

PANDA Scrutiny

Analysis of $\bar{p}p \rightarrow K^+K^-\pi^0$ & $K^+K^-\pi^0\pi^0$

9.5.2014

Torsten Schröder - Ruhr-Universität Bochum

Analysis Overview

$$\bar{p}p \rightarrow K^+K^-\pi^0$$

$$\pi^0 \rightarrow \gamma\gamma$$

$$p_{\bar{p}} = 2 \text{ GeV}/c$$

$$15 \text{ GeV}/c$$

Search for glueballs in light meson sector

- Dalitzplot

- production angle

homogeneity, acceptance

Reconstruction

charged: no PID, use KaonAll list

neutral: use Neutral list

4C fit, no mass constraint on π^0

select best candidate based on χ^2

Signals and Background (2 GeV/c)

400000 signal events

4000000 $\pi^+\pi^-\pi^0$ $\sigma \sim 20x \sigma(K^+K^-\pi^0)$

400000 $K^+K^-\pi^0\pi^0$ $\sigma \sim \sigma(K^+K^-\pi^0)$

Signals and Background (15 GeV/c)

200000 signal events

Analysis Overview

$$\bar{p}p \rightarrow K^+K^-\pi^0\pi^0$$

$$\pi^0 \rightarrow \gamma\gamma$$

$$p_{\bar{p}} = 2 \text{ GeV}/c$$

$$15 \text{ GeV}/c$$

Search for glueballs in light meson sector

- Dalitzplot

- production angle

homogeneity, acceptance

Reconstruction

charged: no PID, use KaonAll list

neutral: use Neutral list

4C fit, no mass constraint on π^0

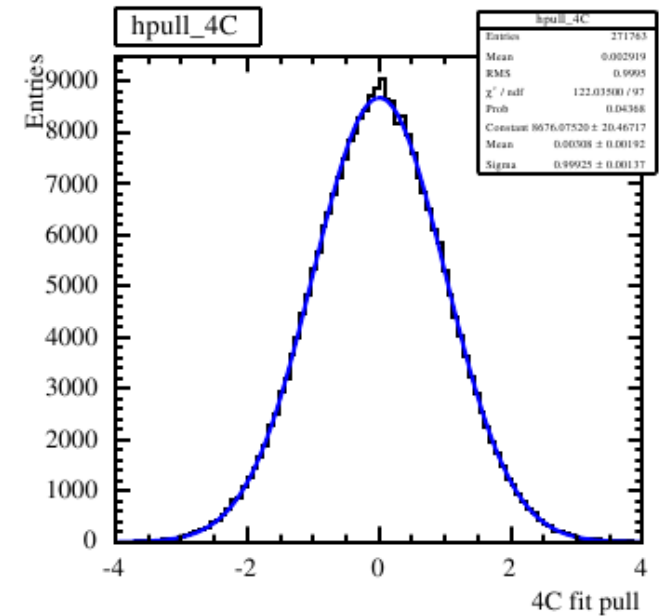
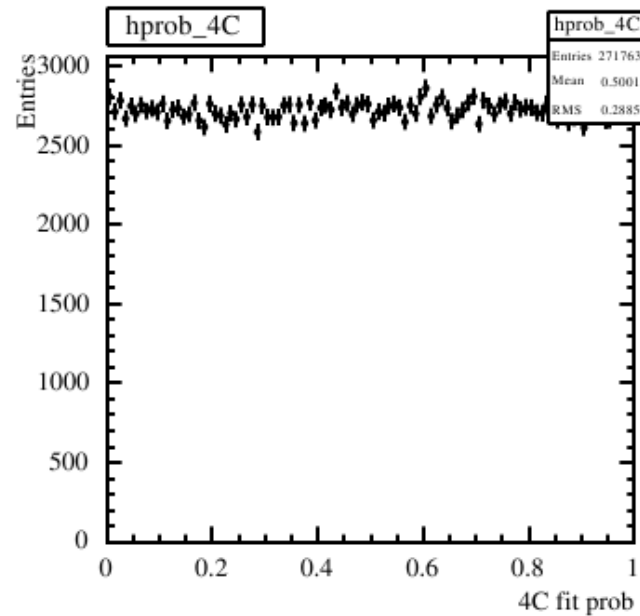
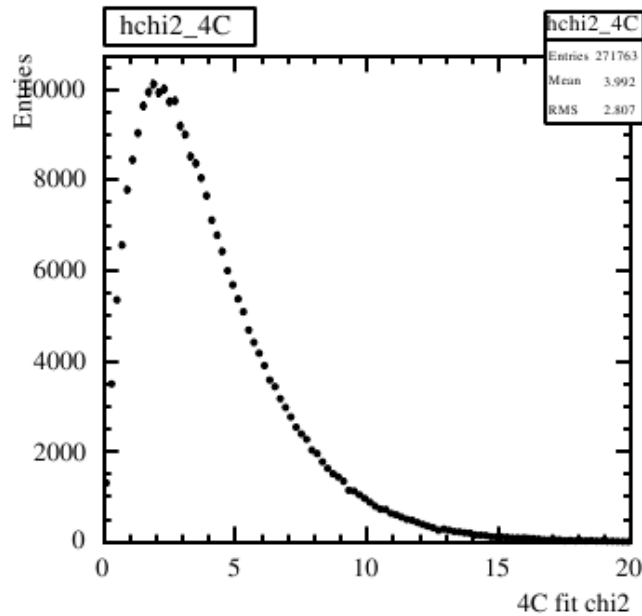
select best candidate based on χ^2

