$KK\pi$ update

Isobar contributions in low-mass $KK\pi$

Base set of included waves

- Uniform background
- $J = 0$:
  - $a_0\pi^0$
  - $K^{*+}K^-$
  - $K^{*-}K^+$
- $J = 1$:
  - $a_0\pi^0$
  - $K^{*+}K^-$ (L=0, and L=1)
  - $K^{*-}K^+$ (L=0, and L=1)

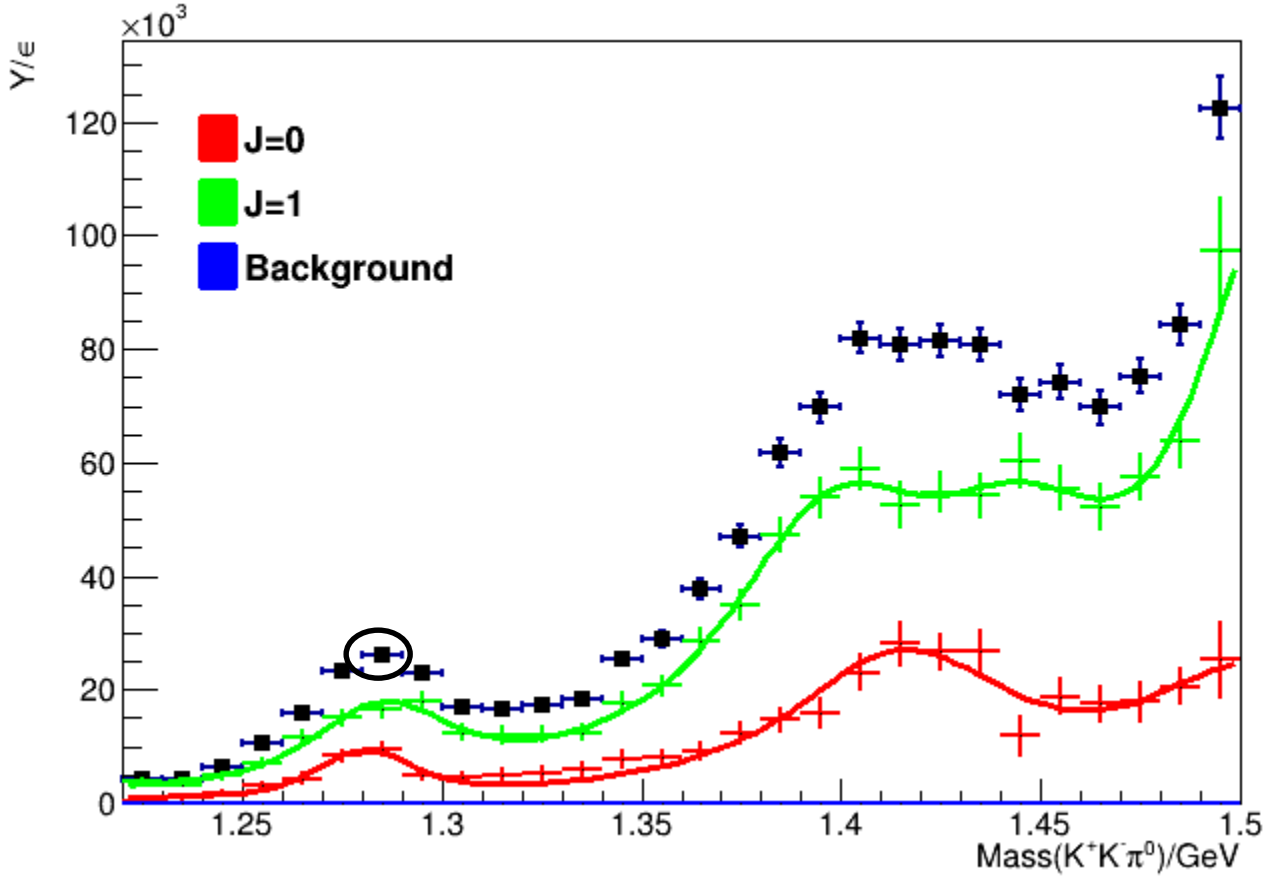
Base set of included waves

- Uniform background
- $J = 0$:
  - $a_0\pi^0$
  - $K^{*+}K^-$
  - $K^{*-}K^+$
- $J = 1$:
  - $a_0\pi^0$
  - $K^{*+}K^-$ (L=0, and L=1)
  - $K^{*-}K^+$ (L=0, and L=1)

NOTE: The use of K^*K contributions in low-mass $KK\pi$ came into question during the collaboration meeting

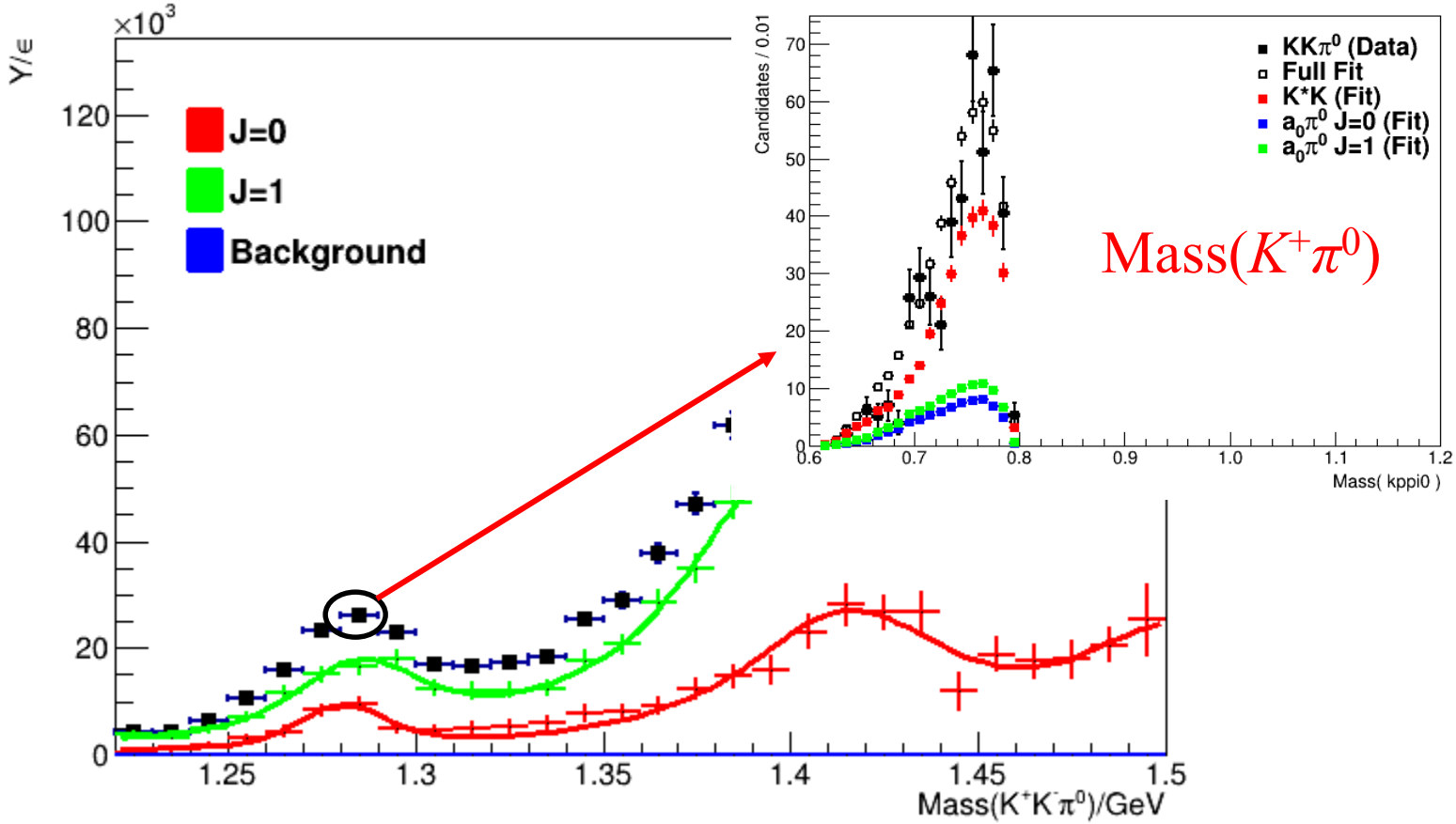
PWA Results for $J = 0,1$ and background

Isobar fit results



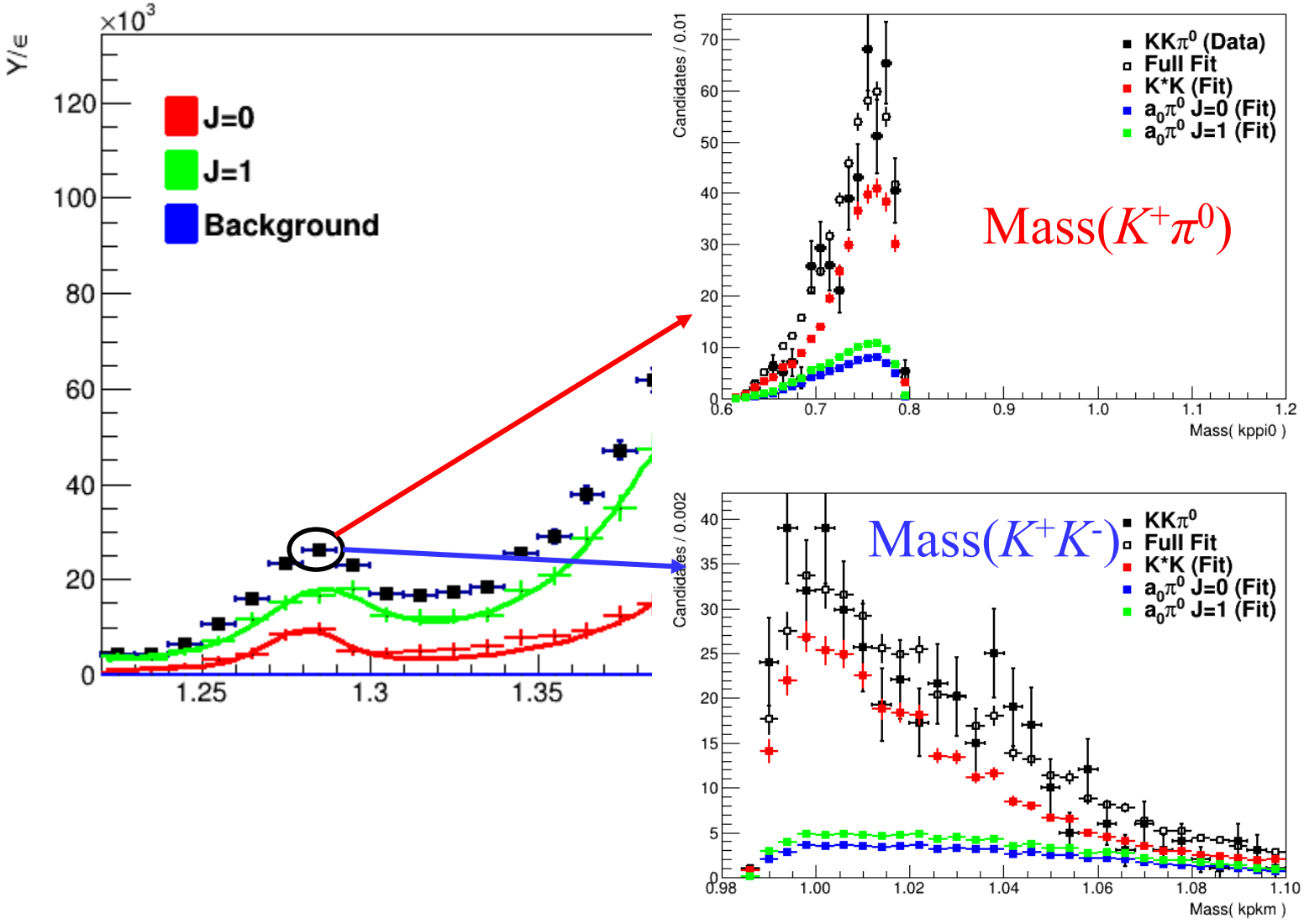
PWA Results for $J = 0,1$ and background

Isobar fit results



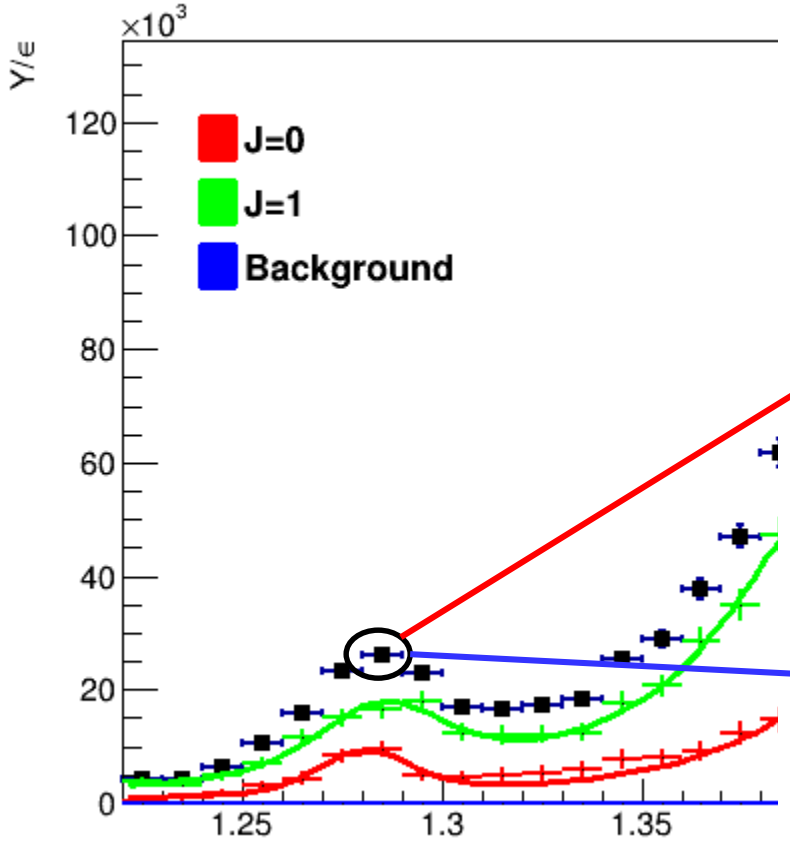
PWA Results for $J = 0,1$ and background

