The study of Light Hadron spectroscopy by using $J/\psi \rightarrow \pi^+\pi^-\pi^0$ channel at *BesIII*

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Motivation

- Decays properties of J/ψ provides an excellent source of an events with which to study Light Hadron spectroscopy and search for Glueballs, Hybrids and Exotic states.

Boss version and Data Sets

- **Boss Version:**

➢ Boss 664p01

➢ 2009 Data with Run No. for MC {-9947,0,-10878}

Event Slection of $J/\psi \rightarrow \pi^+ \pi^- \pi^o$

- **Good Charged Track:**
  - $|V_z| < 10\ cm,\ |V_r| < 1\ cm$ and $|\cos\theta| \leq 0.8$
  - $N_{Good} = 2$

- **PID with dE/dx and TOF:**
  - **Pions:** $Prob\_\pi > Prob\_K$ and $Pro\_\pi > Prob\_p$
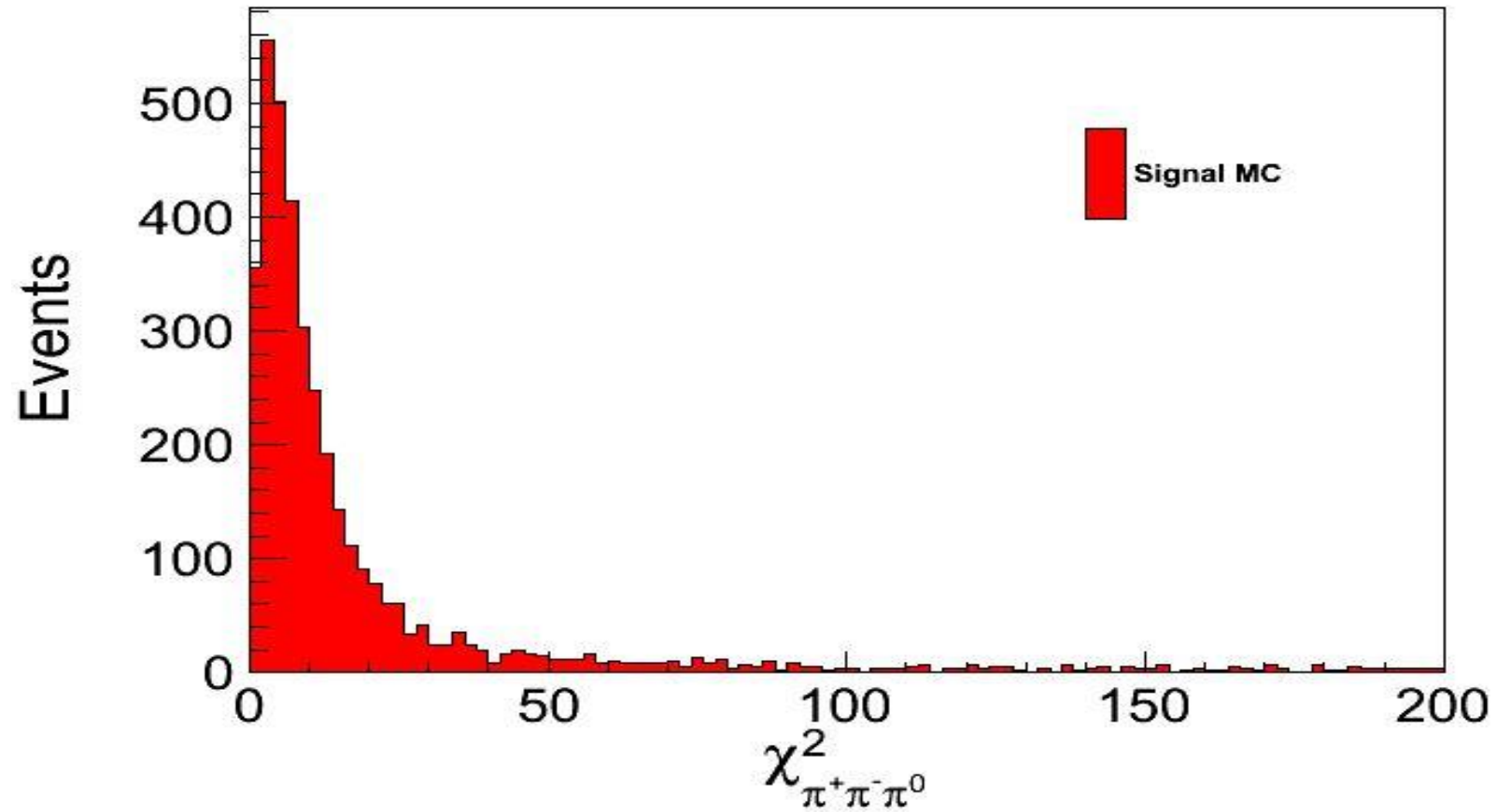 - **At least one pion should Identified:** $N(\pi^+) = N(\pi^-) = 1$