Signals and Background (2 GeV/c)

400000 signal events

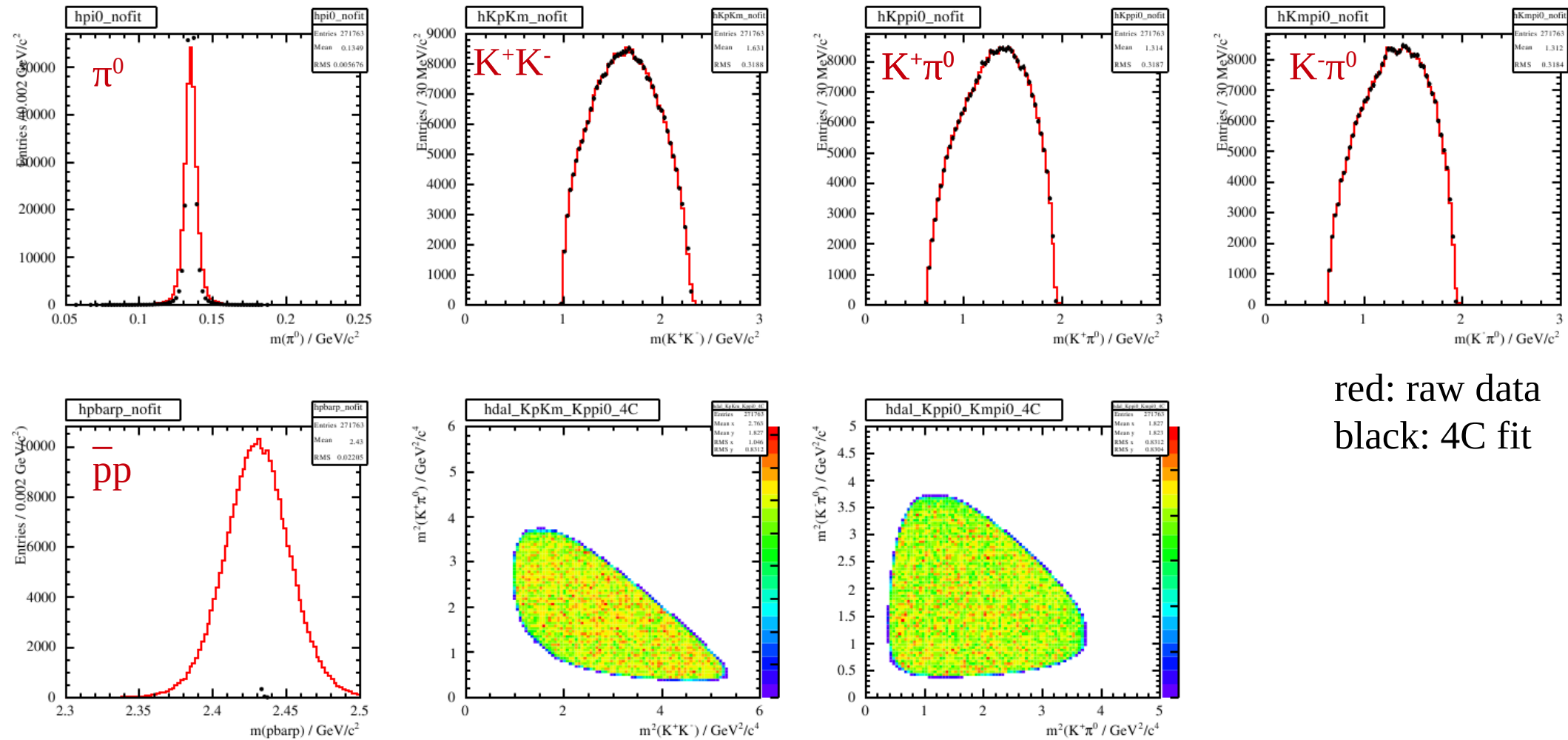
$K^+K^-\pi^0$ - Fit quality

4C Fit



$$p_p^- = 2 \text{ GeV}/c$$

