N_p} = \frac{N_\Lambda(\pi K)}{N_\Lambda(\pi H)}$$

$$P^{p \rightarrow \pi} = \frac{N^{p \rightarrow \pi}}{N_p} = \frac{N_\Lambda(\pi\pi)}{N_\Lambda(\pi H)}$$