- **Neutral Track:**
  - $N_\gamma \geq 2$
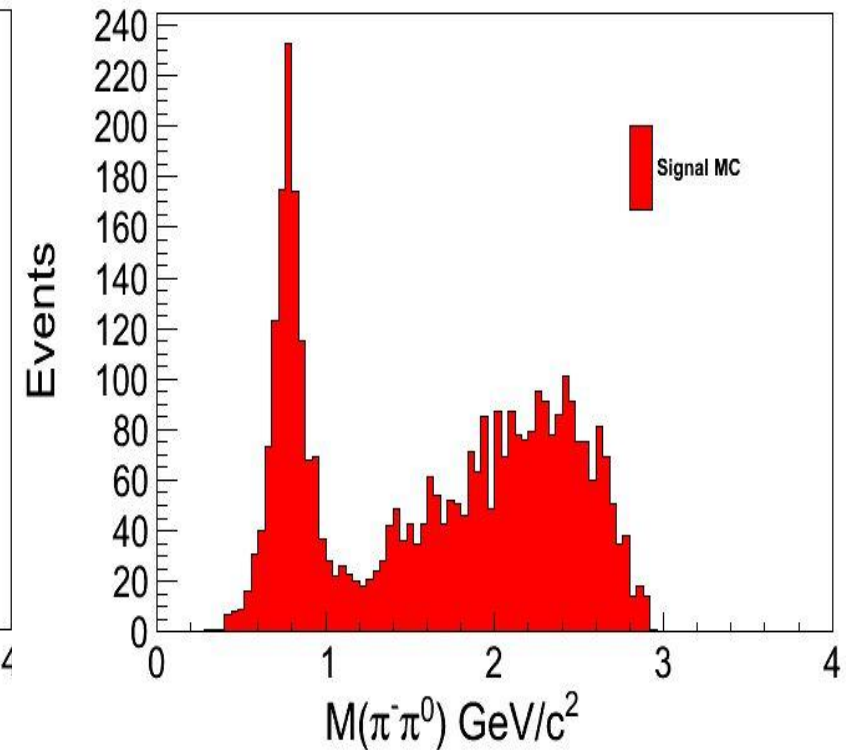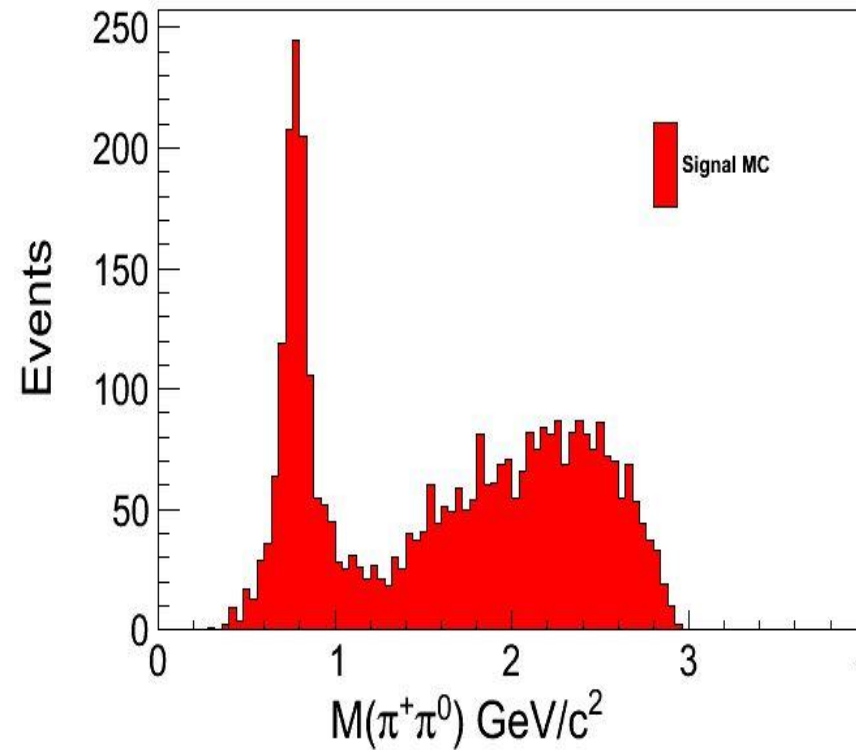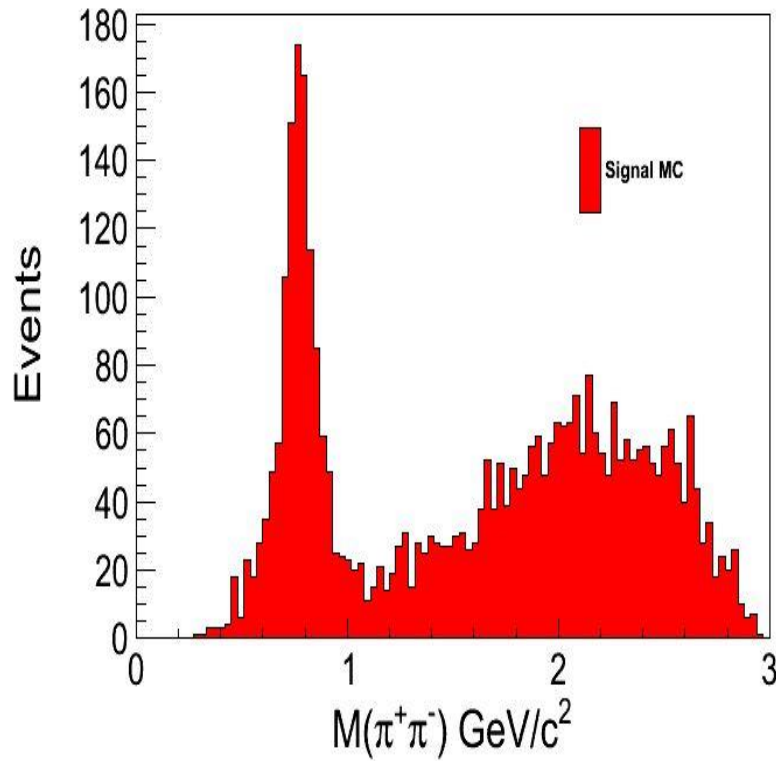
- **Vertex Fit:**
  - $Primary\ Vertex\ (\pi^+\pi^-\pi^0)$

