# BESIII Oxford Group Meeting

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# Introduction

- $D \to K^+K^-\pi^+\pi^-$ analysis

- Fit to $m_{BC}$ to obtain single tag yields
  - Signal PDF shape taken from signal MC
  - Peaking backgrounds studied with inclusive MC and fixed with Gaussian PDF shape
  - Obtained yields for $KK\pi\pi$, $KK$ and $\pi\pi$ so far
  - Need neutral particle truth matching for the other tag modes

# $KK\pi\pi$ single tag yield

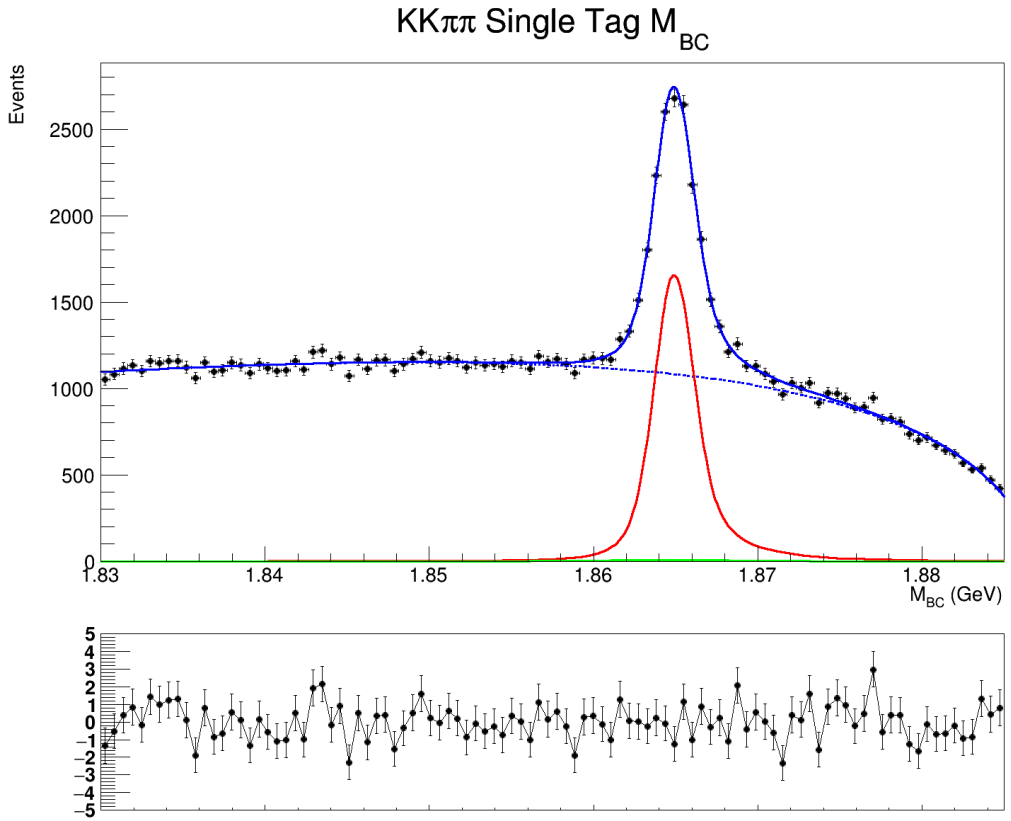
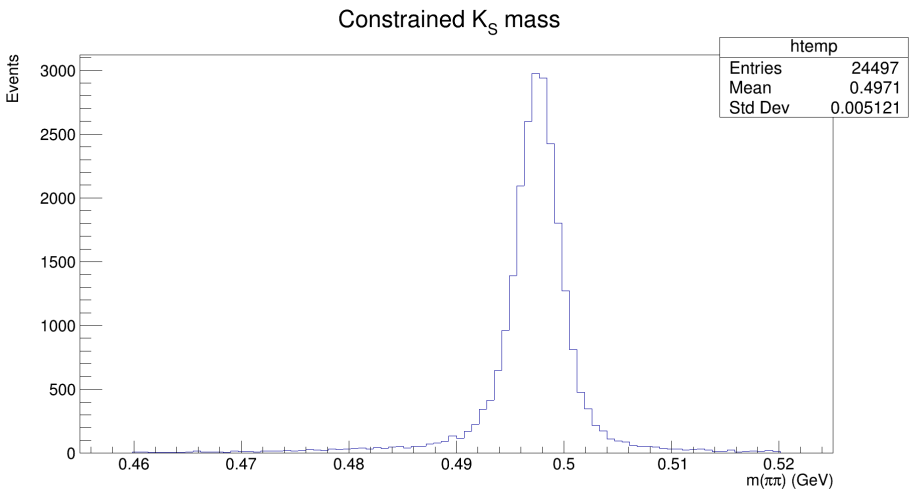