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

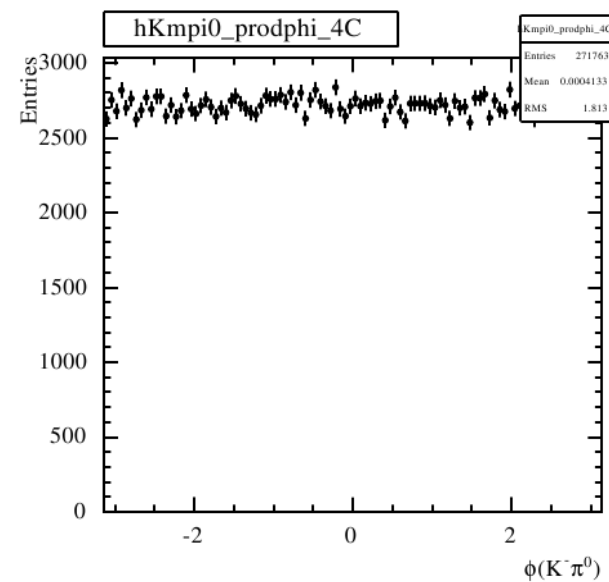
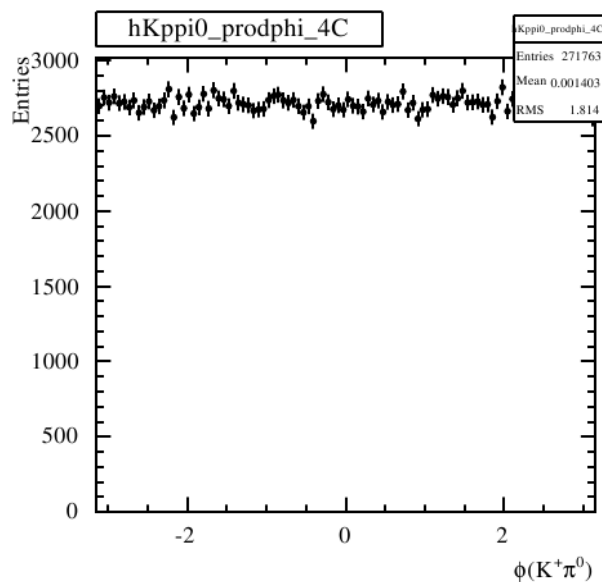