- **Kinematics Fit:**
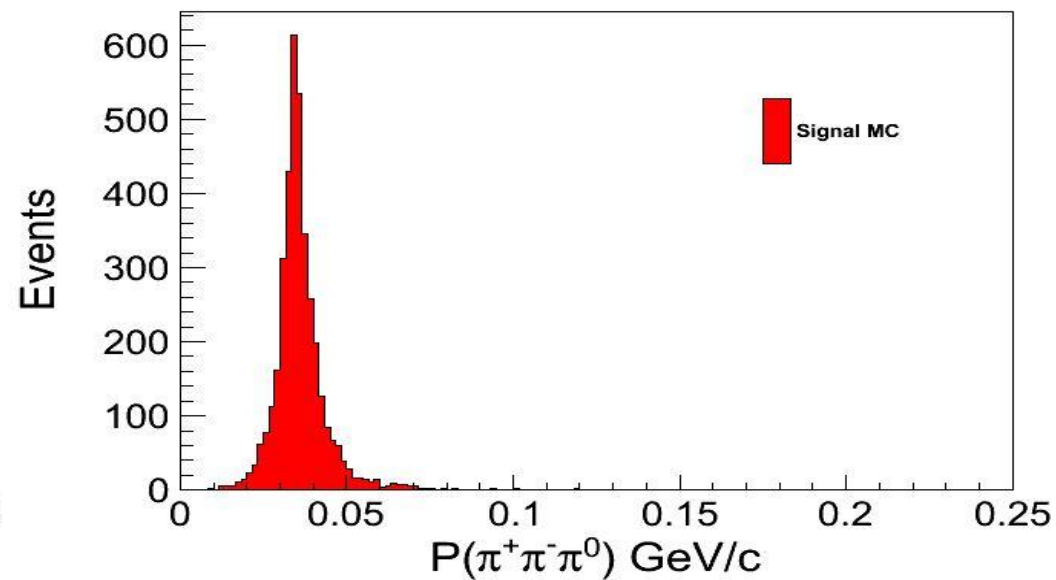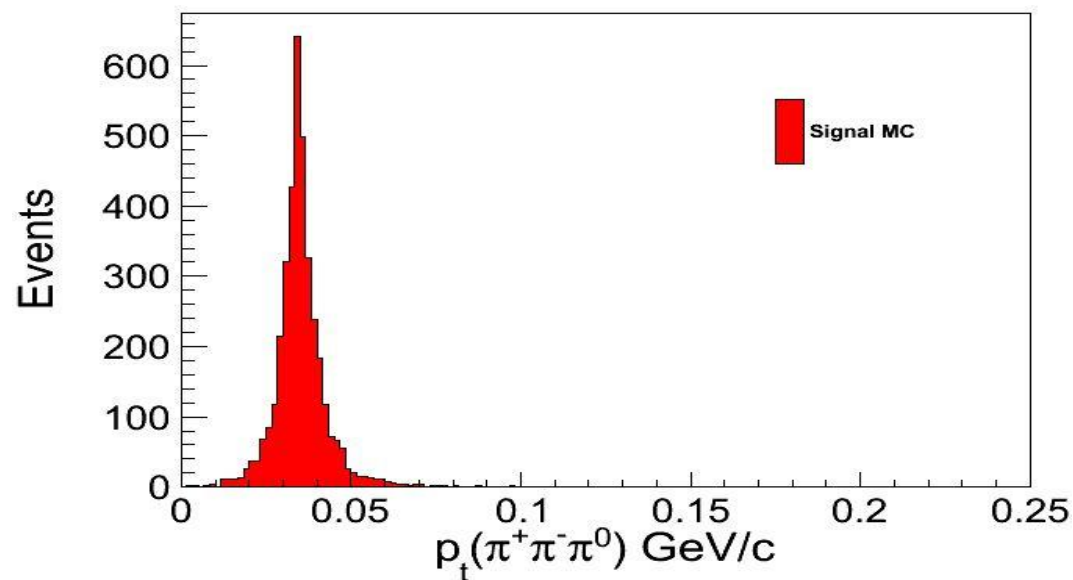 - $\chi^2_{4c}(\pi^+\pi^-\pi^0) < 200$
  - $\chi^2_{5C}(\pi^+\pi^-\pi^0) < 200$