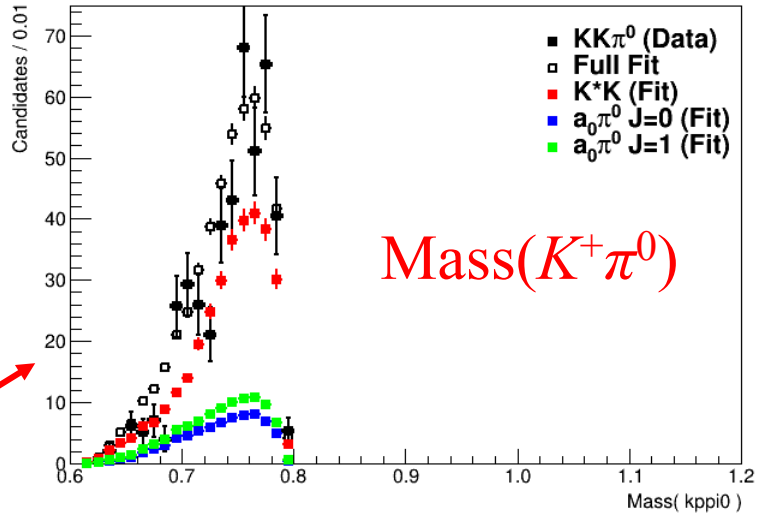
Isobar fit results

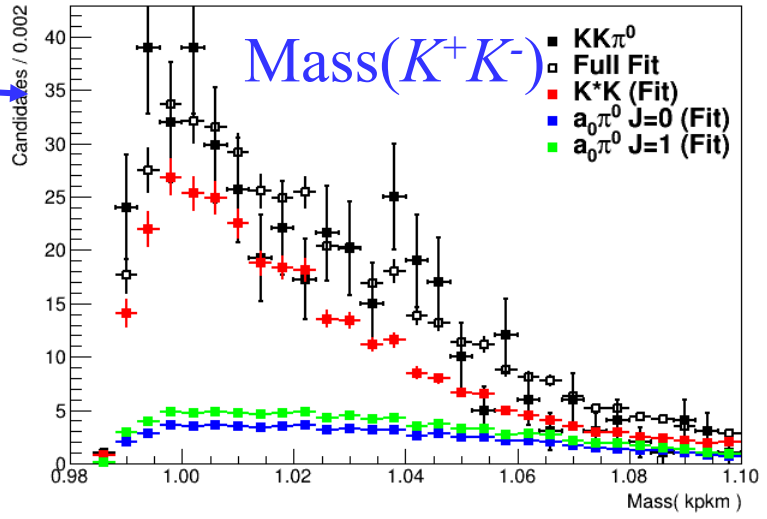


PWA Results for $J = 0,1$ and background

Isobar fit results





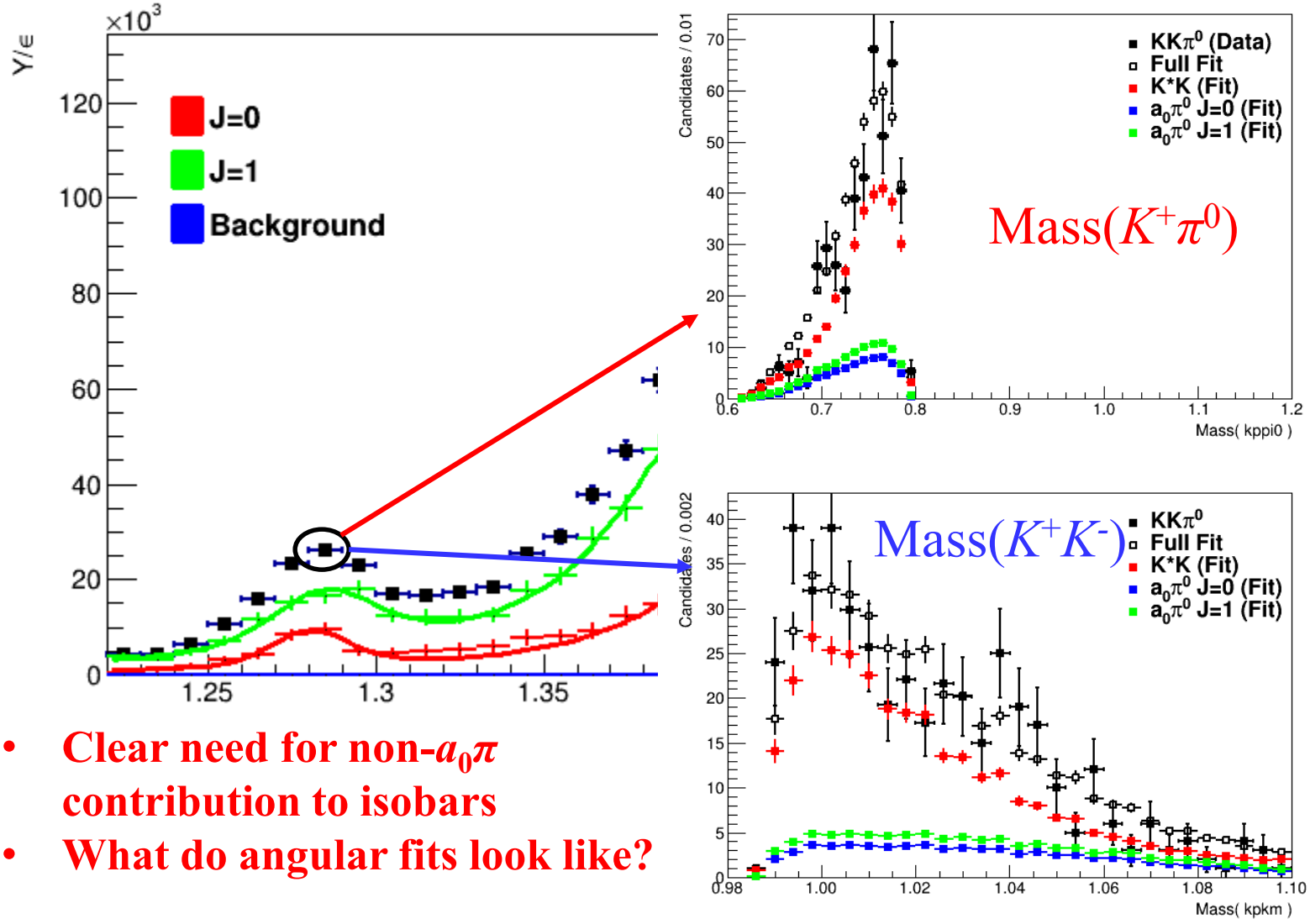


- **Clear need for non-$a_0\pi$ contribution to isobars**

ASU

PWA Results for $J = 0,1$ and background

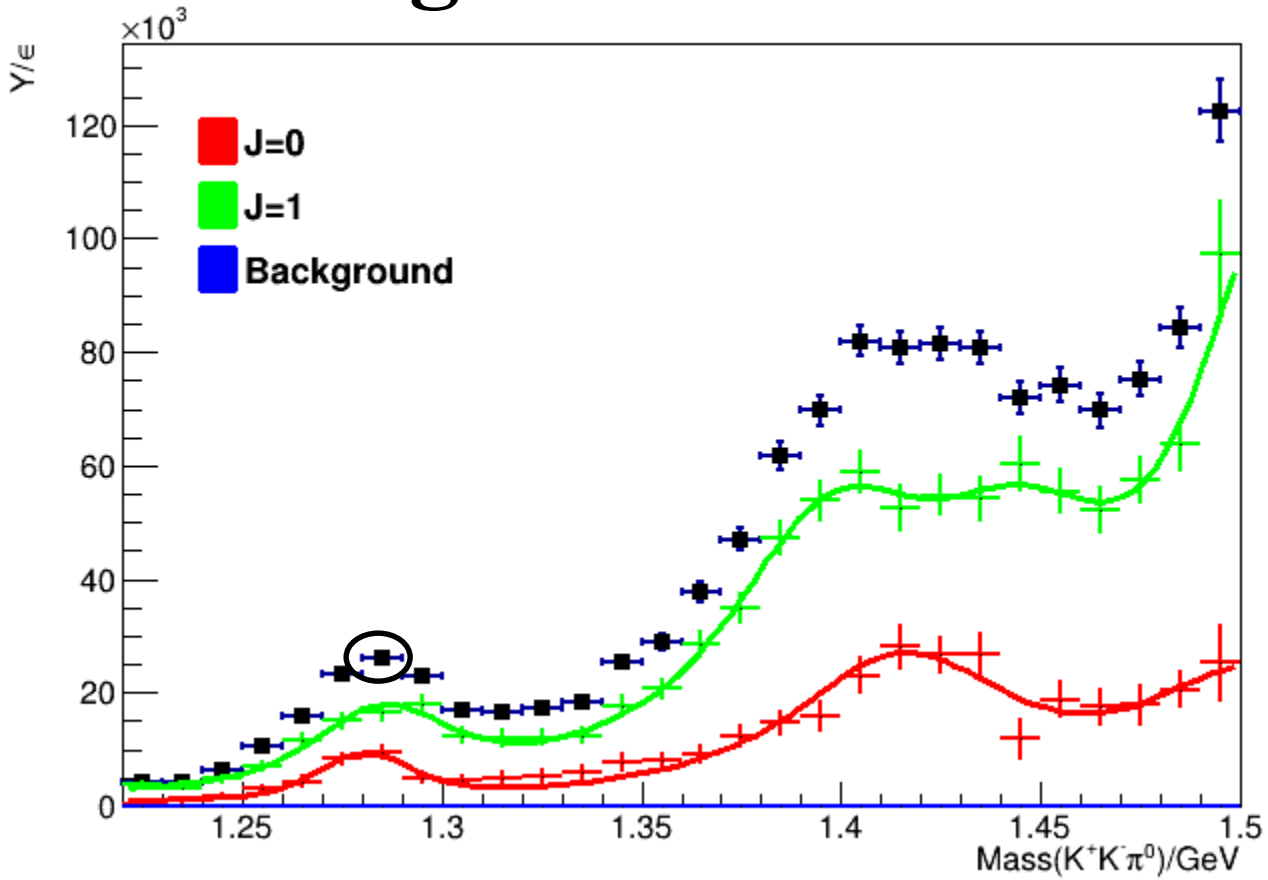
Isobar fit results



- **Clear need for non-$a_0\pi$ contribution to isobars**
- **What do angular fits look like?**

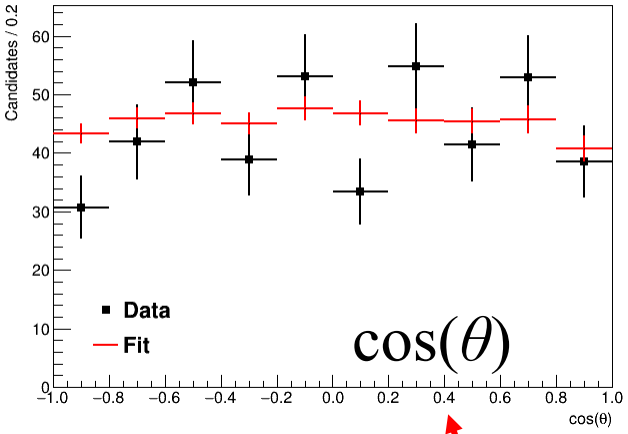
PWA Results for $J = 0,1$ and background

