Initial PWA of restricted $K^+K^-\ \pi^0$ events

Data

Dataset:

- Spring 2018 data

Data

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Restrictions:

Data

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Restrictions:

- Incident photon timed to be within central peak

Data

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- Only best Confidence Level (*CL*) per event kept

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- 0.15 GeV < Mass[π^0] < 0.12 GeV

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- Incident photon timed to be within central peak
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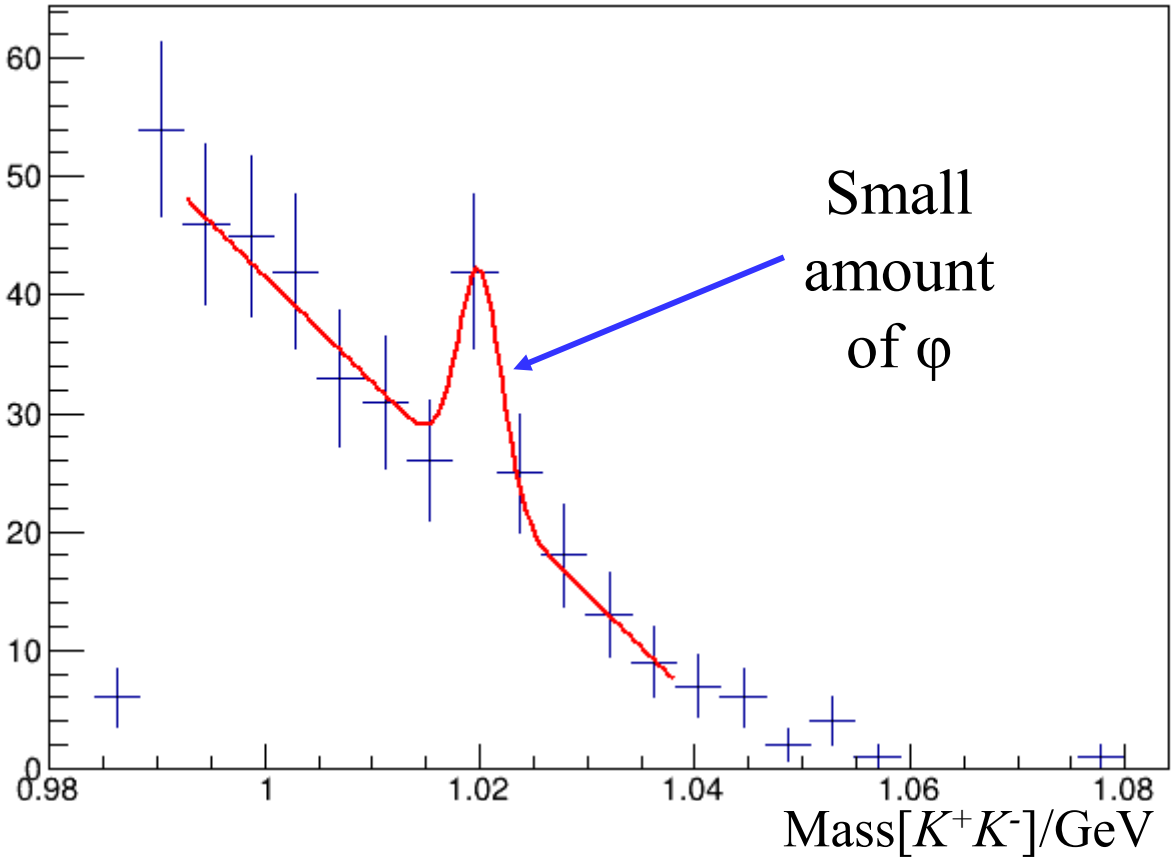
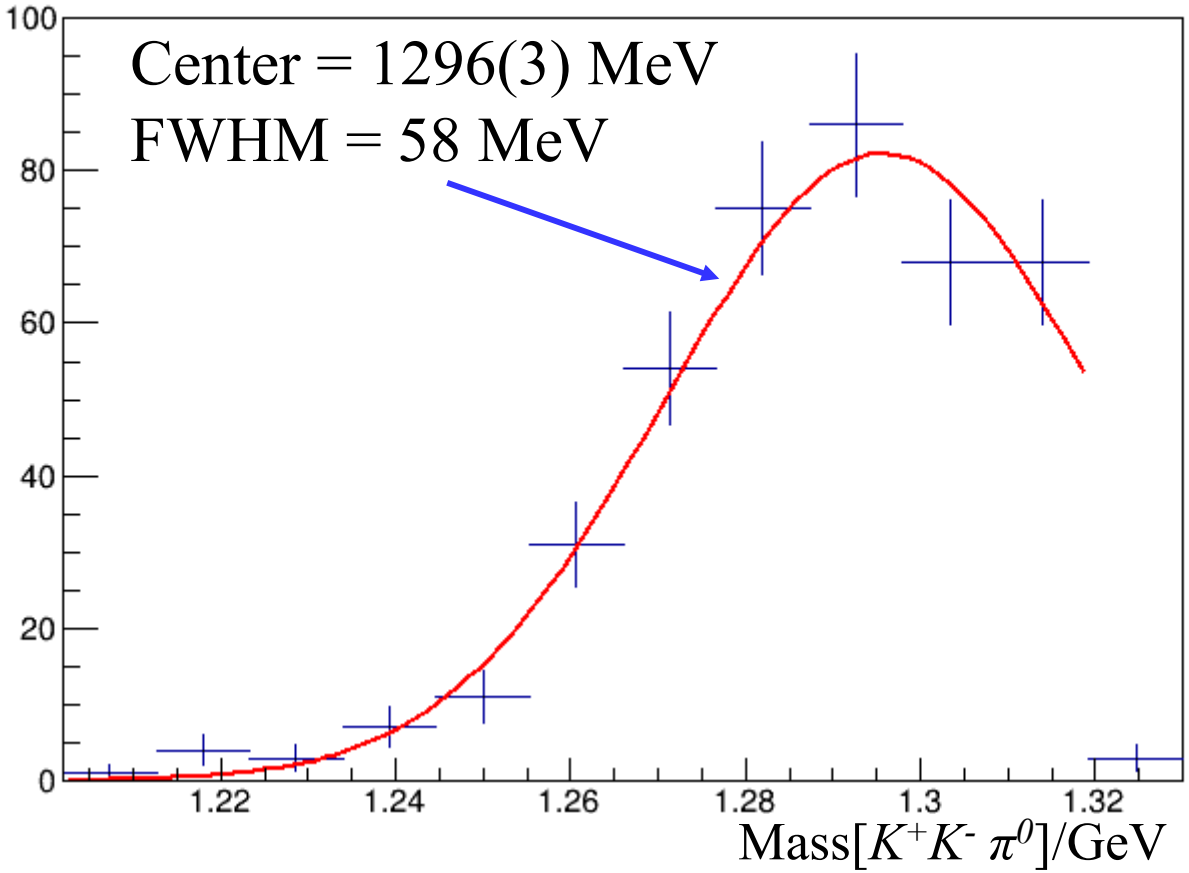
- *CL* must be above 10^{-4}
- Kaons must be seen in TOF
- Missing mass within 3 standard deviations of central peak
- 0.15 GeV < Mass[π^0] < 0.12 GeV
- Mass[$K^+K^-\pi^0$] < 1.32