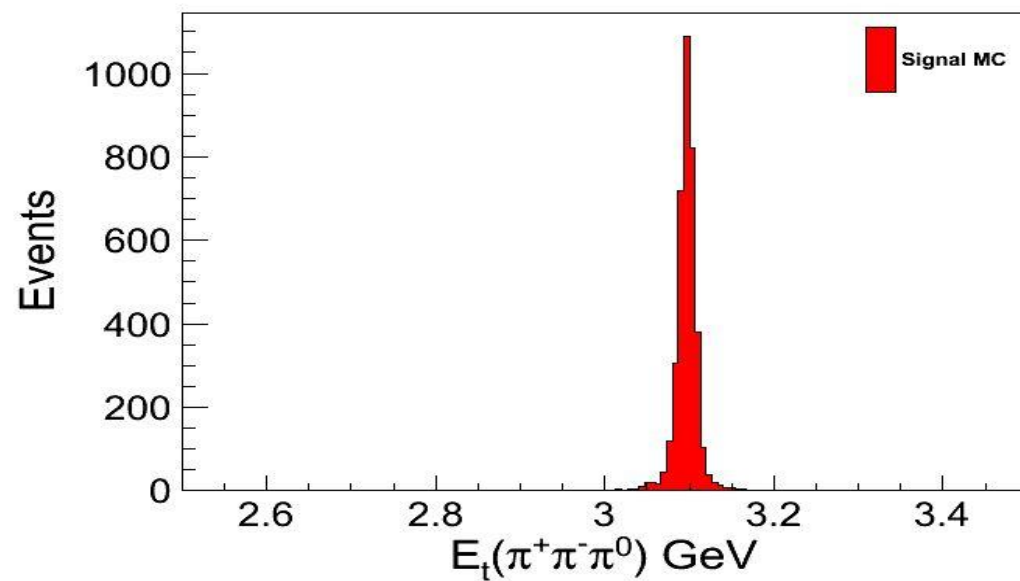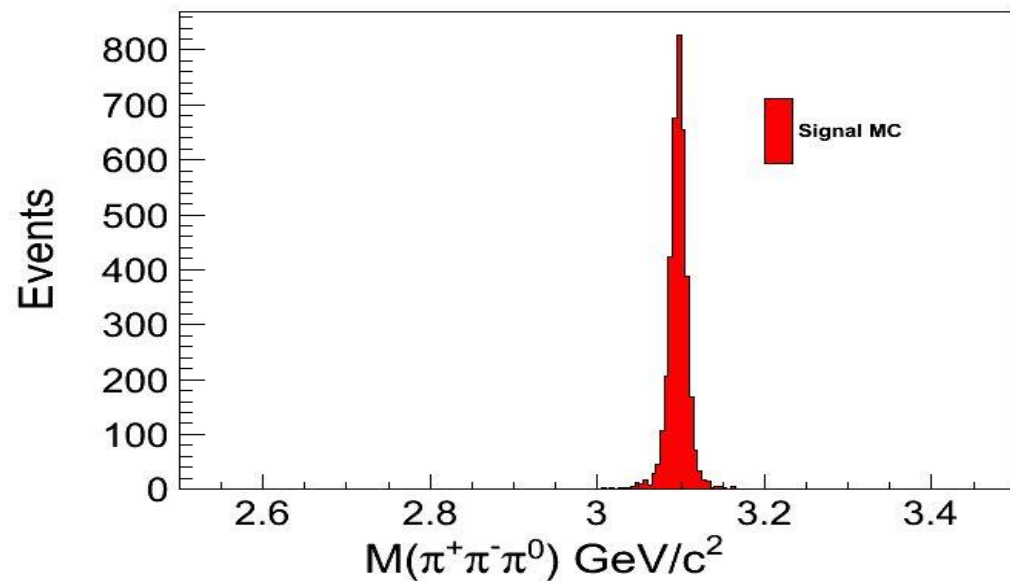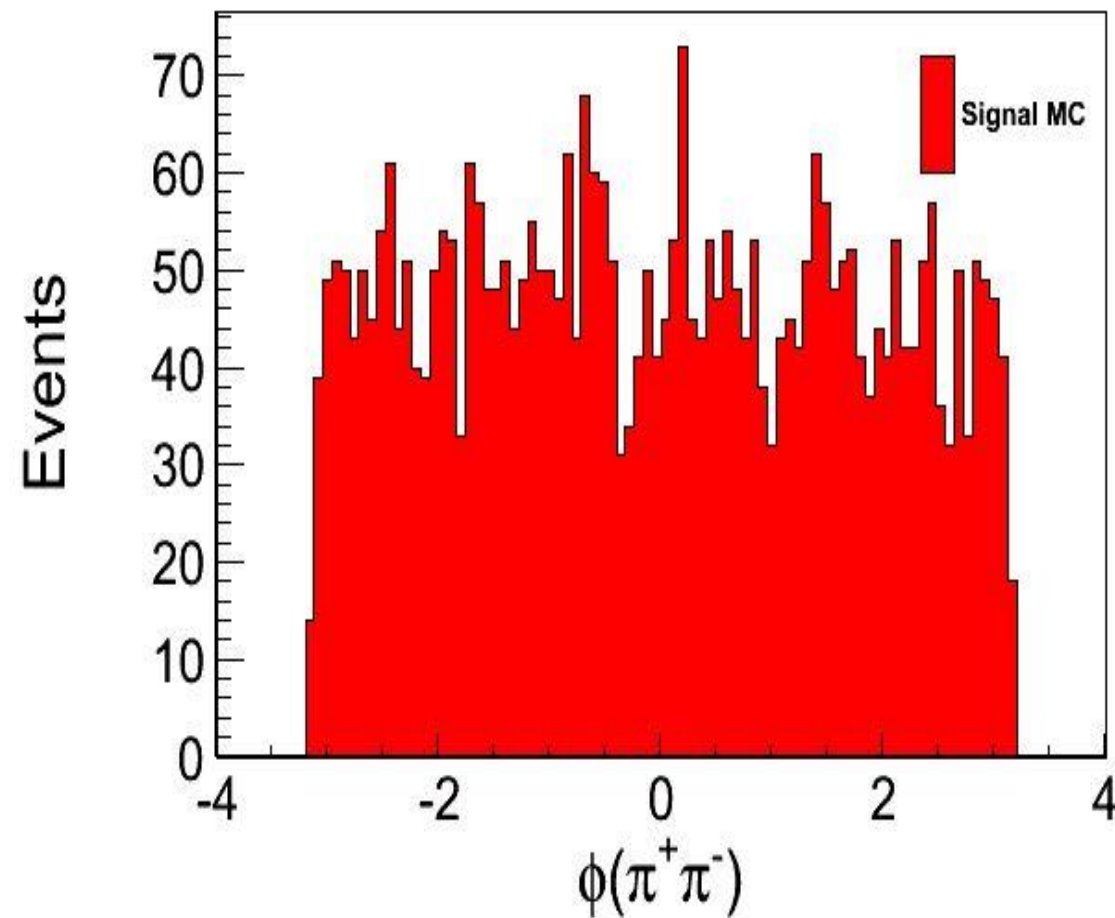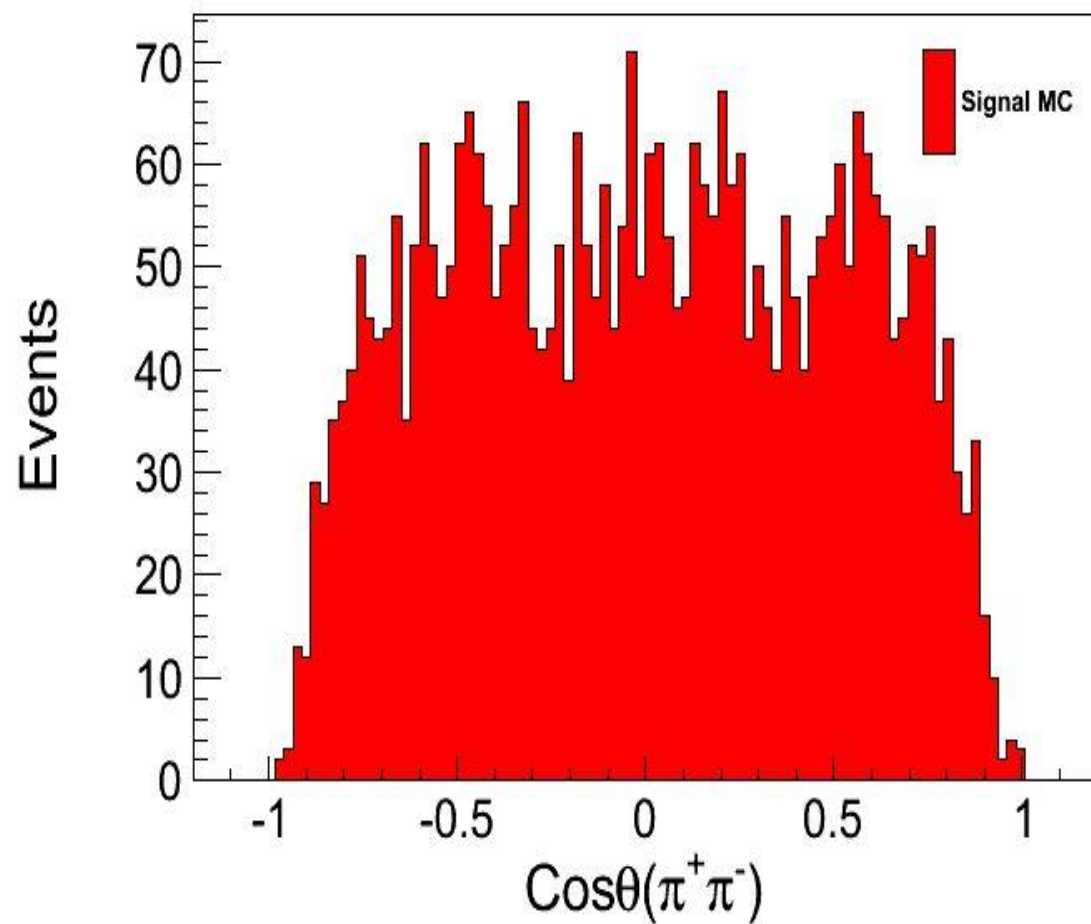