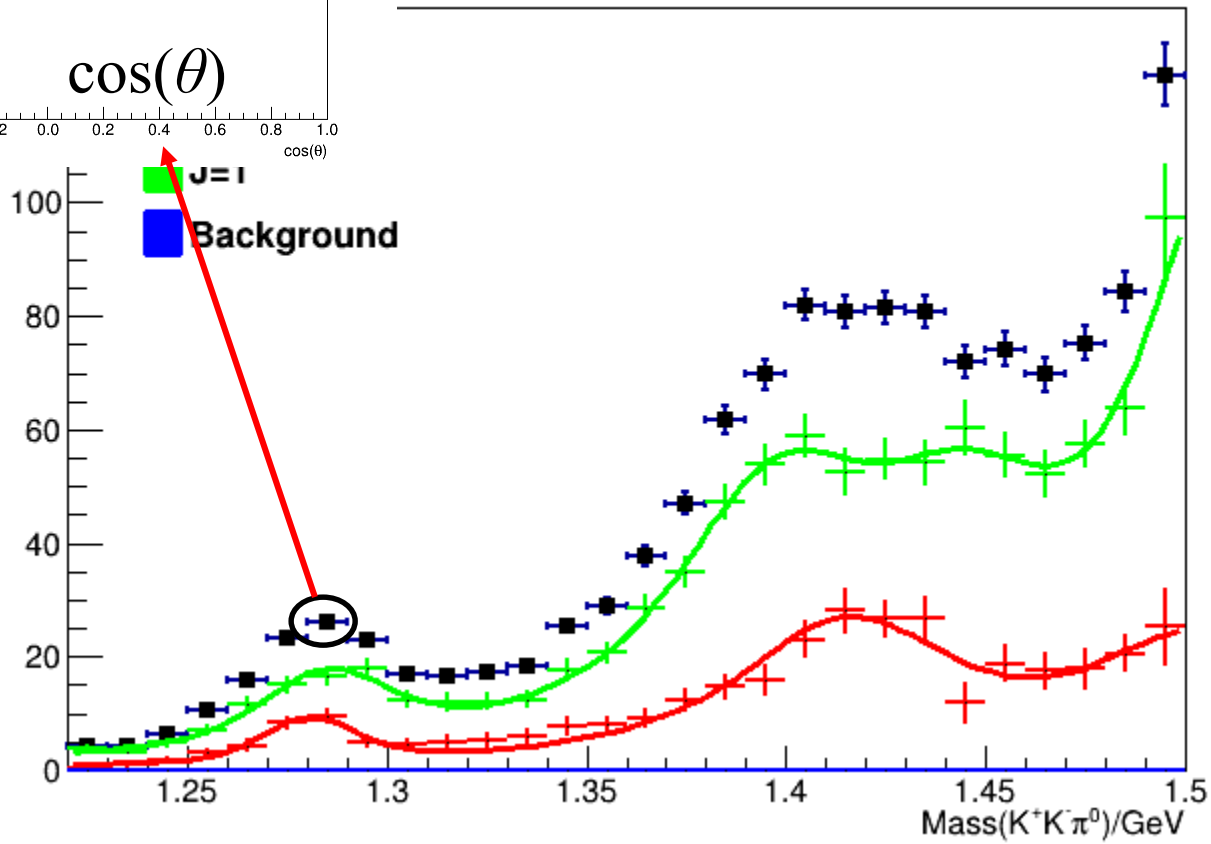
Angular fit results



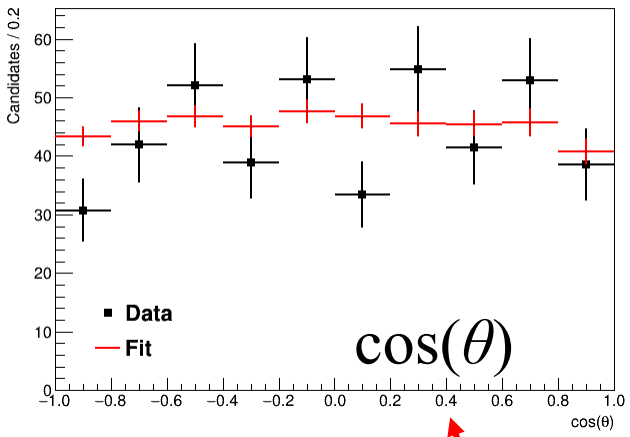
or $J = 0,1$ and background

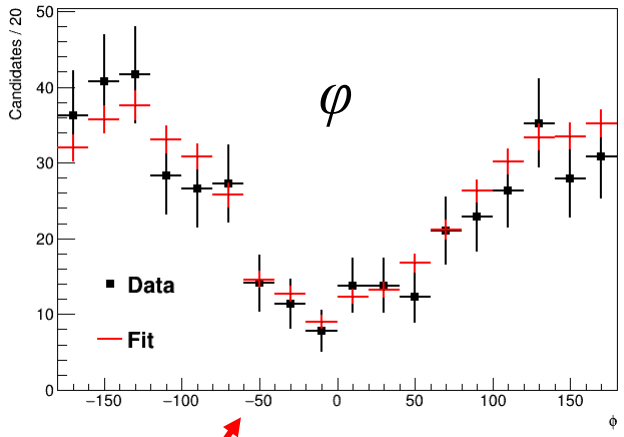
gular fit results

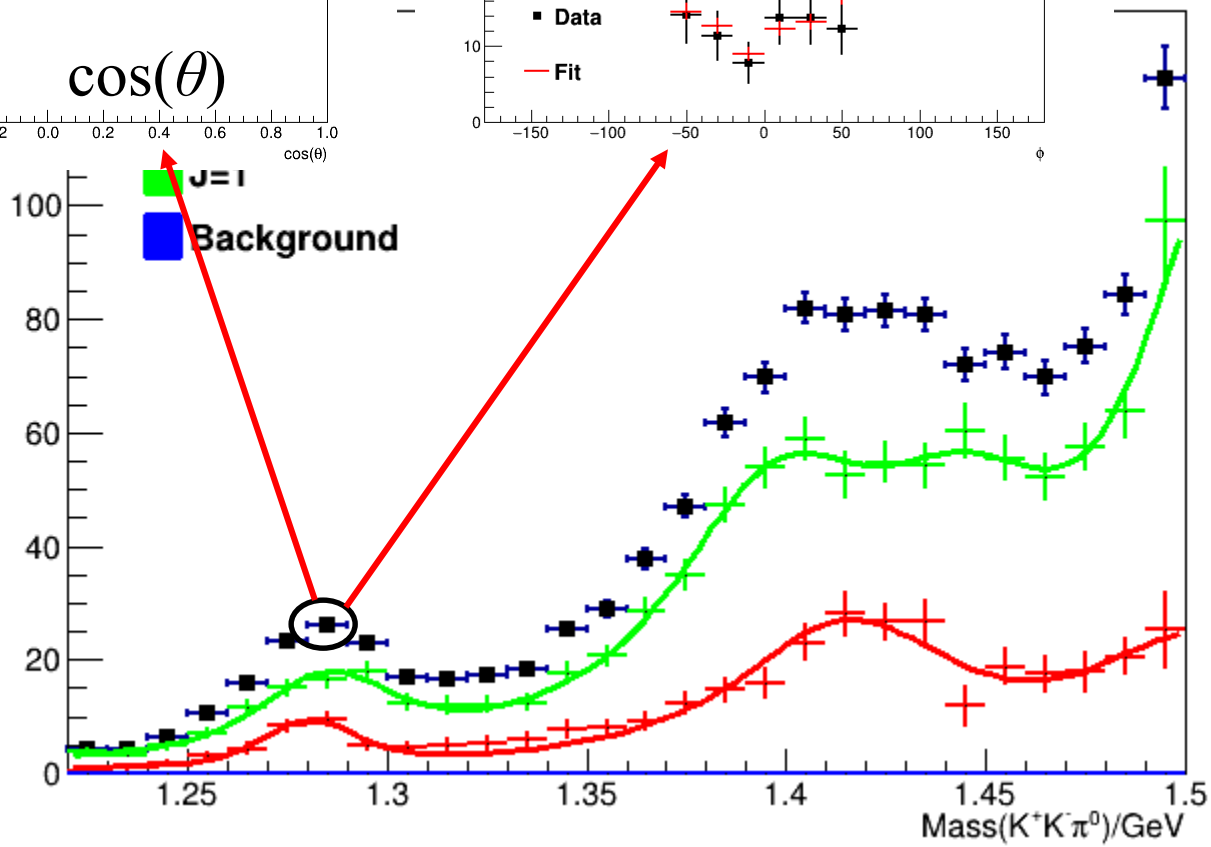




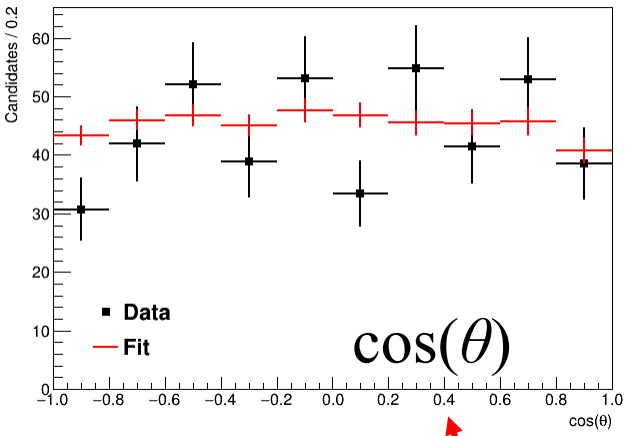
ckground

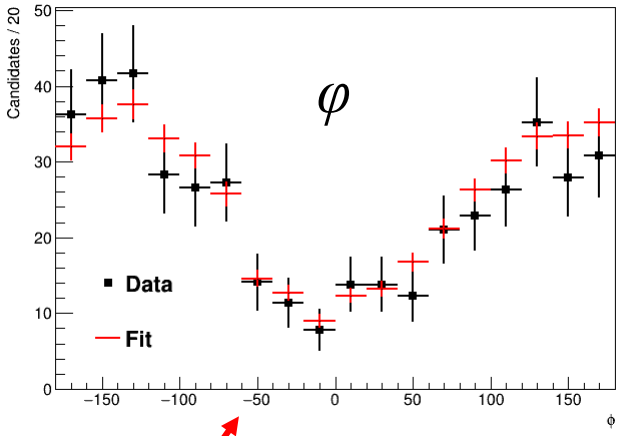

Candidates / 0.2
Data
Fit
cos(θ)
cos(θ)

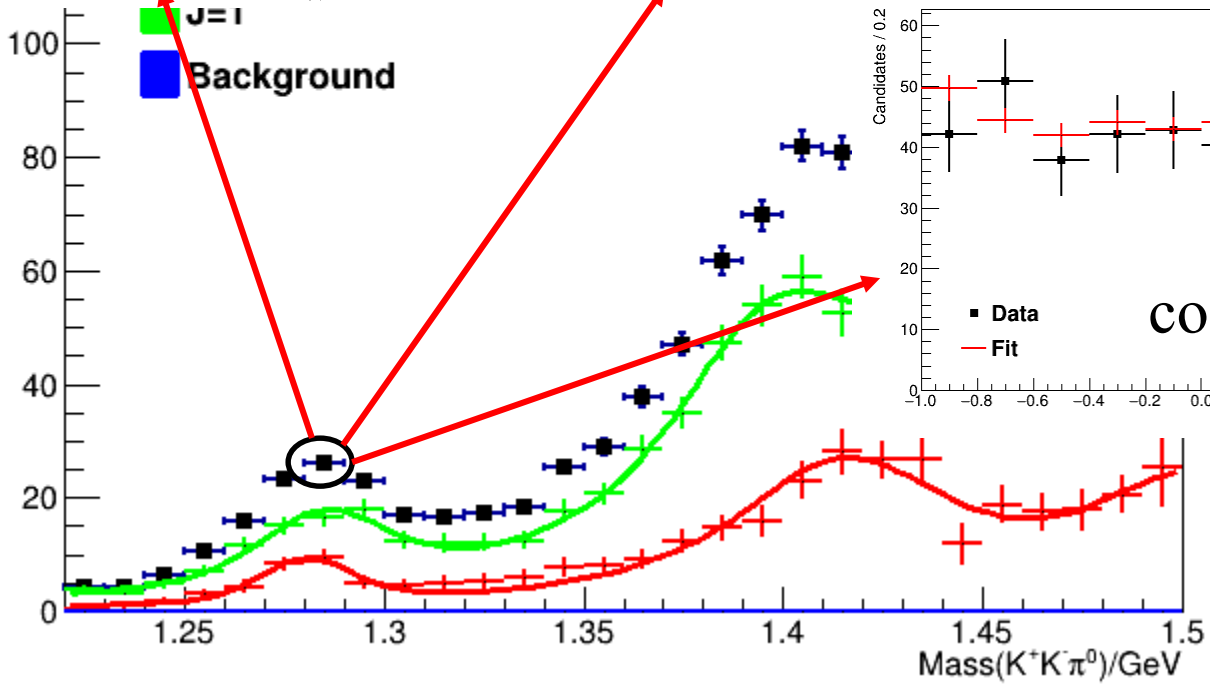

Candidates / 20
φ
Data
Fit
ϕ


J=1
Background
Mass(K⁺K⁻π⁰)/GeV

ckground

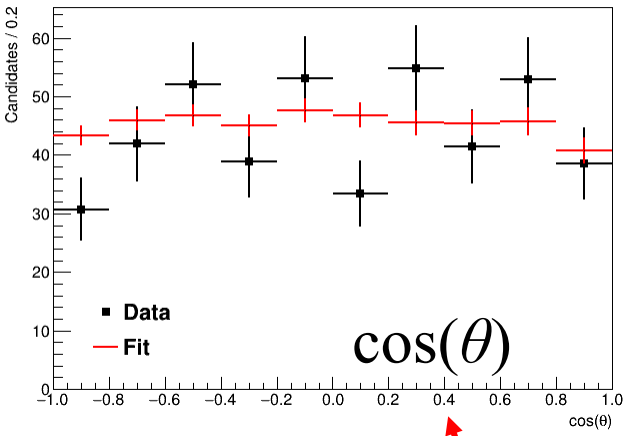

Candidates / 0.2
Data
Fit
cos(θ)
cos(θ)

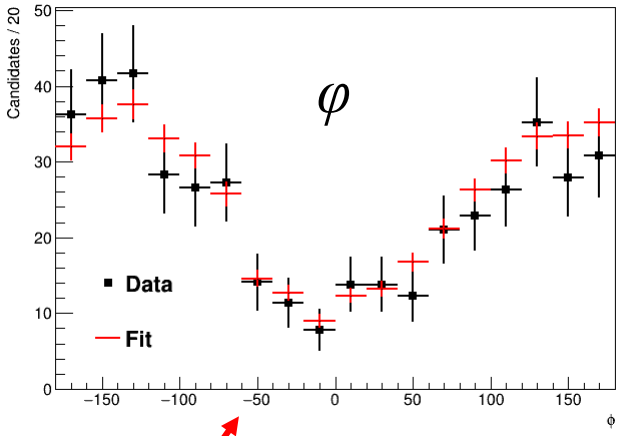

Candidates / 20
φ
Data
Fit
ϕ

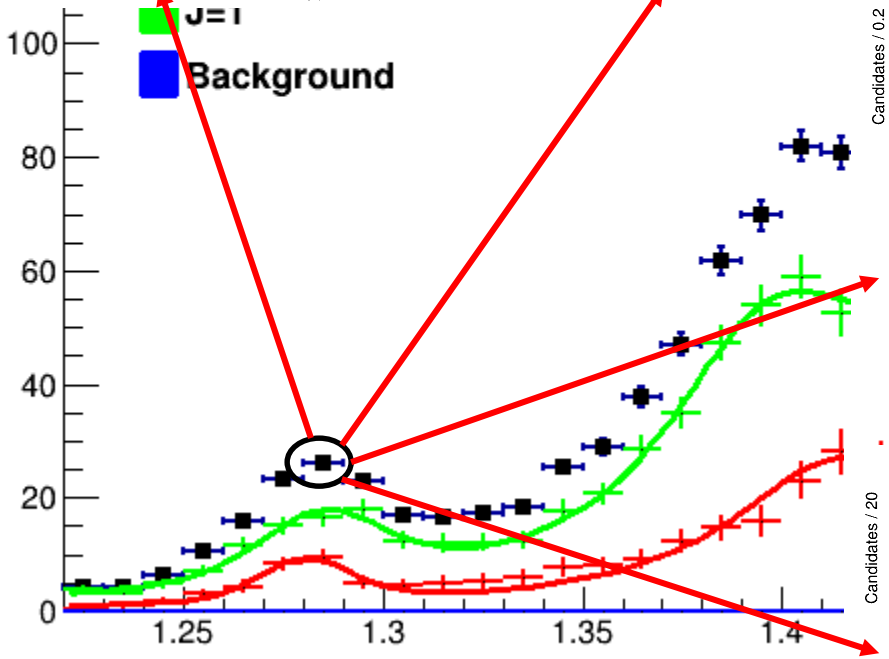

Background
Mass(K⁺K⁻π⁰)/GeV

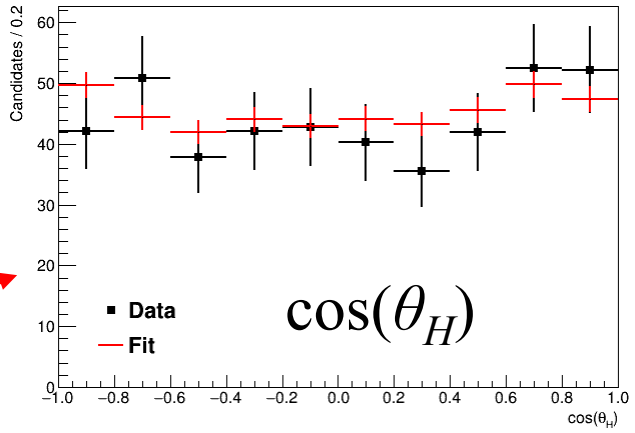
Candidates / 0.2
Data
Fit
cos(θ_H)
cos(θ_H)