**Figure 1:** $KK\pi\pi$ single tag fit to $m_{\mathrm{BC}}$, yield: $10\,573 \pm 174$

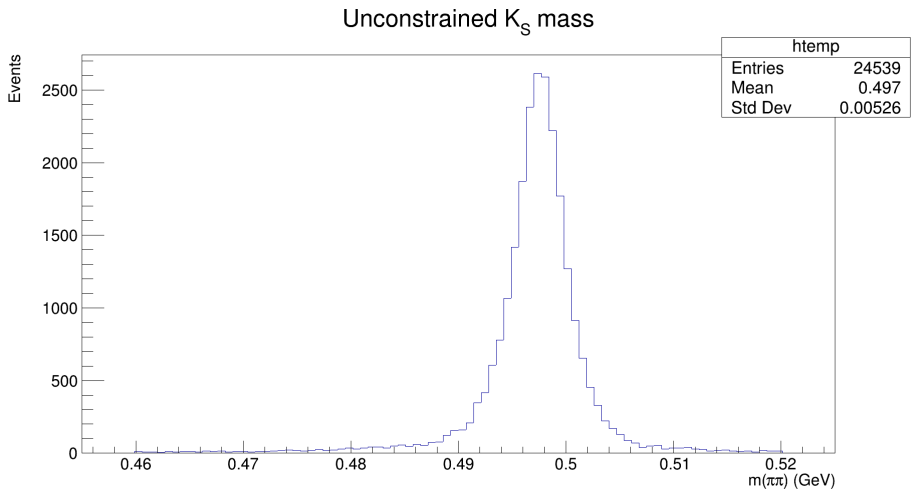
Question: Should I let the mean of the convolved Gaussian shape float?

Question: Mass resolution is around 0.5 MeV, too small?

# $K_S KK$ mass veto



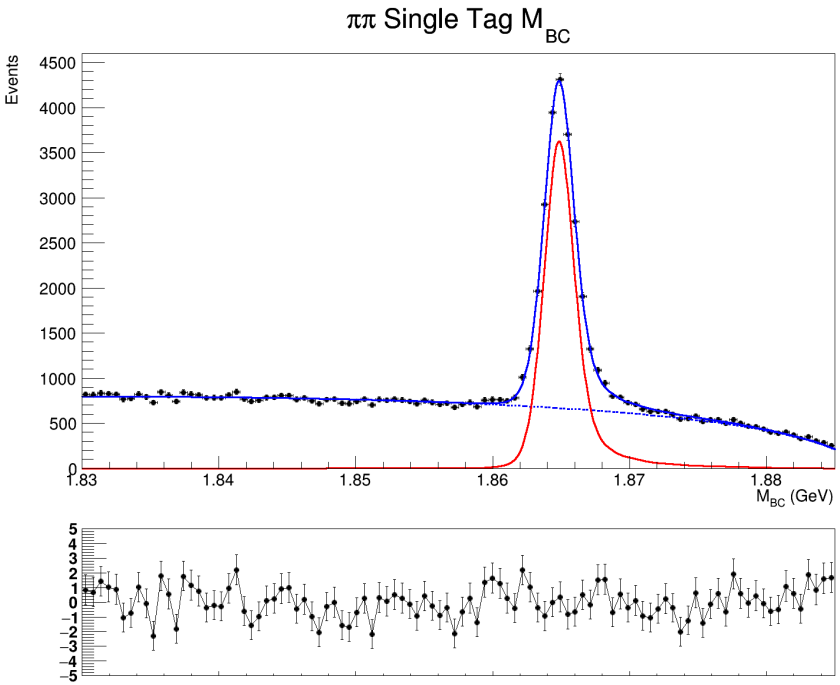

**(a)** $m(\pi\pi)$ constrained



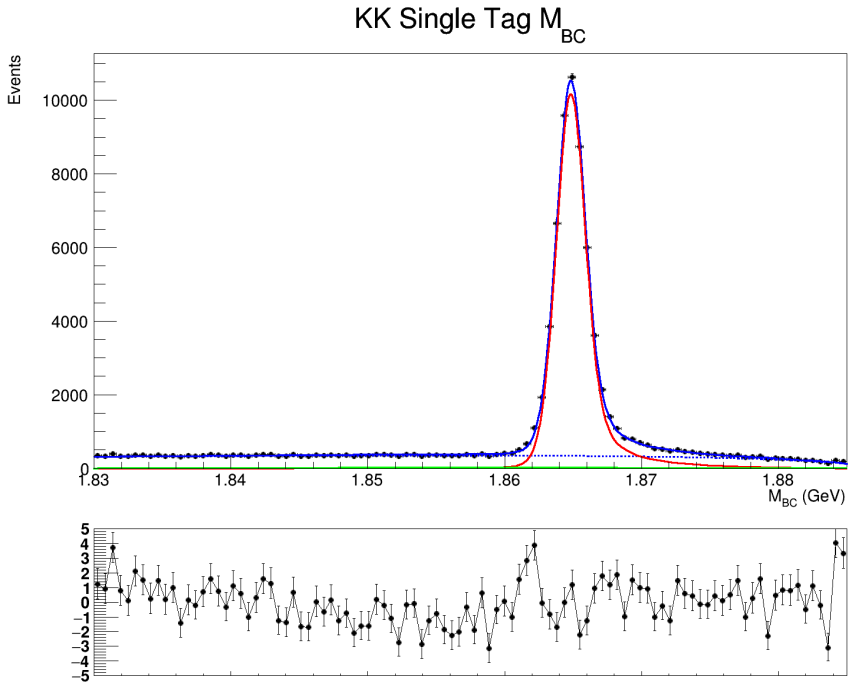

**(b)** $m(\pi\pi)$ unconstrained

Problem: Vertex fit doesn't improve $K_S$ mass resolution...?

# $KK$ and $\pi\pi$ single tag yields




**(a)** $\pi\pi$ single tag yield: $19\,705 \pm 177$




**(b)** $KK$ single tag yield: $53\,934 \pm 249$

- From $K_S KK$ MEMO: $19\,339 \pm 163$ and $53\,481 \pm 247$, respectively
- Lower because $\Delta E$ range was smaller

# Next steps

- Code with neutral particle truth matching running
- Run $m_{\mathrm{BC}}$ fit for other tag modes
- Start with DT yields