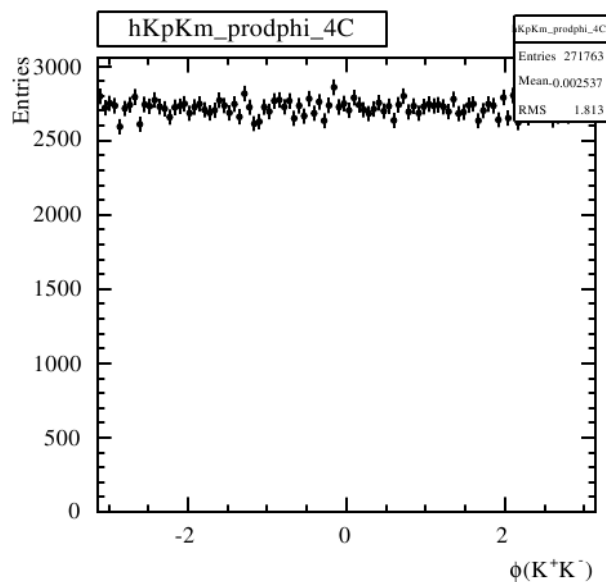
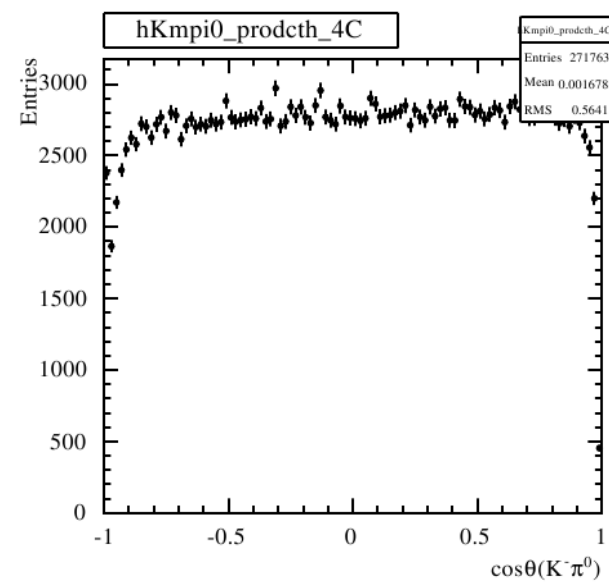
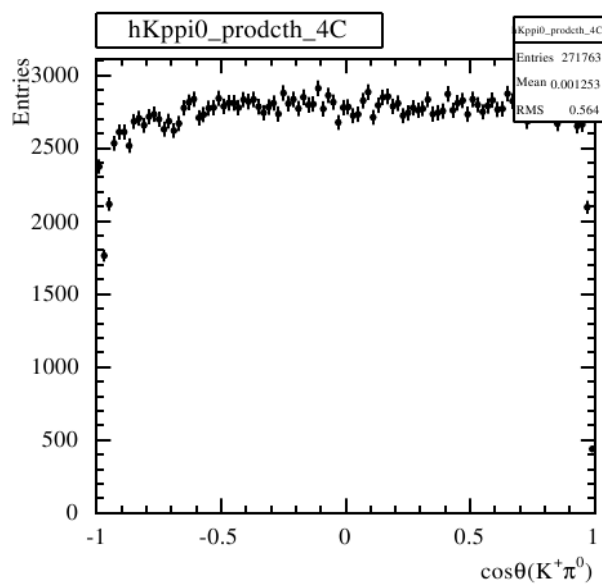
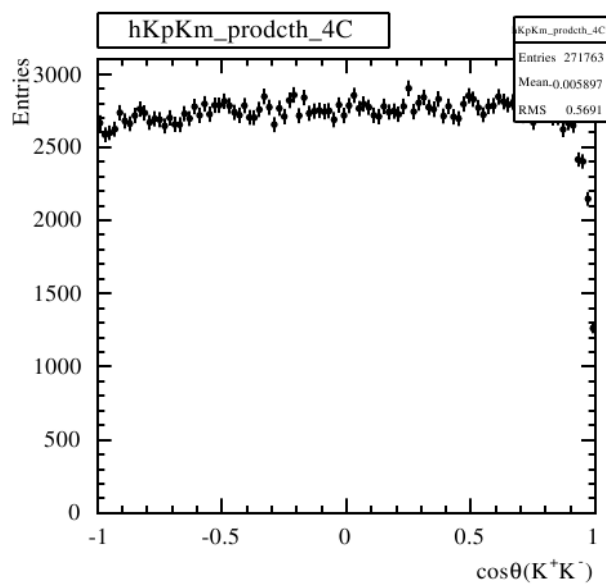