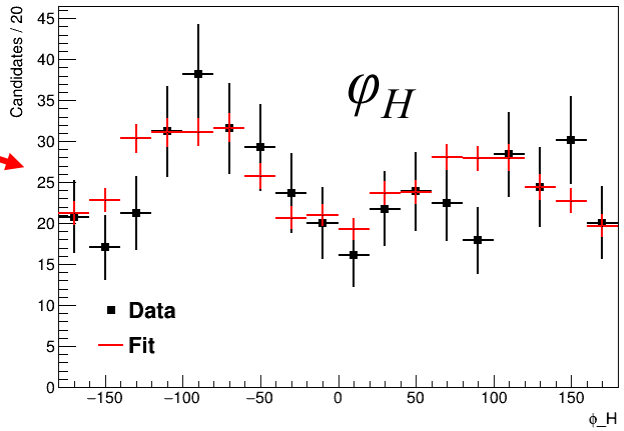
ckground





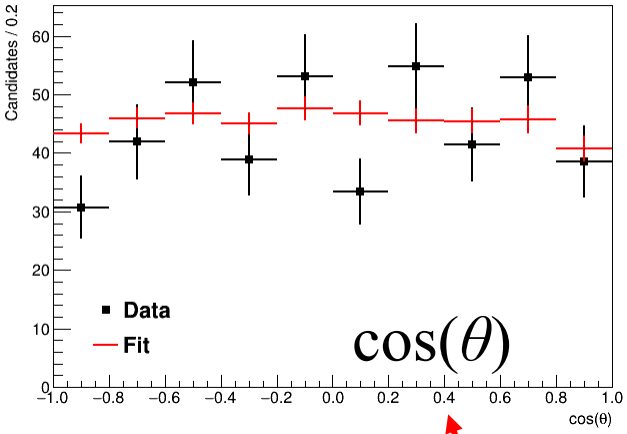


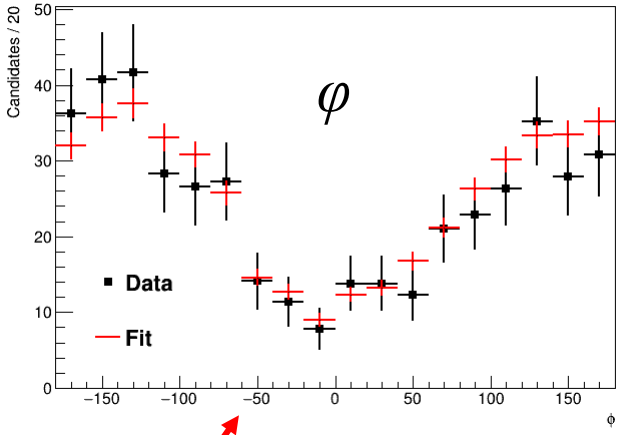


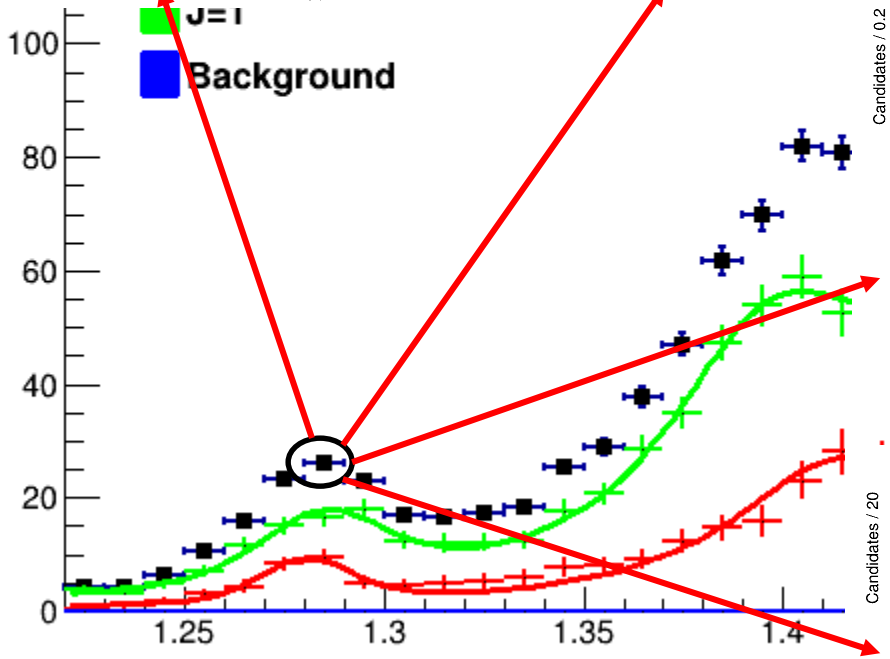


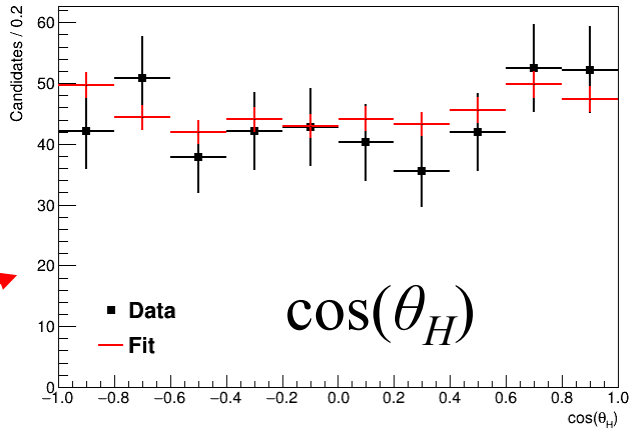
ASU

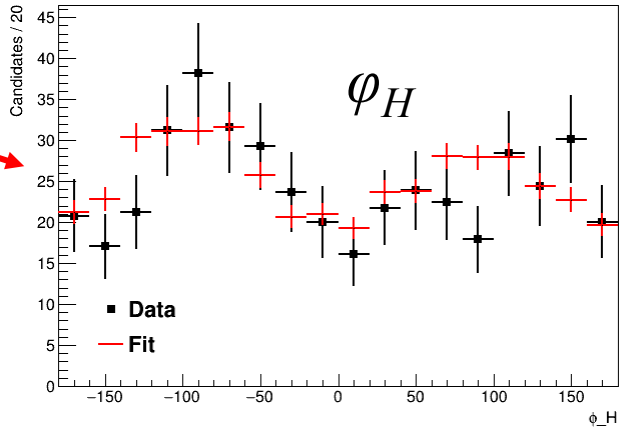
ckground





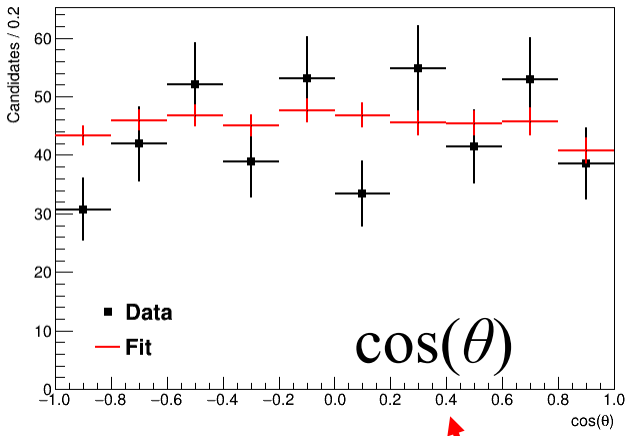


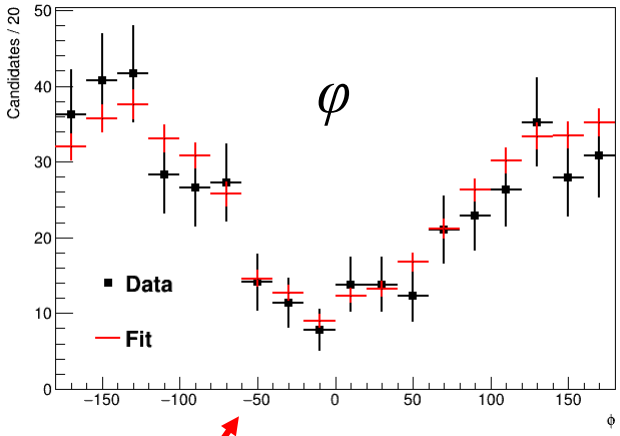


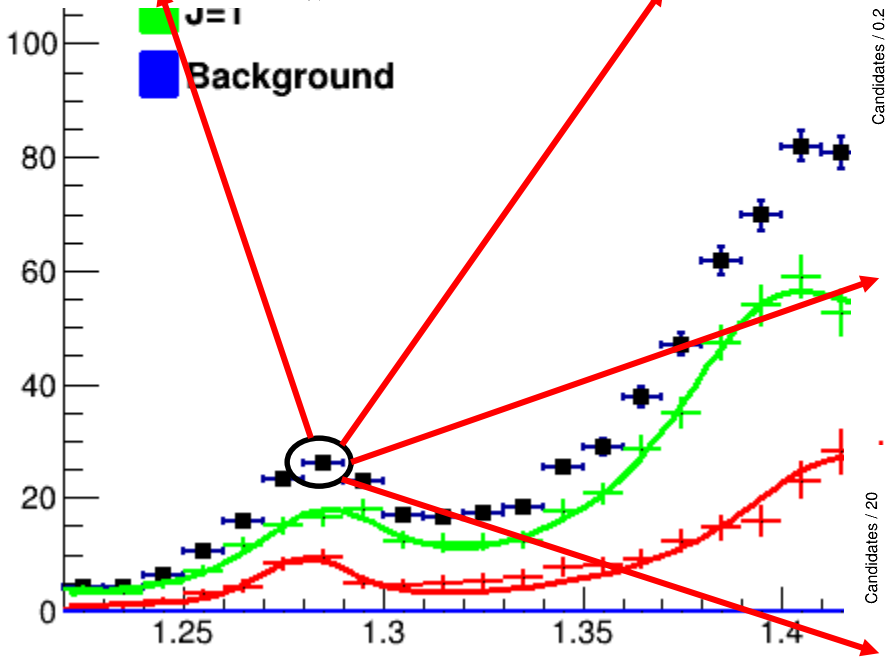


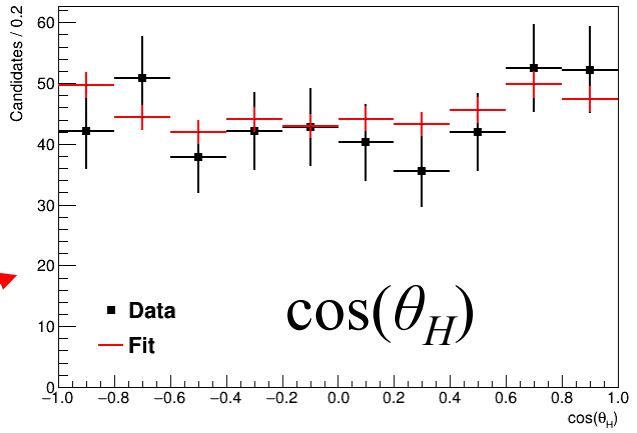
- **Angular fits look good ☺**

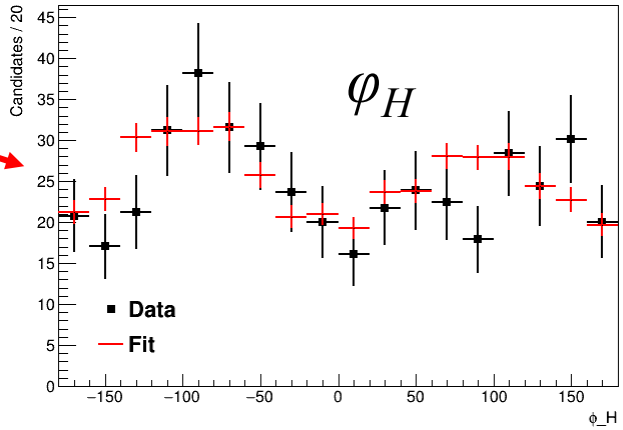
ckground











- **Angular fits look good ☺**
- **What do other collaborations include for contributions to low-mass *KKπ*?**

ASU

E852 mass-independent PWA of $KK\pi$

In low-mass $KK\pi$ region below 1.375 GeV included [1]:

[1] Phys. Lett. B 516 (2001) 264-272

E852 mass-independent PWA of $KK\pi$

In low-mass $KK\pi$ region below 1.375 GeV included [1]:

- J=0
  - $a_0(980)\pi$

[1] Phys. Lett. B 516 (2001) 264-272

E852 mass-independent PWA of $KK\pi$

In low-mass $KK\pi$ region below 1.375 GeV included [1]:

- J=0
  - $a_0(980)\pi$
- J=1
  - $a_0(980)\pi$

[1] Phys. Lett. B 516 (2001) 264-272

E852 mass-independent PWA of $KK\pi$

In low-mass $KK\pi$ region below 1.375 GeV included [1]:

- J=0
  - $a_0(980)\pi$
- J=1
  - $a_0(980)\pi$

- The K^*K was turned off for mass($KK\pi$) < 1.375

[1] Phys. Lett. B 516 (2001) 264-272

E852 mass-independent PWA of $KK\pi$

In low-mass $KK\pi$ region below 1.375 GeV included [1]:

- J=0
  - $a_0(980)\pi$
- J=1
  - $a_0(980)\pi$

- The K^*K was turned off for mass($KK\pi$) < 1.375
- No phase space $KK\pi$ included (but explicitly not ruled out)

[1] Phys. Lett. B 516 (2001) 264-272

BESIII mass-independent PWA of $KK\pi$

In low mass region between 1.24 and 1.36 GeV, BESIII included [2]:

[2] arXiv:2209.11175v1

BESIII mass-independent PWA of $KK\pi$

In low mass region between 1.24 and 1.36 GeV, BESIII included [2]:

- J=0
  - $(KK)_{S\text{-}wave}\pi$
  - $(K\,\pi)_{P\text{-}wave}K$

[2] arXiv:2209.11175v1

BESIII mass-independent PWA of $KK\pi$

In low mass region between 1.24 and 1.36 GeV, BESIII included [2]:

- J=0
  - $(KK)_{S\text{-}wave}\pi$
  - $(K\,\pi)_{P\text{-}wave}K$
- J=1
  - $a_0(980)\pi$,

[2] arXiv:2209.11175v1

BESIII mass-independent PWA of $KK\pi$

In low mass region between 1.24 and 1.36 GeV, BESIII included [2]:

- J=0
  - $(KK)_{S\text{-}wave}\pi$
  - $(K\,\pi)_{P\text{-}wave}K$
- J=1
  - $a_0(980)\pi$,

where $(KK)_{\text{S-wave}}\pi$ represents the combination

[2] arXiv:2209.11175v1

BESIII mass-independent PWA of $KK\pi$

In low mass region between 1.24 and 1.36 GeV, BESIII included [2]:

- J=0
  - $(KK)_{S\text{-}wave}\pi$
  - $(K\,\pi)_{P\text{-}wave}K$
- J=1
  - $a_0(980)\pi$,

where $(KK)_{\text{S-wave}}\pi$ represents the combination

- $a_0(980)\pi$
- $(KK)_{S\text{-}phsp}\pi$

[2] arXiv:2209.11175v1

BESIII mass-independent PWA of $KK\pi$

In low mass region between 1.24 and 1.36 GeV, BESIII included [2]:

- J=0
  - $(KK)_{S\text{-}wave}\pi$
  - $(K\,\pi)_{P\text{-}wave}K$
- J=1
  - $a_0(980)\pi$,

where $(KK)_{\text{S-wave}}\pi$ represents the combination

- $a_0(980)\pi$
- $(KK)_{S\text{-}phsp}\pi$

and $(K\,\pi)_{P\text{-}wave}K$ represents a combination of

[2] arXiv:2209.11175v1

BESIII mass-independent PWA of $KK\pi$

In low mass region between 1.24 and 1.36 GeV, BESIII included [2]:

- J=0
  - $(KK)_{S\text{-}wave}\pi$
  - $(K\,\pi)_{P\text{-}wave}K$
- J=1
  - $a_0(980)\pi$,

where $(KK)_{\text{S-wave}}\pi$ represents the combination

- $a_0(980)\pi$
- $(KK)_{S\text{-}phsp}\pi$

and $(K\,\pi)_{P\text{-}wave}K$ represents a combination of

- $K^*(892)K$
- $(K\,\pi)_{P\text{-}phsp}K$

[2] arXiv:2209.11175v1

BESIII mass-independent PWA of $KK\pi$

In low mass region between 1.24 and 1.36 GeV, BESIII included [2]:

- J=0
  - $(KK)_{S\text{-}wave}\pi$
  - $(K\,\pi)_{P\text{-}wave}K$
- J=1
  - $a_0(980)\pi$,

where $(KK)_{\text{S-wave}}\pi$ represents the combination

- $a_0(980)\pi$
- $(KK)_{S\text{-}phsp}\pi$

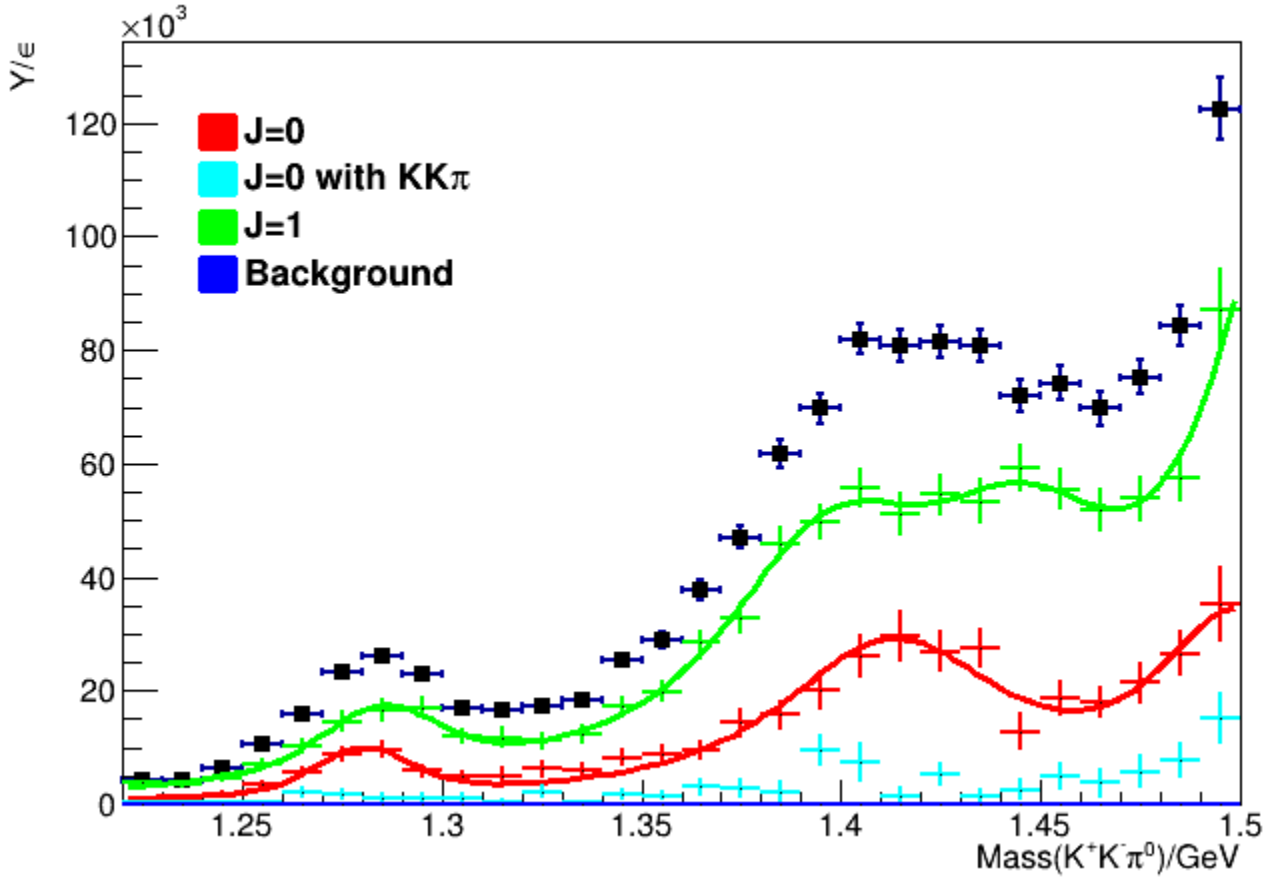
and $(K\,\pi)_{P\text{-}wave}K$ represents a combination of