# χ_{4c}^2 Distribution of $J/\psi \rightarrow \pi^+\pi^-\pi^o$
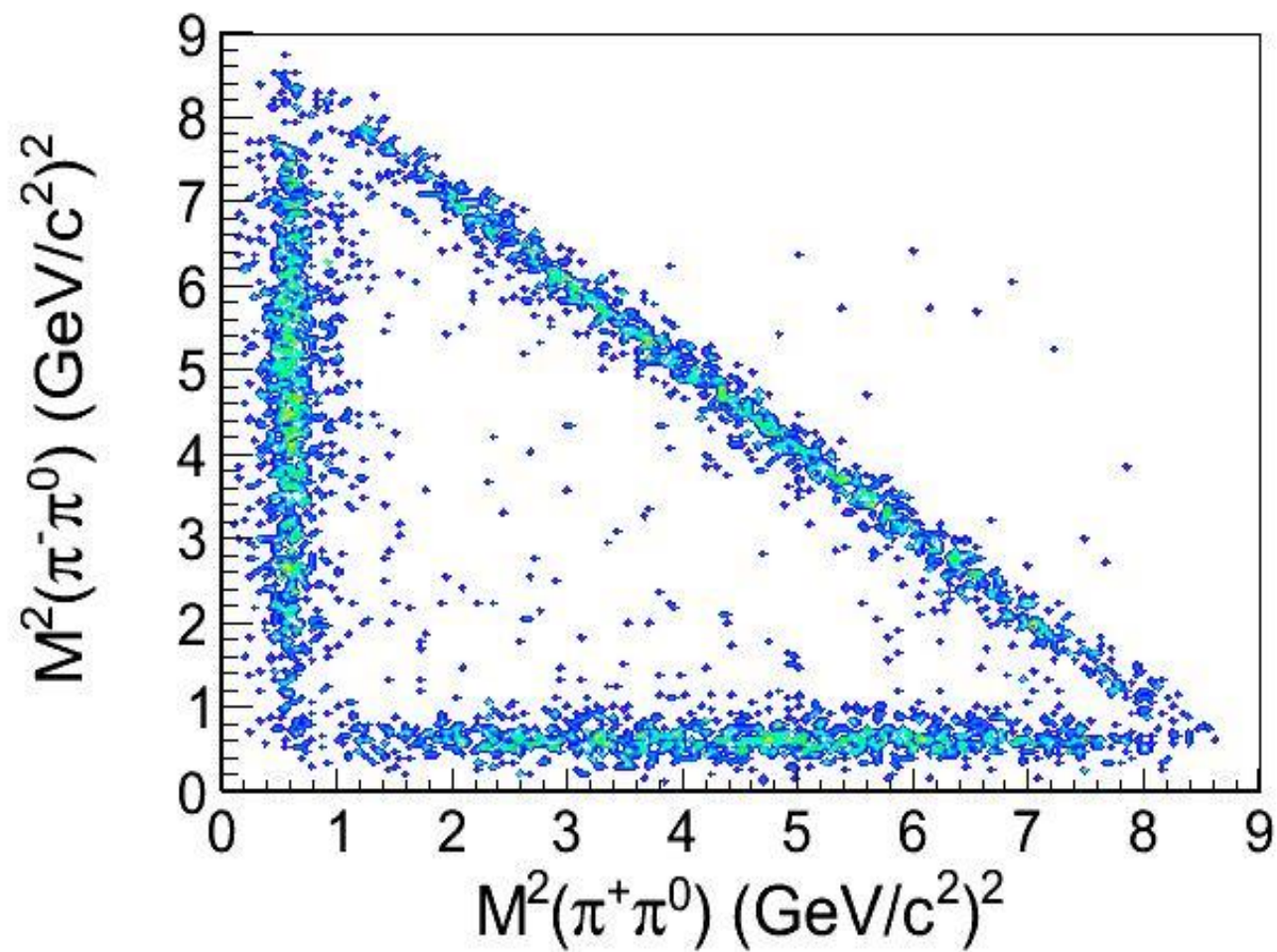
Invariant Mass of pion