red: raw data
black: 4C fit

no efficiency correction

$p_p^- = 2 \text{ GeV}/c$

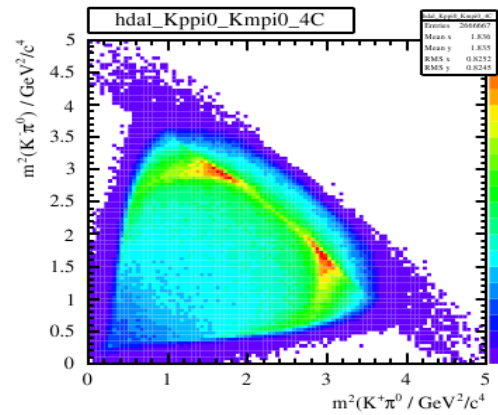
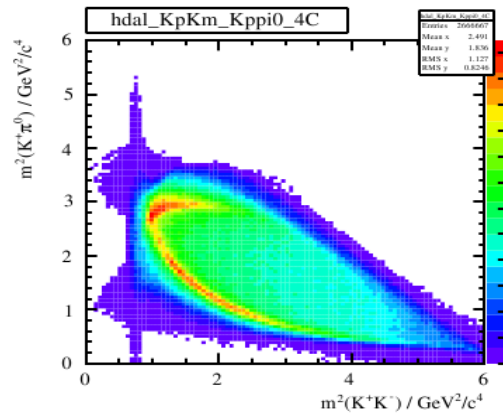
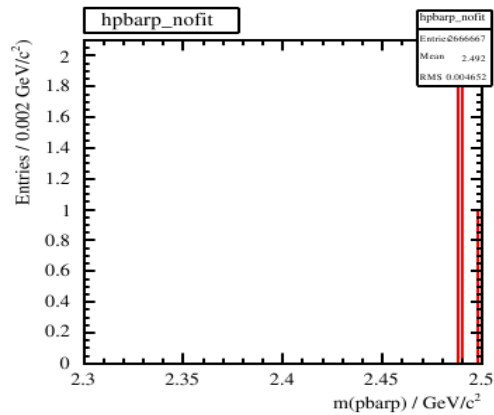
$K^+K^-\pi^0$ - Production angles



no efficiency correction

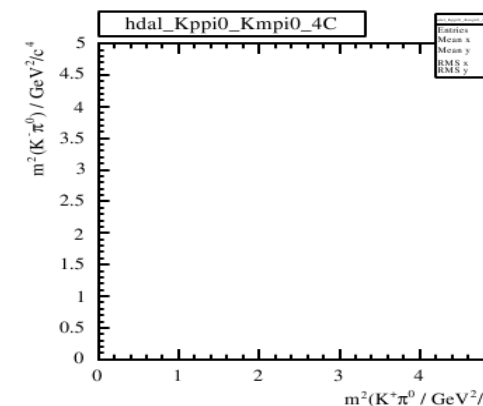
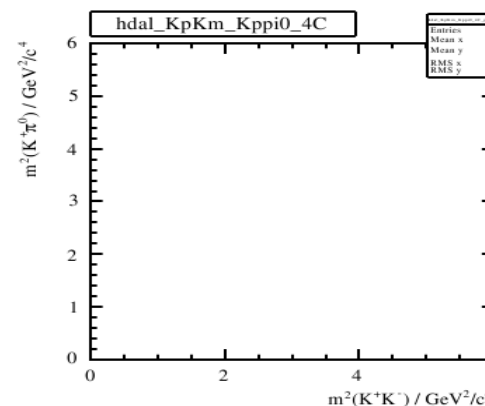
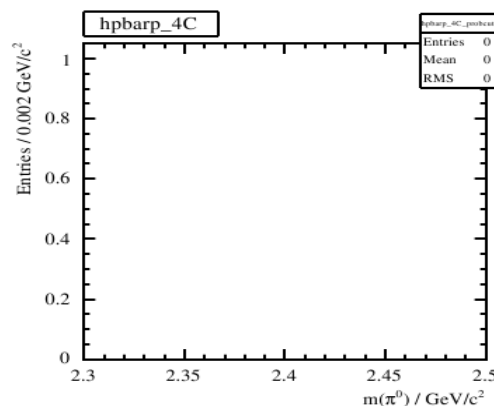
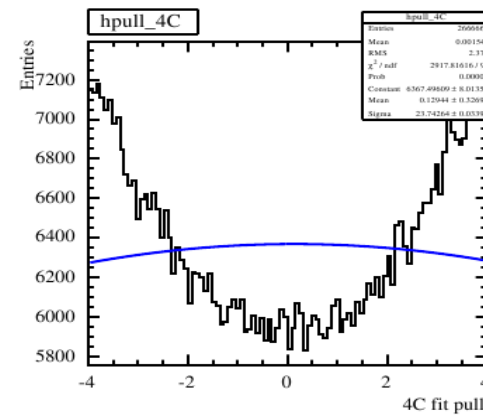
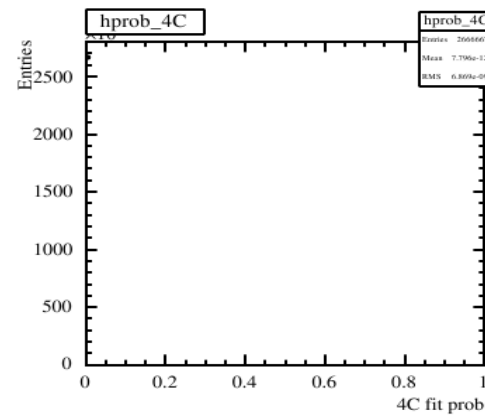
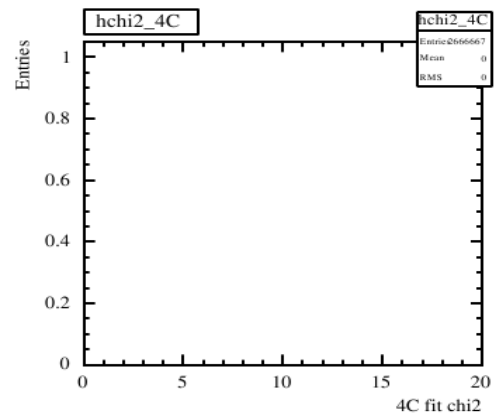
$p_p^- = 2 \text{ GeV}/c$