- $K^*(892)K$
- $(K\,\pi)_{P\text{-}phsp}K$

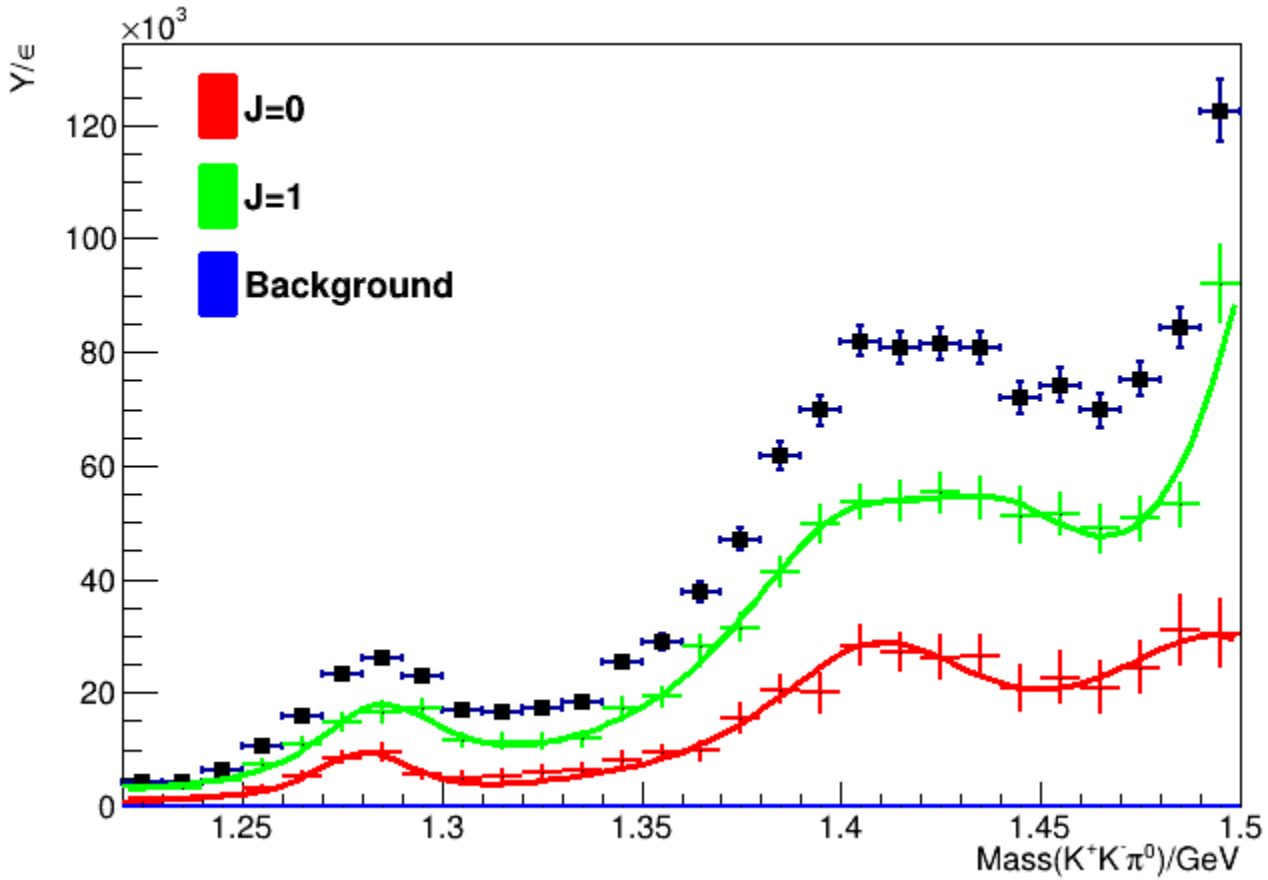
BESIII includes K^*K and phase-space $KK\pi$ contributions at low mass

[2] arXiv:2209.11175v1

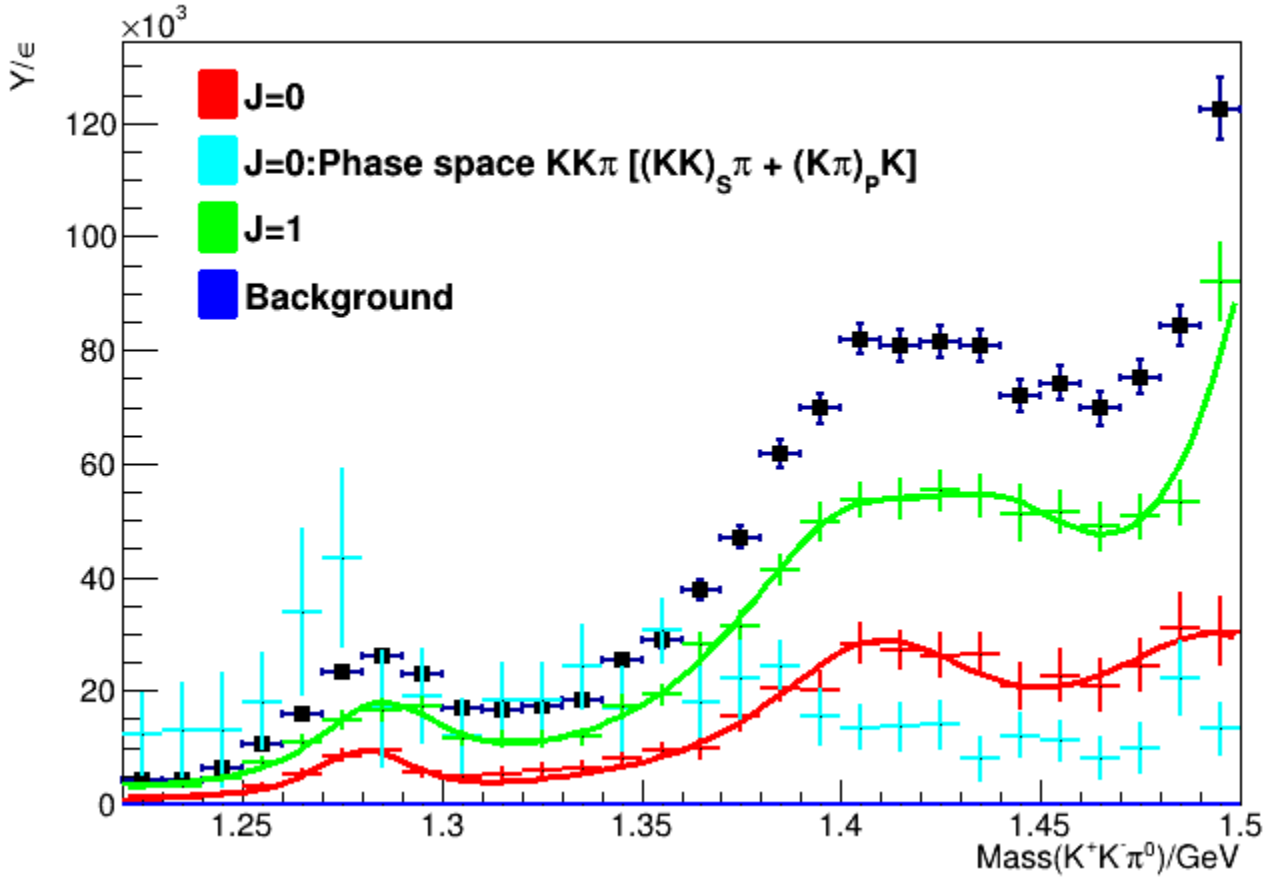
- Fit with $(KK)_{S\text{-}phsp}\pi$ J=0 wave included



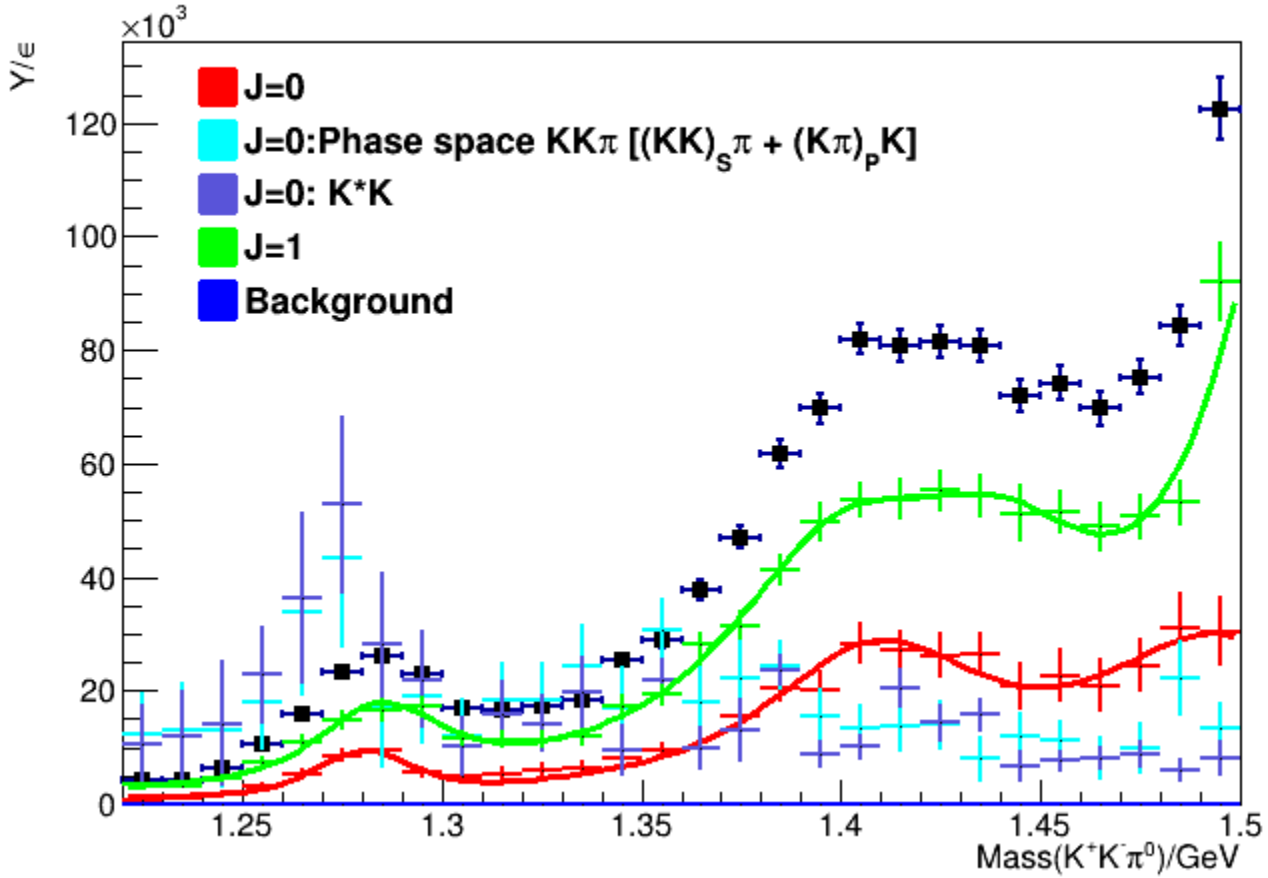
- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included



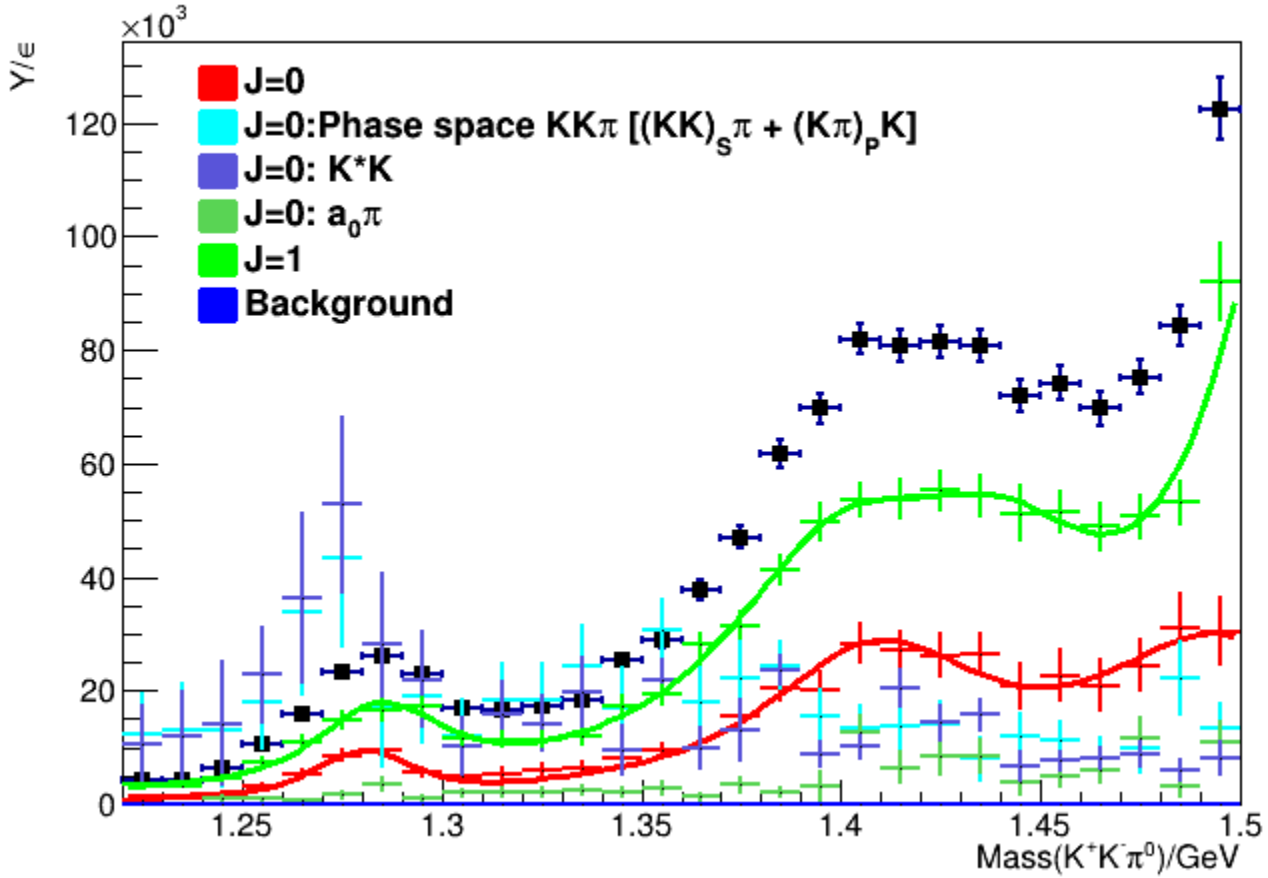
- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included



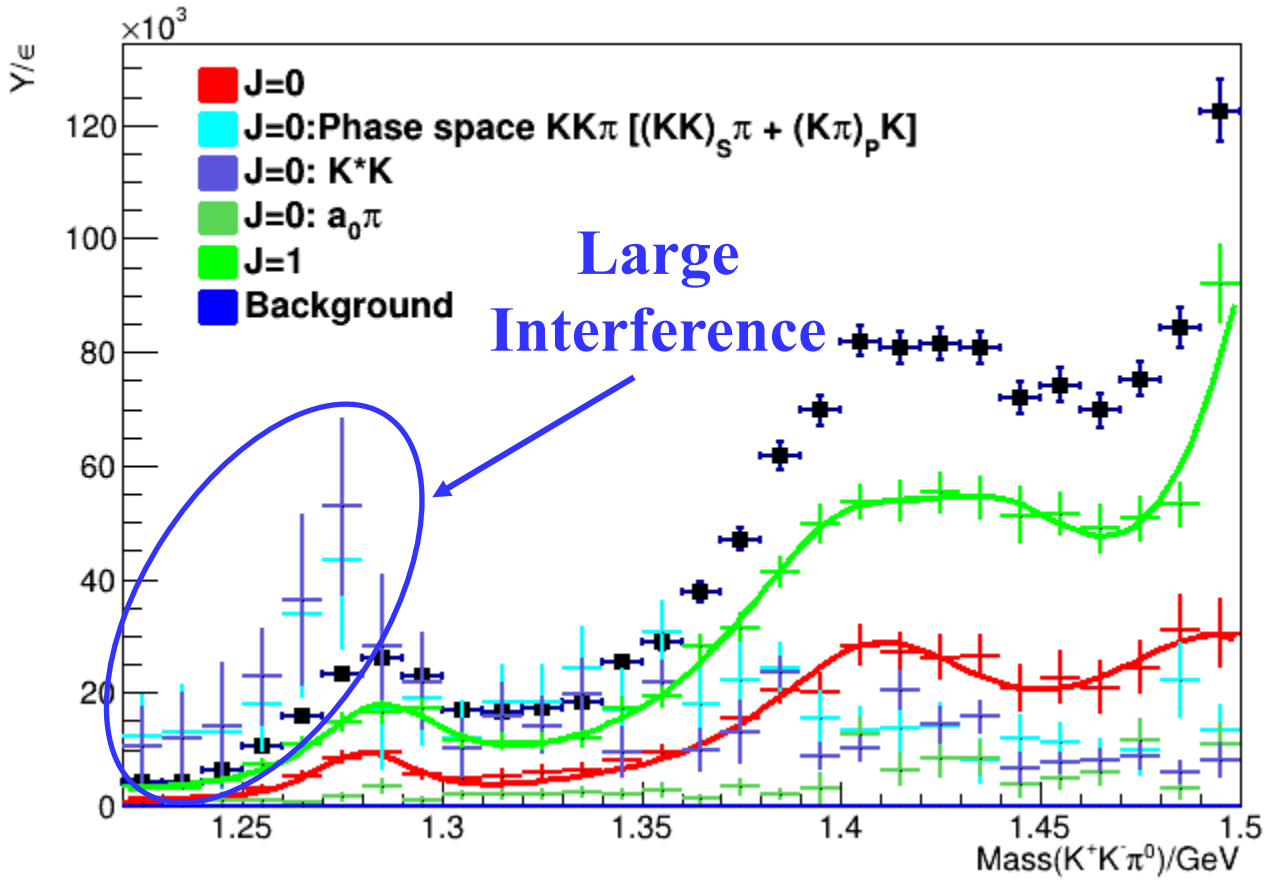
- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included



- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included

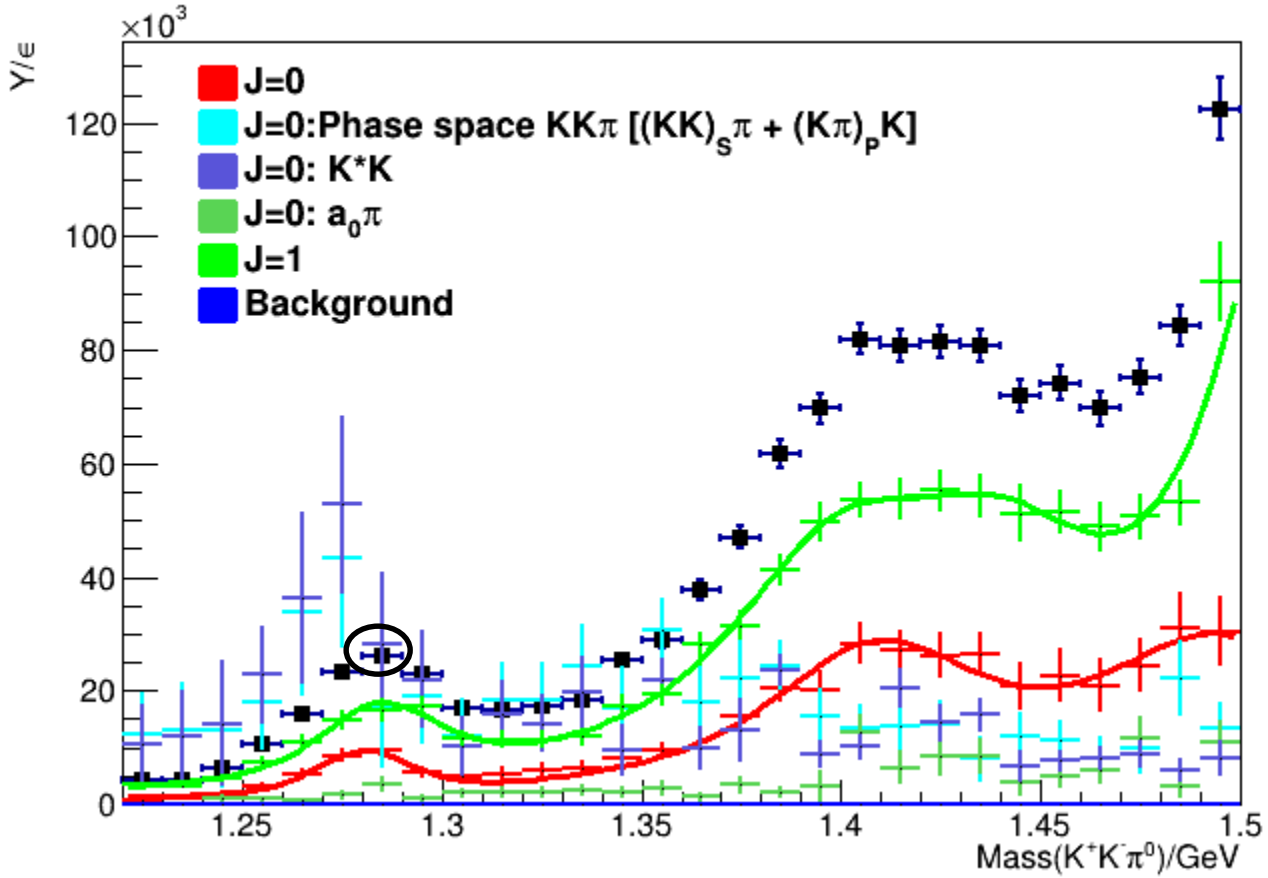


- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included



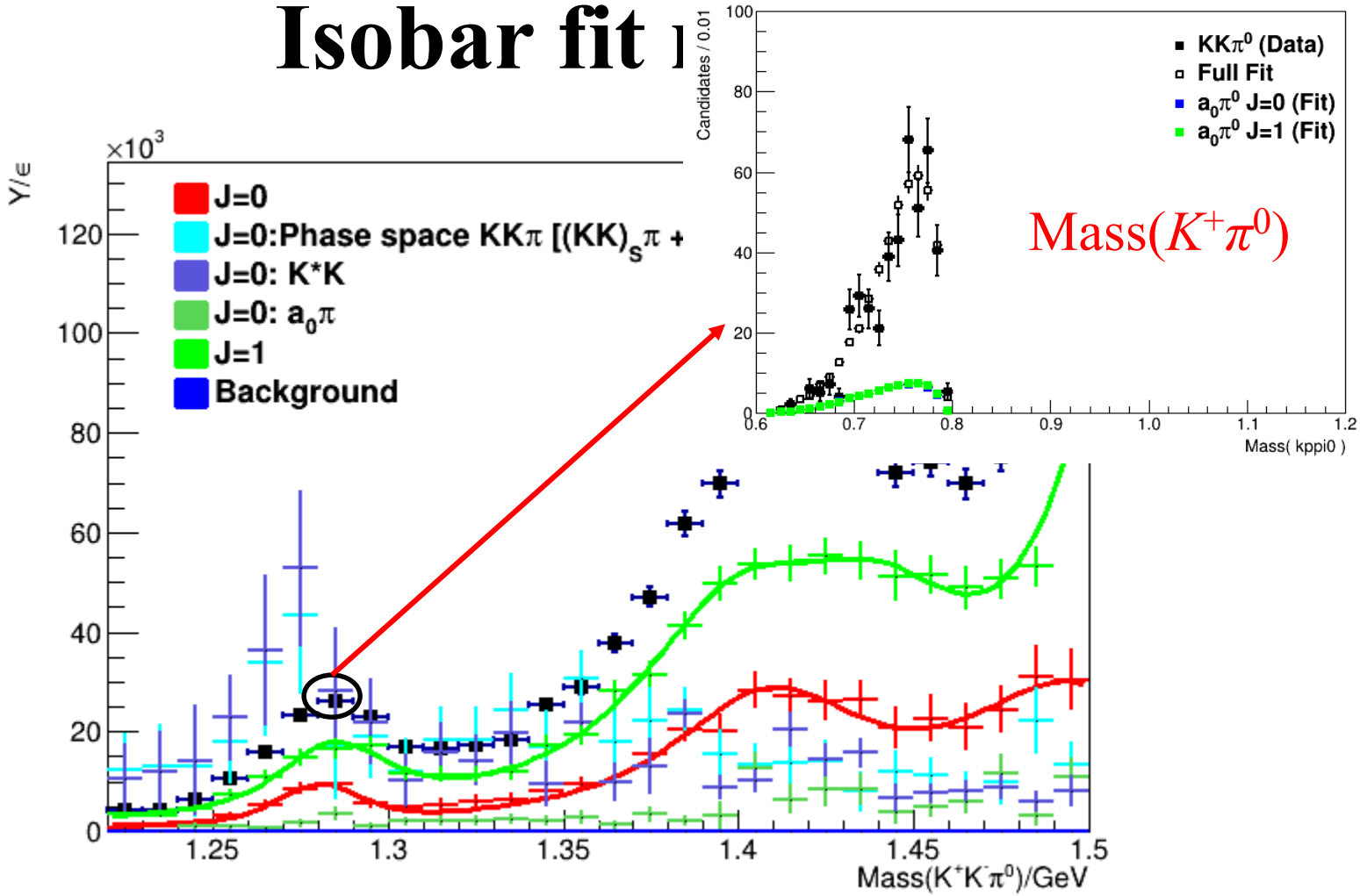
- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included

Isobar fit results



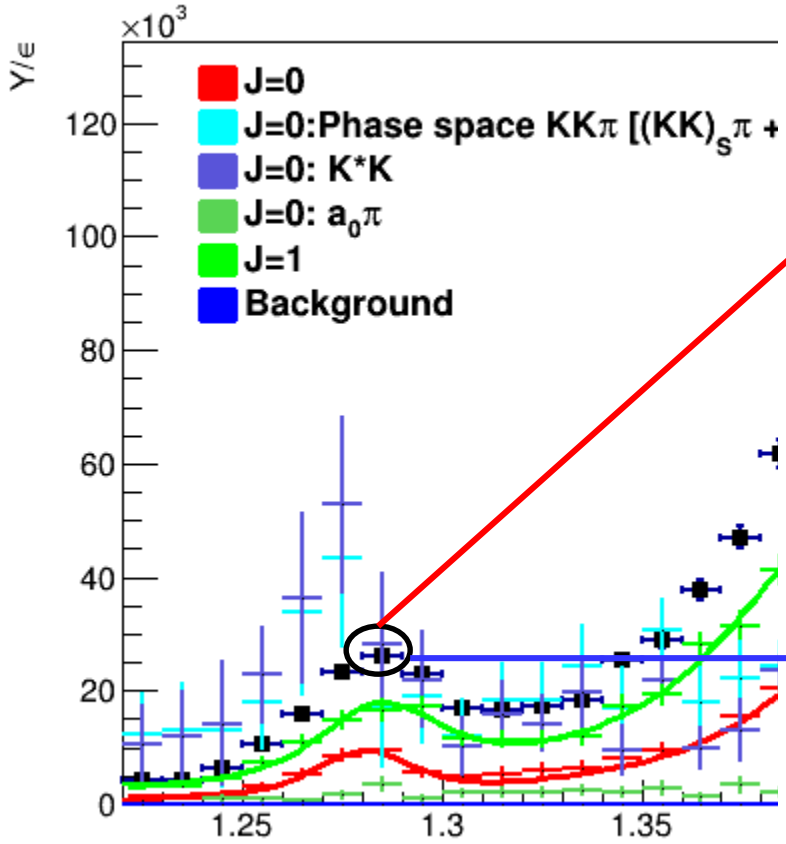
- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included