$J/\psi \rightarrow \pi^+\pi^-\pi^0$

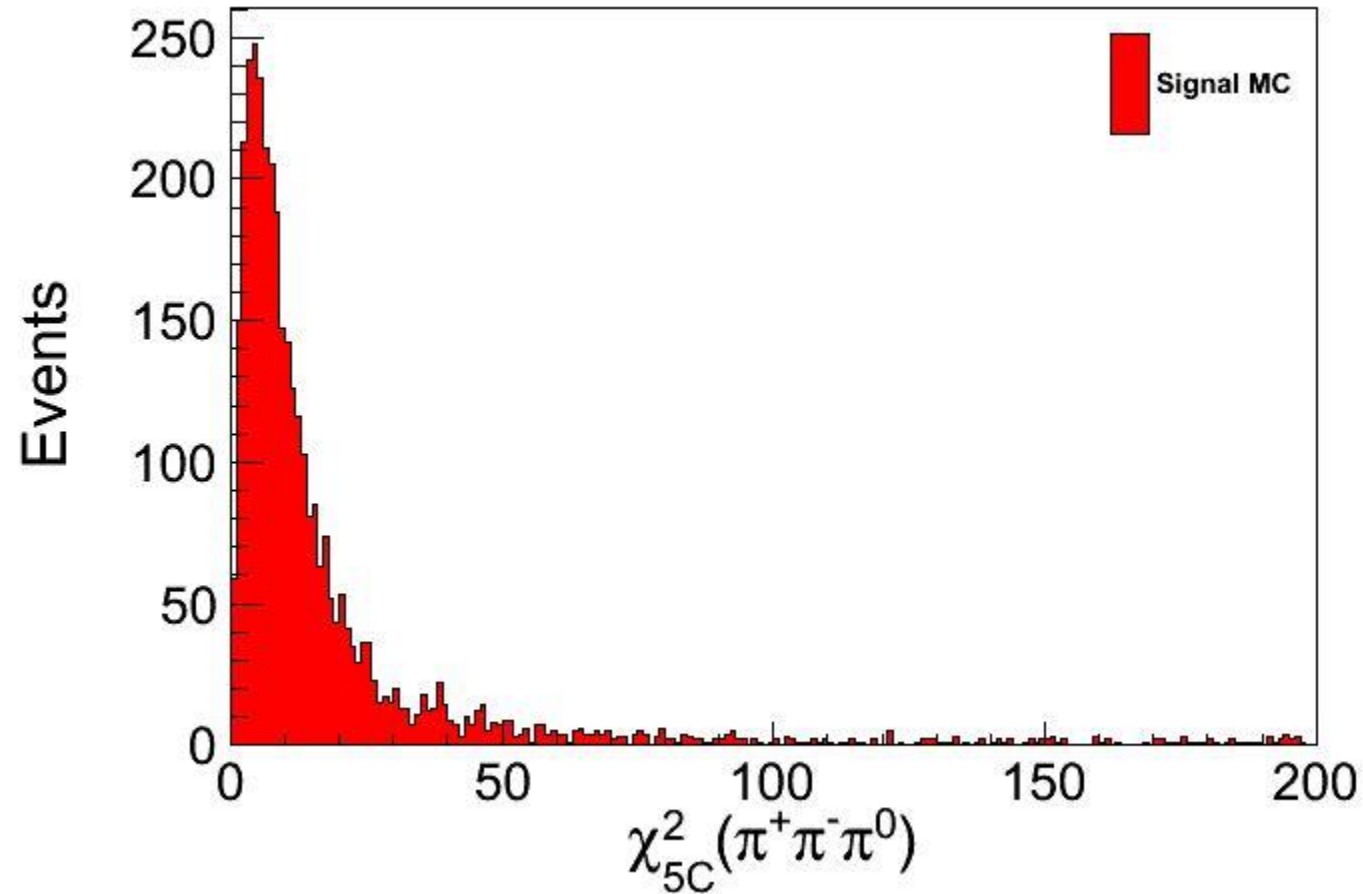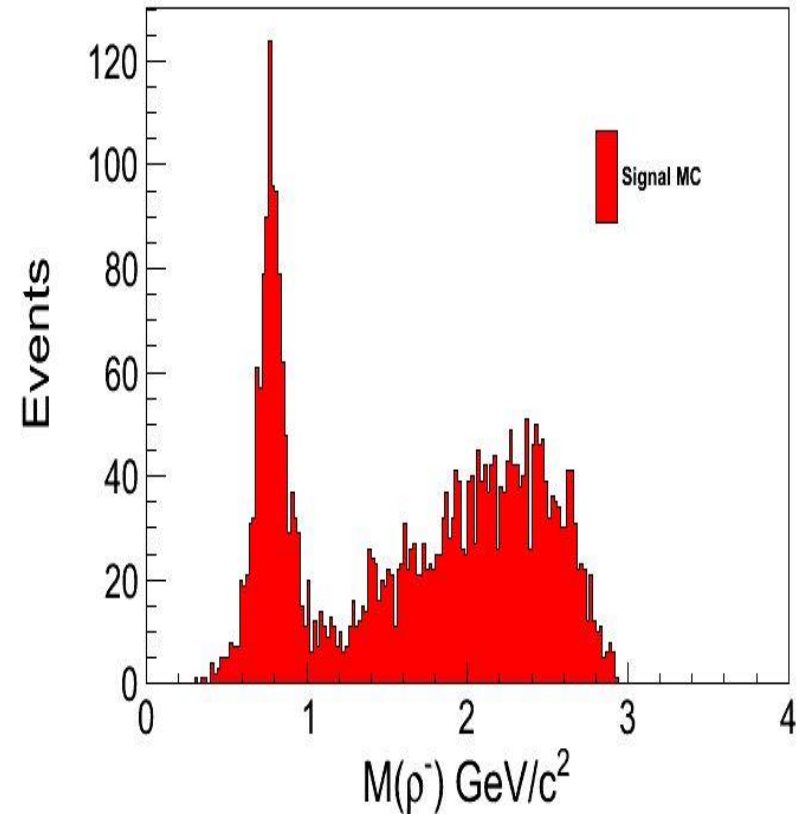# $Cos\theta$ and ϕ Distribution of $\pi^+\pi^-$
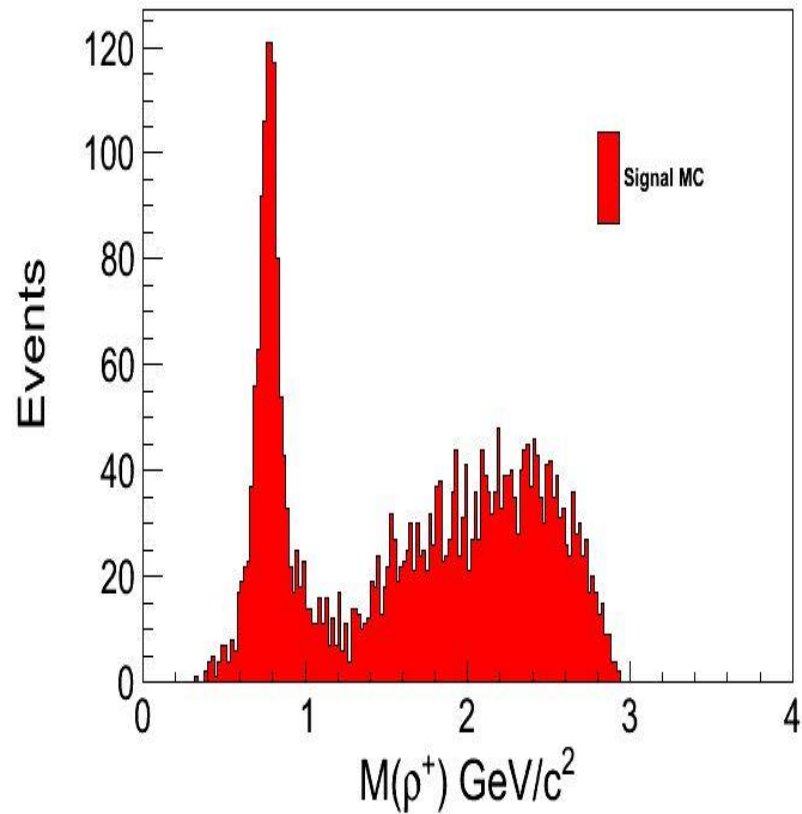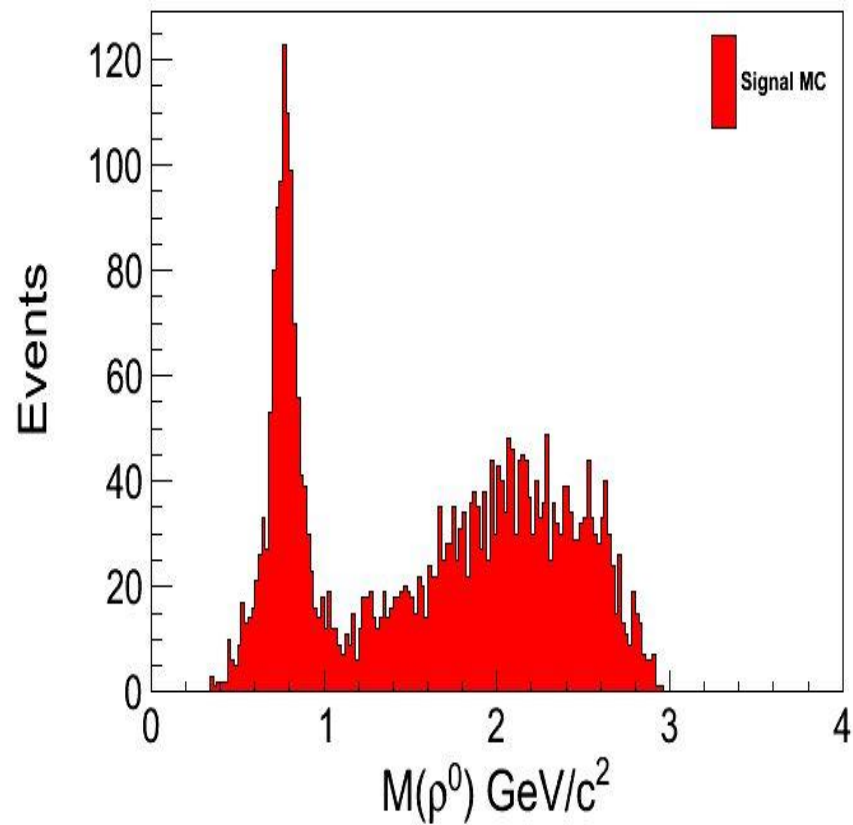
Dalits Plot for J/ψ