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



4000000
events generated

4C Fit

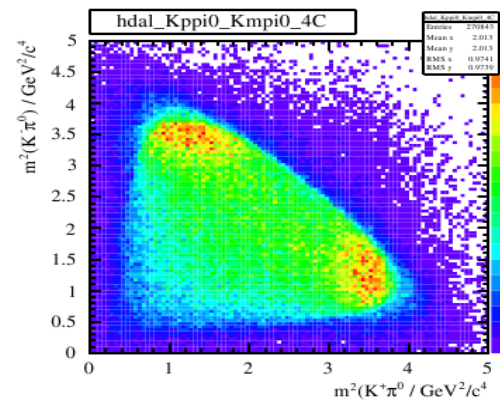
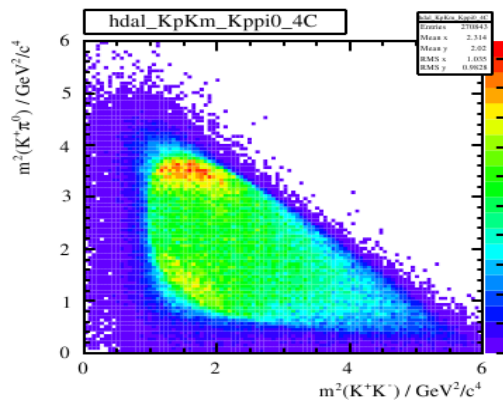
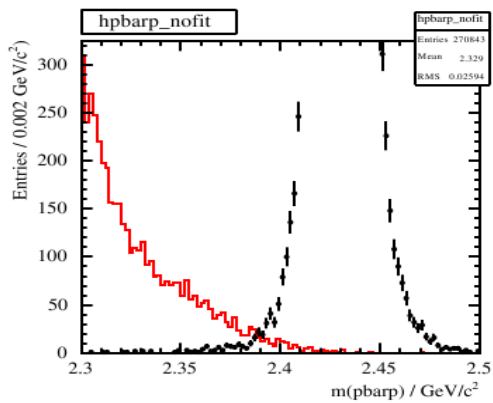