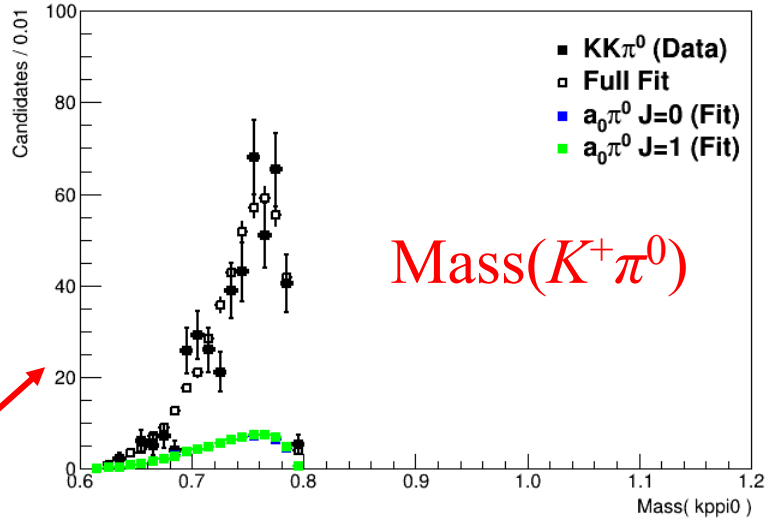
Isobar fit

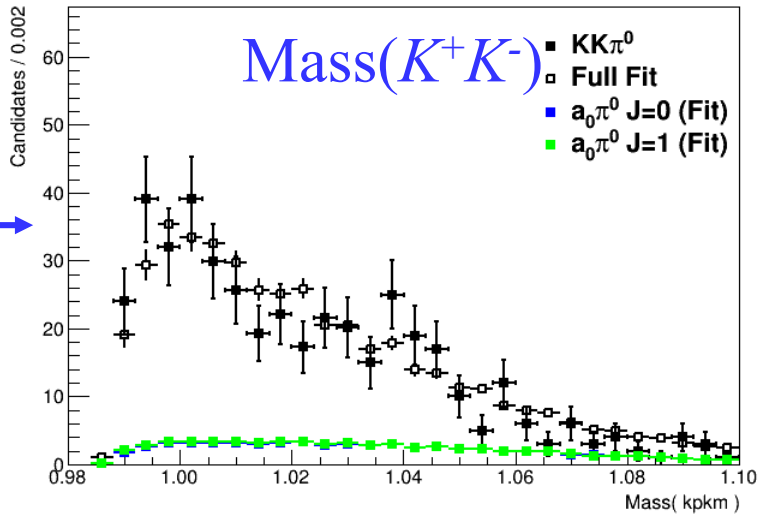


- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included

Isobar fit

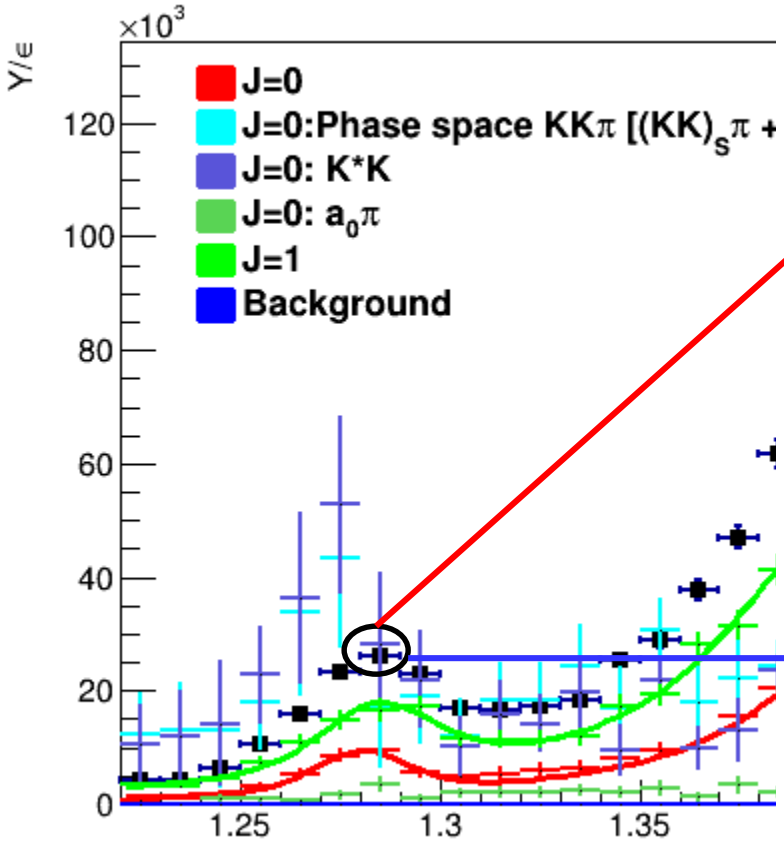


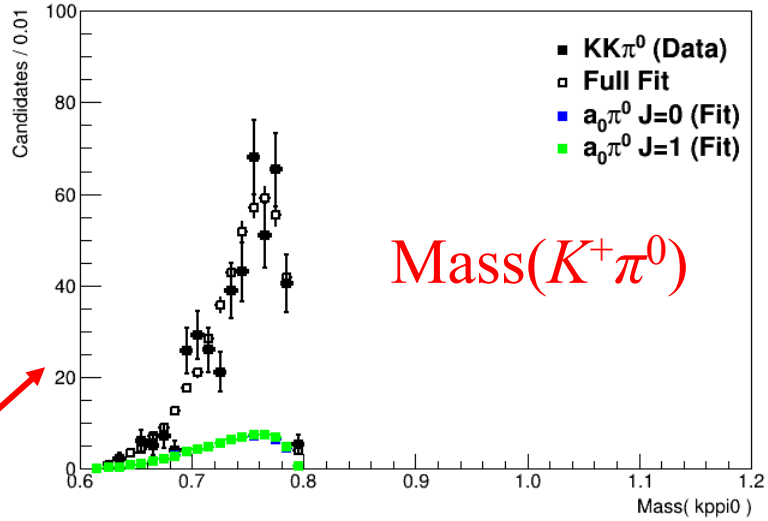


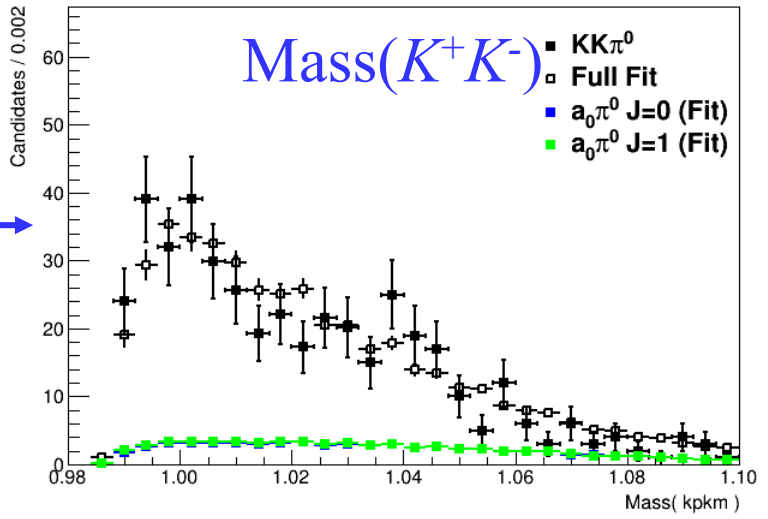


- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included

Isobar fit



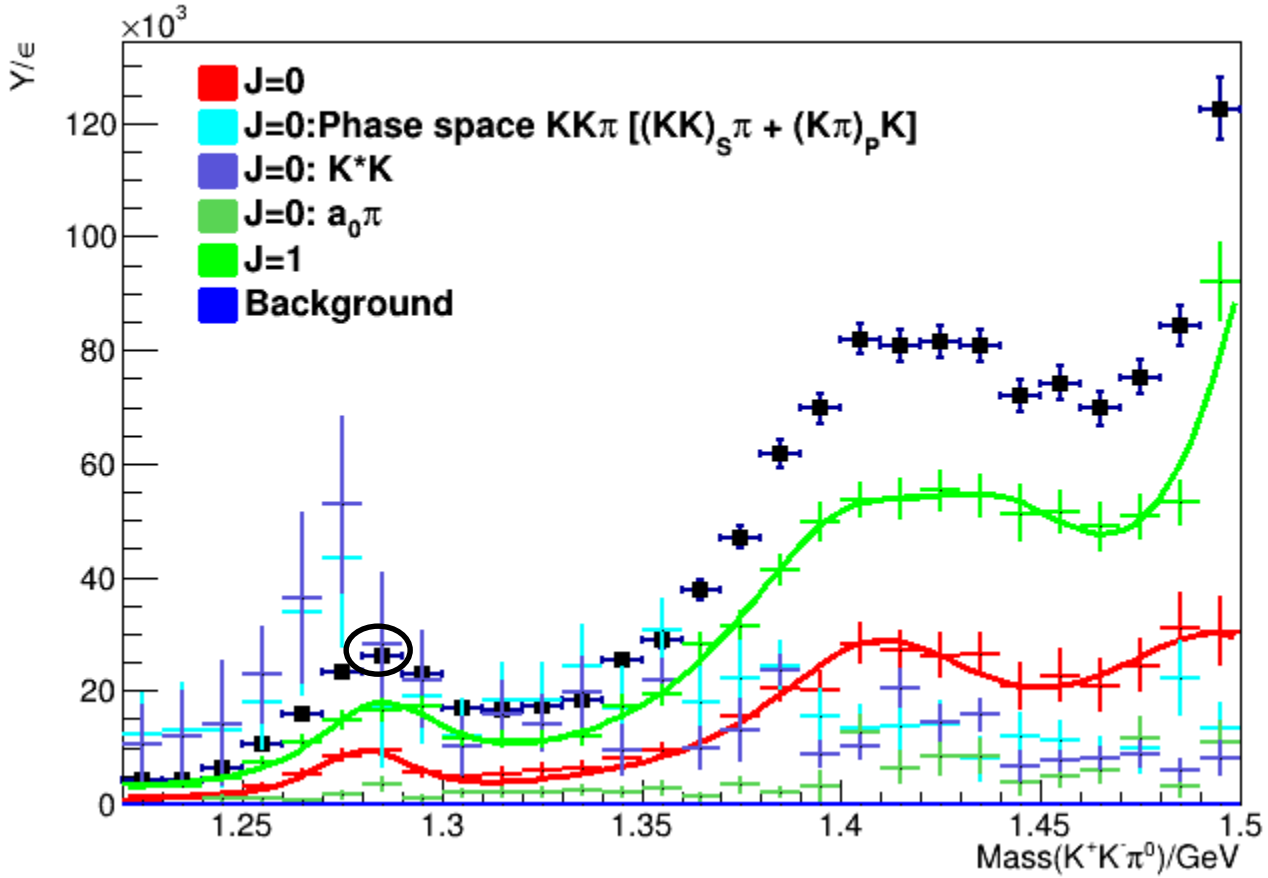


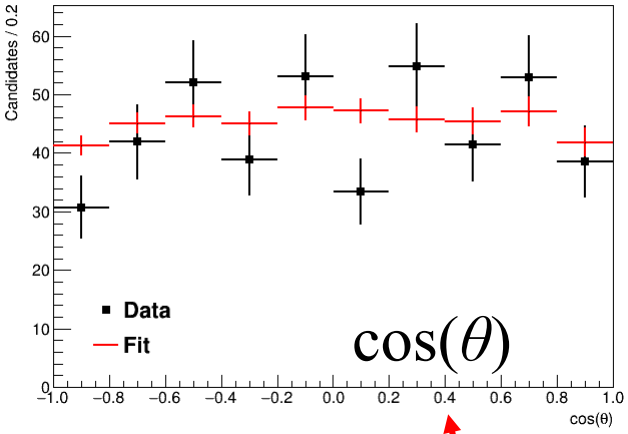


Isobars still look good ☺

- Fit with $(KK)_{S\text{-}phsp}\pi$ and $(KK)_{P\text{-}phsp}\pi$ J=0 waves included

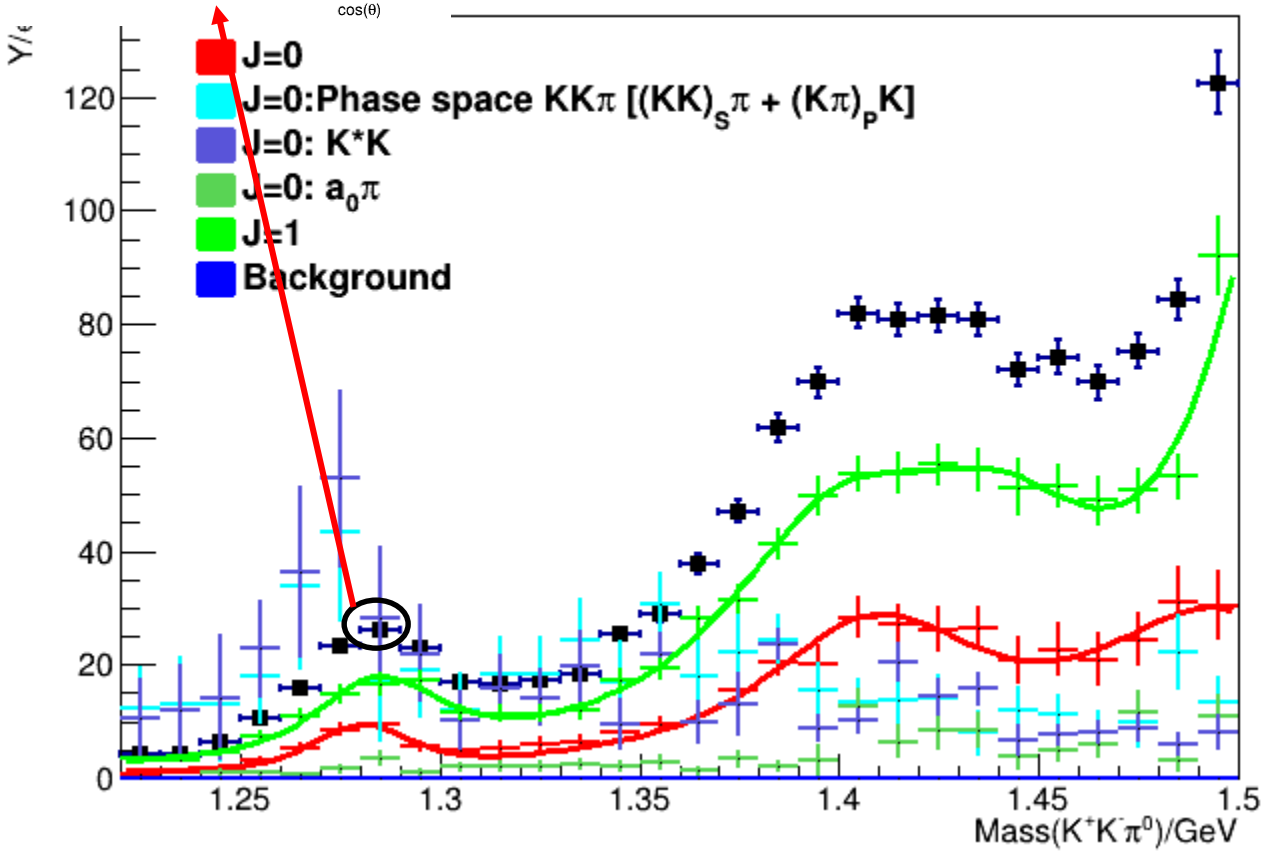
Angular fit results

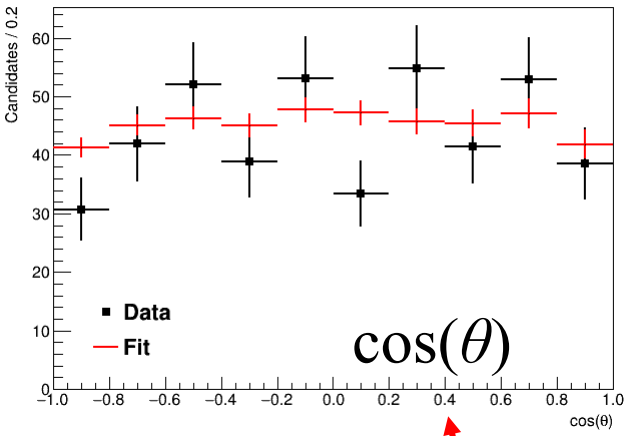


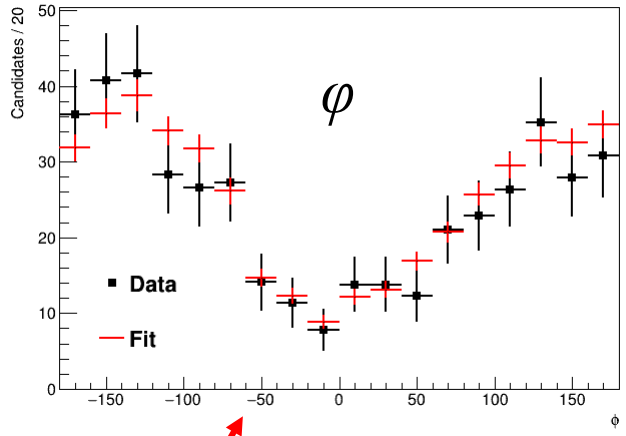


$(KK)_{P\text{-}phsp}\pi$ J=0 waves included

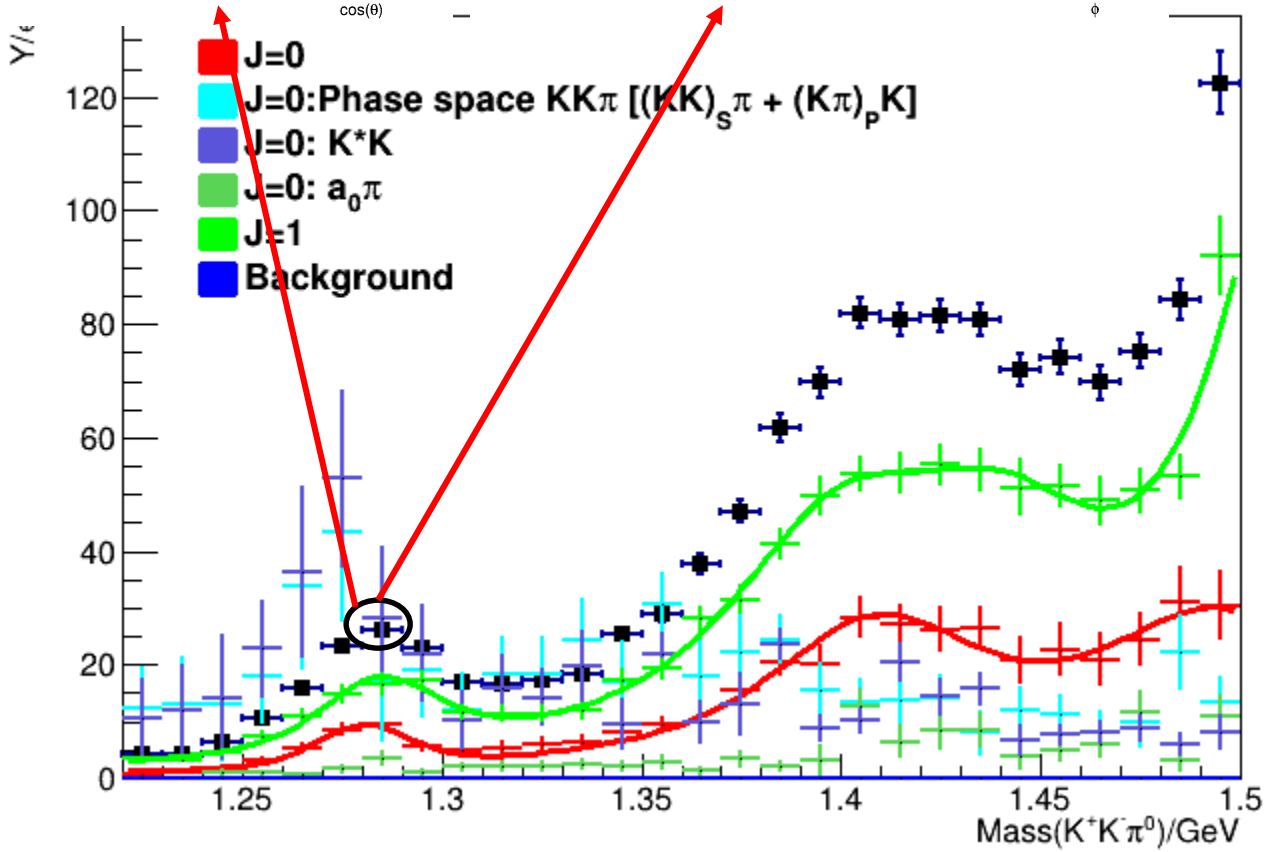
;ular fit results

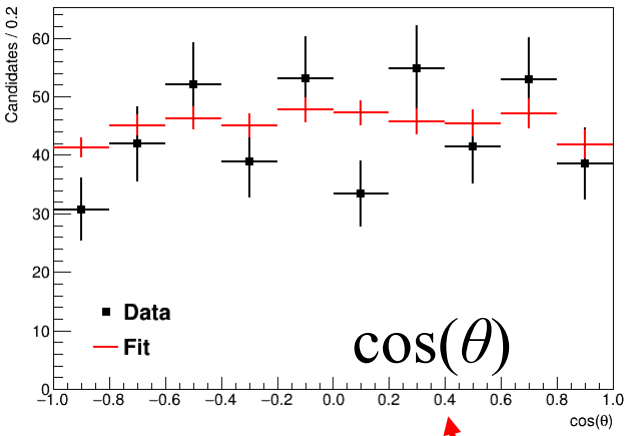


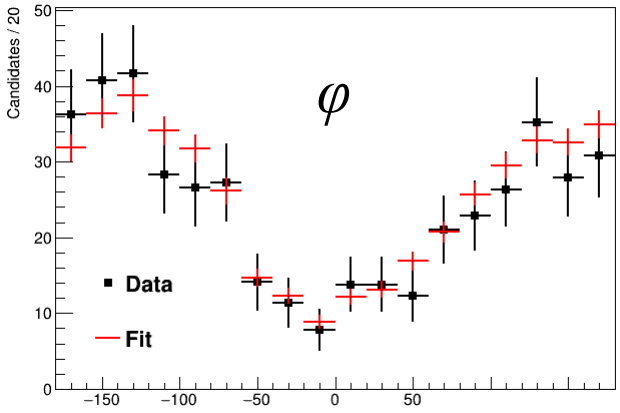

Candidates / 0.2
Data
Fit
cos(θ)
cos(θ)