ByUsing 5C kinematics Fit

$\chi^2_{5C}(\pi^+\pi^-\pi^0)$ Distribution of J/ψ
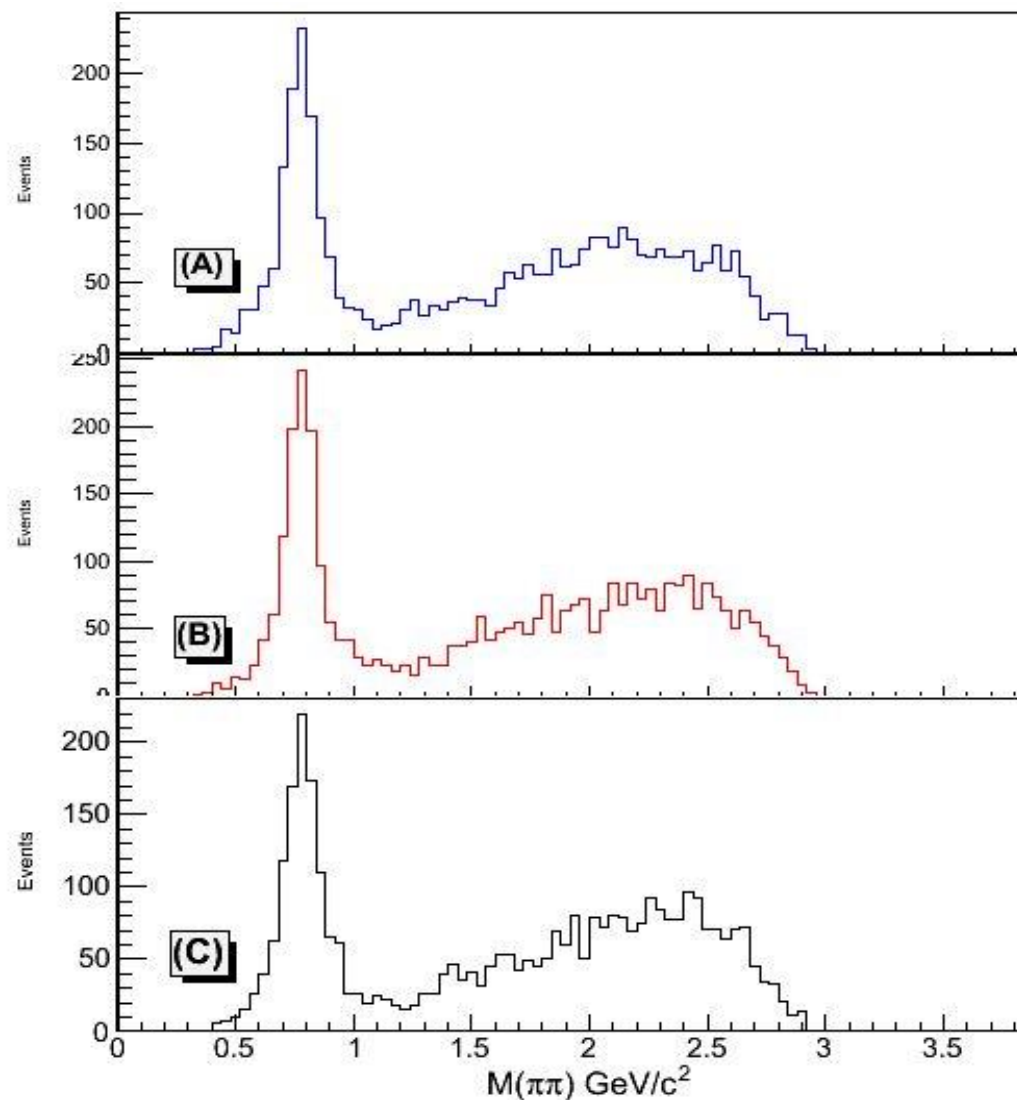
Invariant Mass of ρ

Invariant Mass of $\rho^o(\pi^+\pi^-)$, $\rho^+(\pi^+\pi^0)$ and $\rho^-(\pi^-\pi^0)$