4C Fit $\chi^2 > 0.1$

No events left

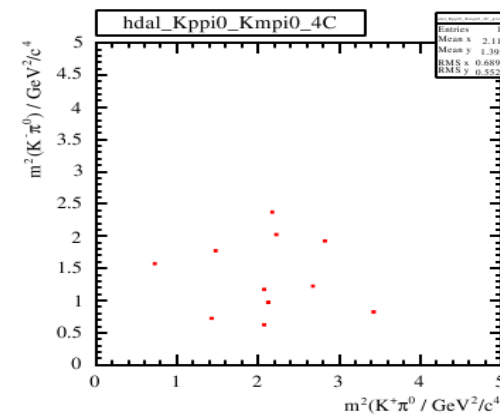
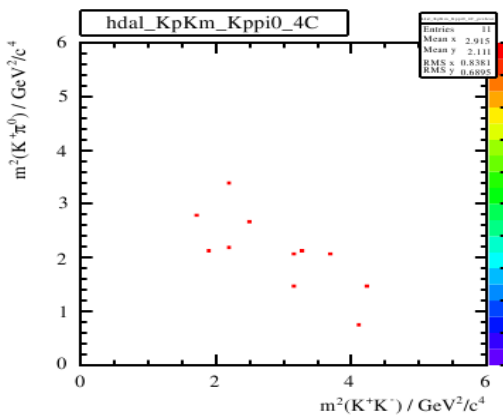
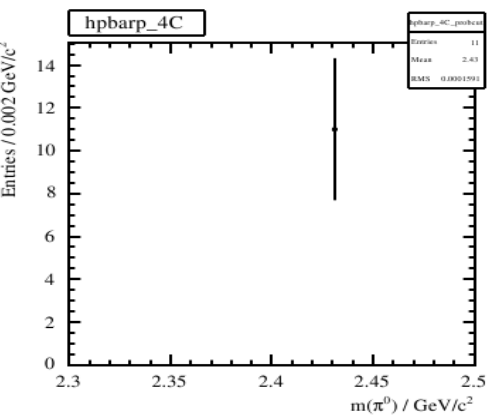
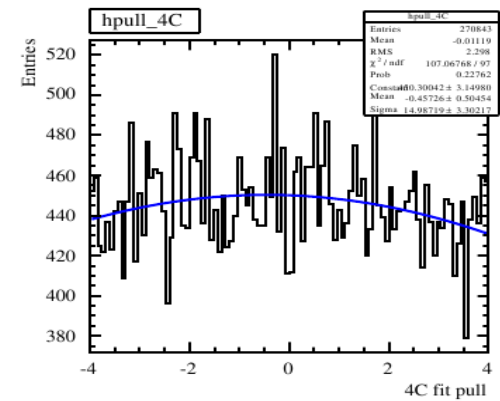
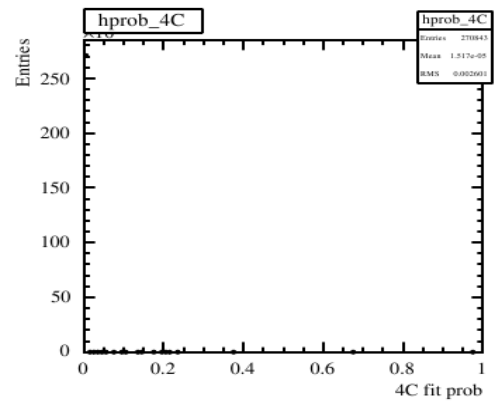
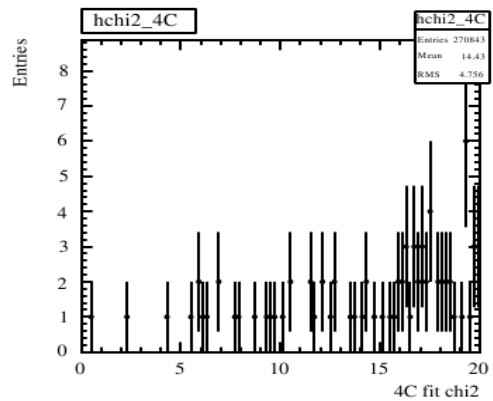
$p_p^- = 2 \text{ GeV}/c$

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



400000
events generated

4C Fit



4C Fit $\chi^2 > 0.1$

11 events left

$p_p^- = 2 \text{ GeV}/c$

Work in progress

- Detector studies
- $\bar{p}p \rightarrow K^+K^-\pi^0$ more background events
- $\bar{p}p \rightarrow K^+K^-\pi^0$ at 15 GeV/c
- $\bar{p}p \rightarrow K^+K^-\pi^0\pi^0$ at 2&15 GeV/c