Candidates / 20
φ
Data
Fit
ϕ

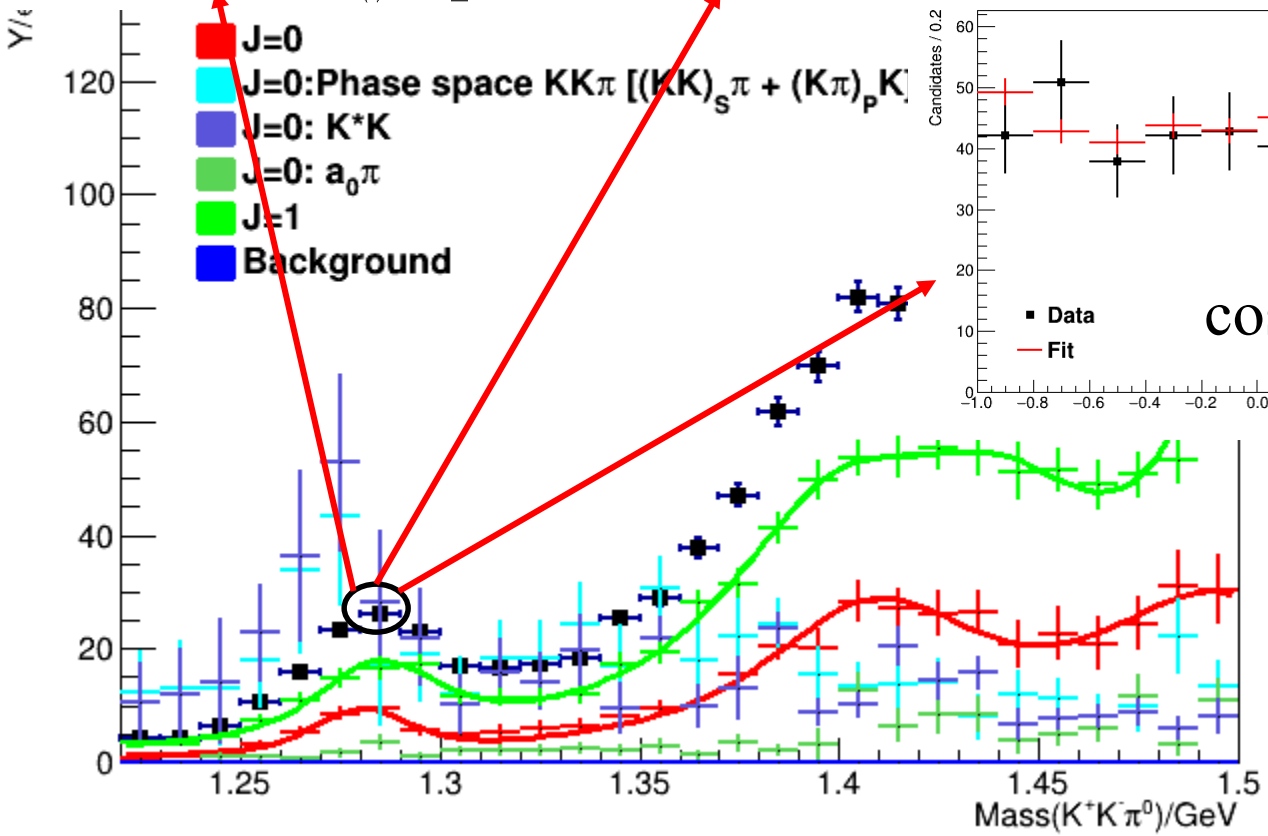
ıded


J=0
J=0:Phase space KKπ [(KK)$_S$π + (Kπ)$_P$K]
J=0: K*K
J=0: a$_0$π
J=1
Background
Mass(K$^+$K$^-$π^0)/GeV

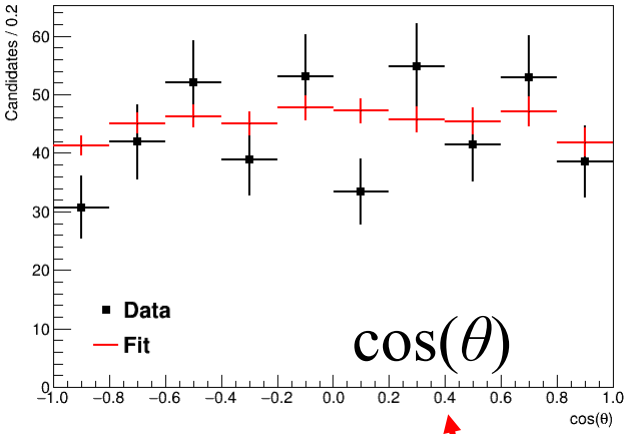

Candidates / 0.2
Data
Fit
cos(θ)
cos(θ)

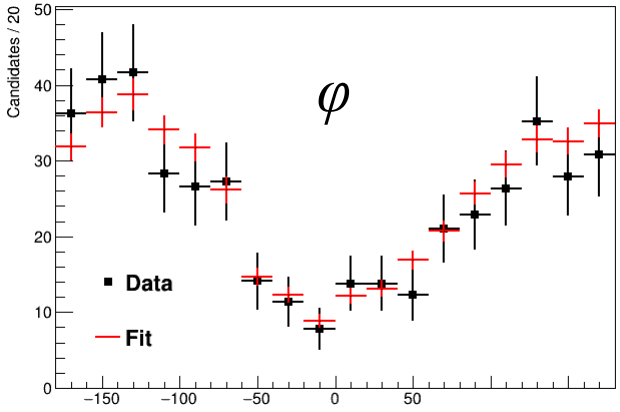

Candidates / 20
φ
Data
Fit

ıded

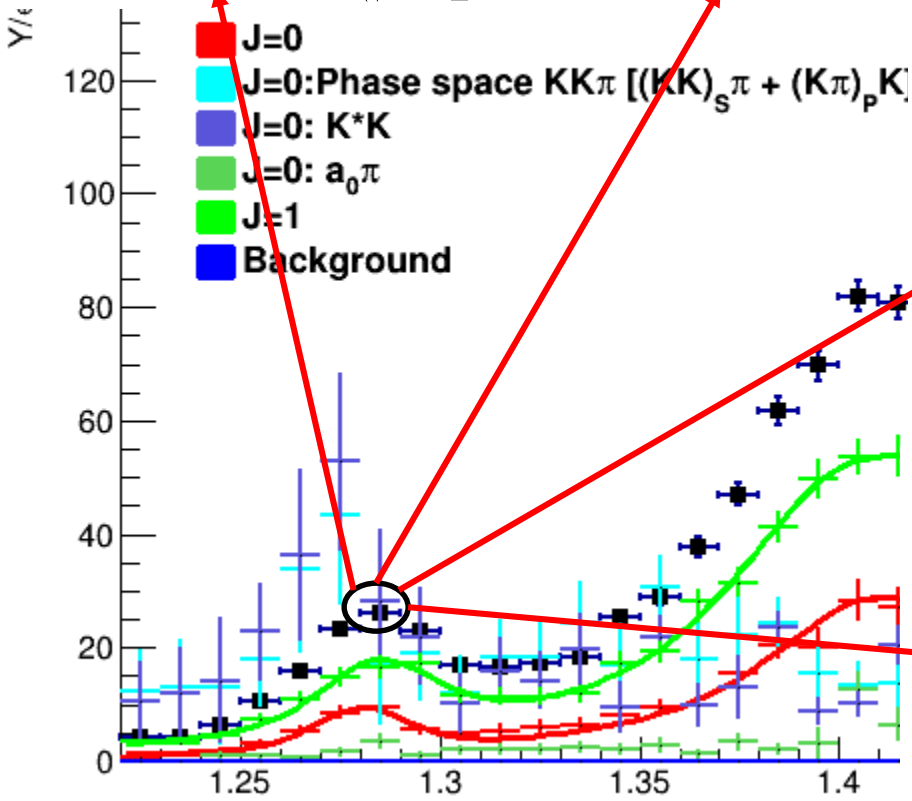

J=0
J=0:Phase space KKπ [(KK)$_S$π + (Kπ)$_P$K
J=0: K*K
J=0: a$_0$π
J=1
Background
Mass(K$^+$K$^-$π^0)/GeV

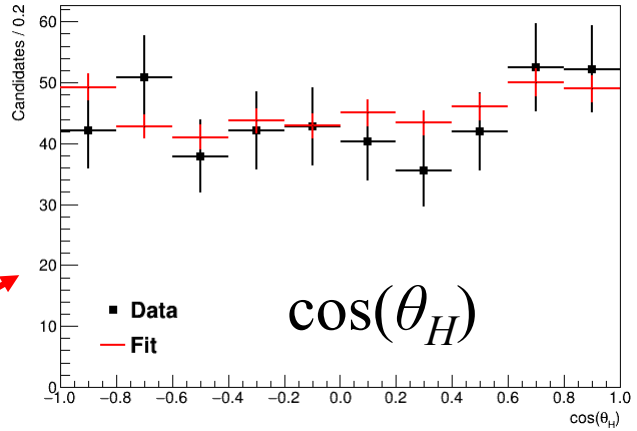
Candidates / 0.2
Data
Fit
cos(θ$_H$)
cos(θ$_H$)

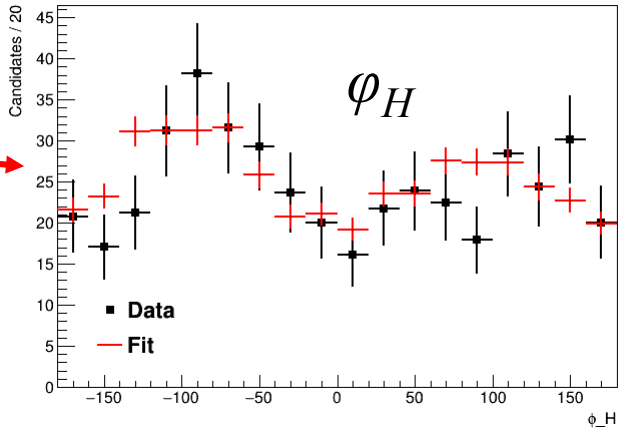

Candidates / 0.2
Data
Fit
cos(θ)
cos(θ)


Candidates / 20
φ
Data
Fit

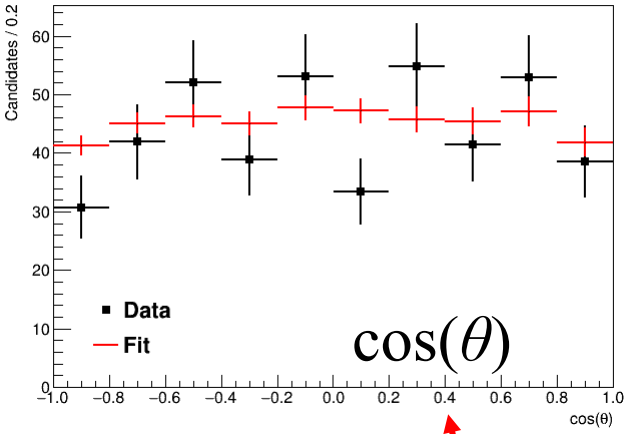
ıded

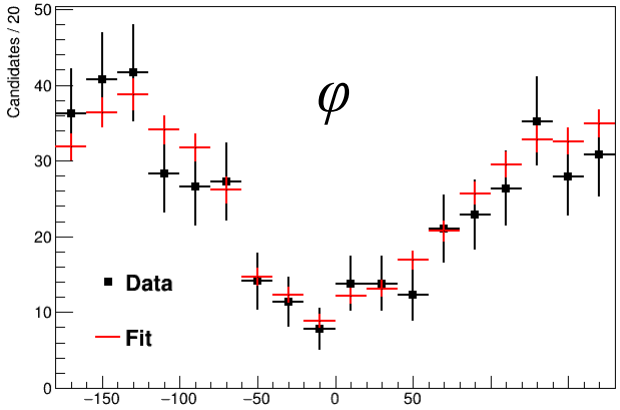

J=0
J=0:Phase space KKπ [(KK)$_S$π + (Kπ)$_P$K
J=0: K*K
J=0: a$_0$π
J=1
Background
1.25
1.3
1.35
1.4


Candidates / 0.2
Data
Fit
cos(θ$_H$)
cos(θ$_H$)

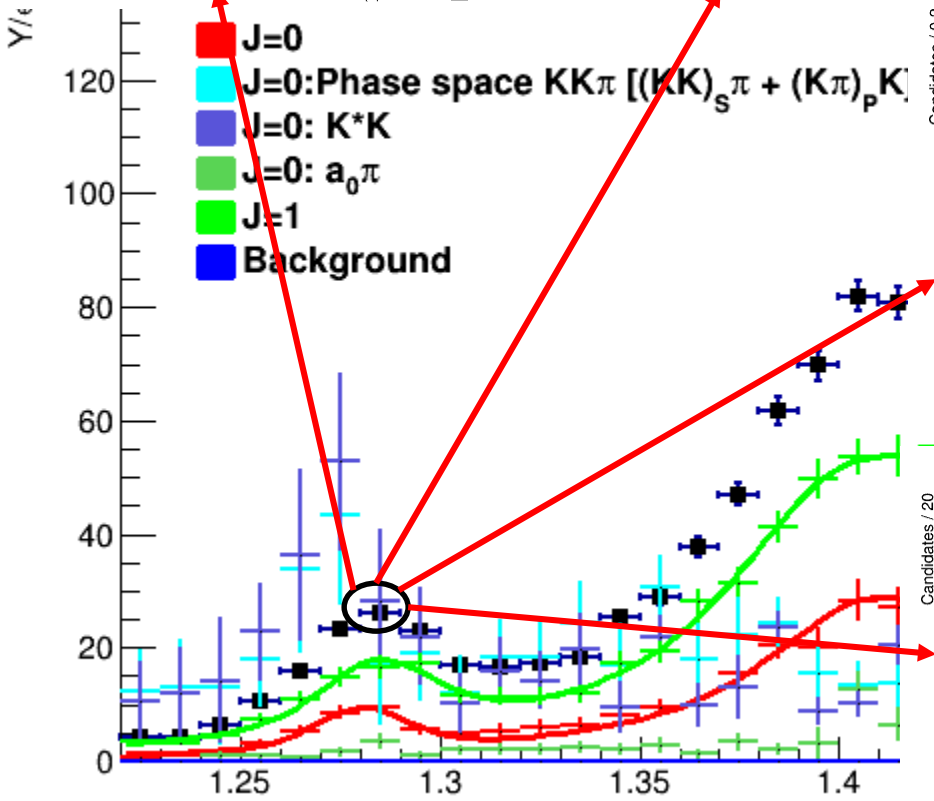

Candidates / 20
φ$_H$
Data
Fit
ϕ_H

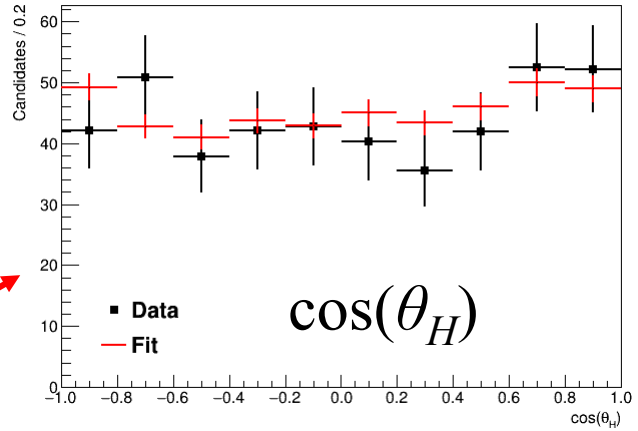
ASU

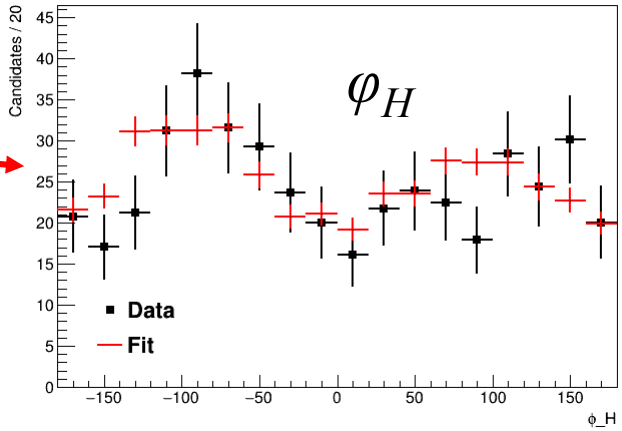




ıded







Fit over angles still look good ☺

Text

Text

Text