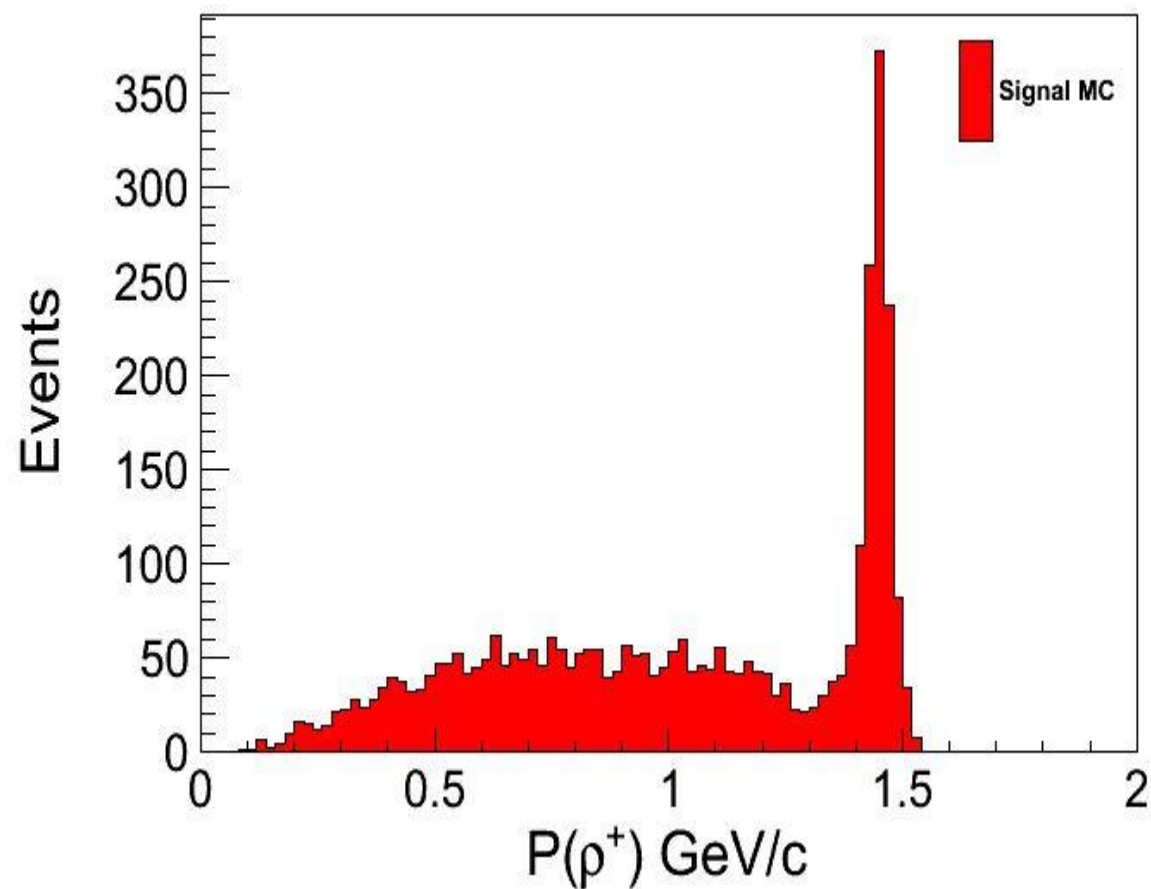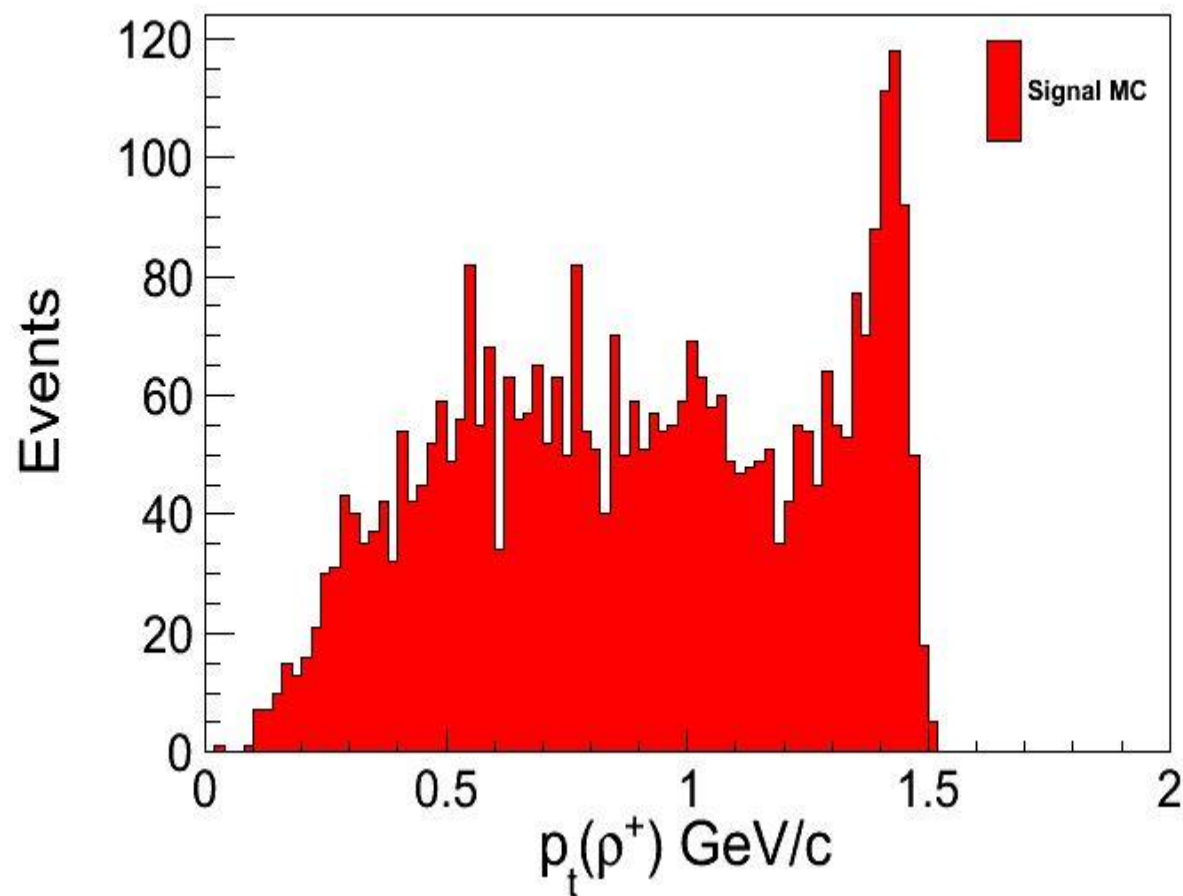- The distributions of the Invariant Mass of two pions by using Fit5c as:

➢ (A) $M(\pi^+\pi^-)$

➢ (B) $M(\pi^+\pi^0)$

➢ (C) $M(\pi^-\pi^0)$

Transverse Momentum and 3 Momentum of ρ^+

cosθ Distribution of ρ^+