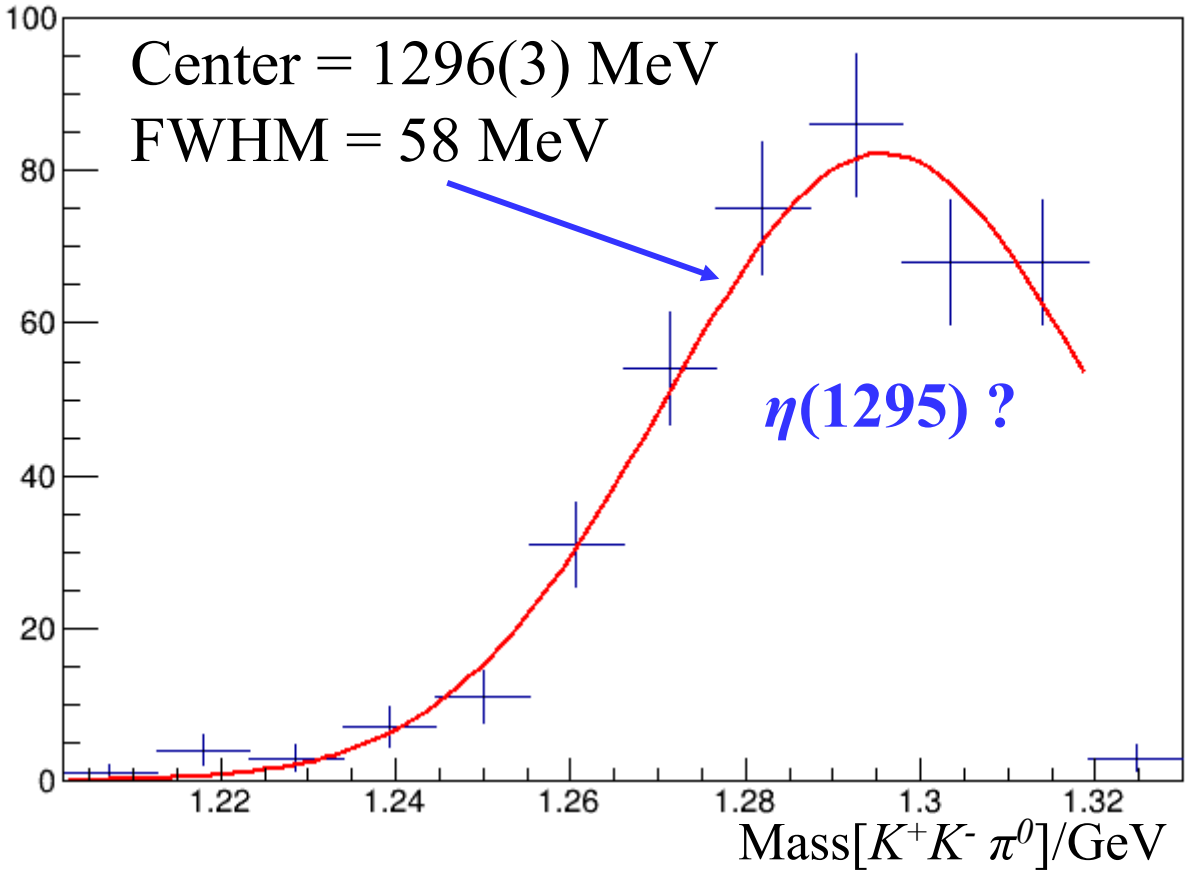
Mass[K^+K^-]


60
50
40
30
20
10
0
0.98
1
1.02
1.04
1.06
1.08
Small amount of φ
Mass[K^+K^-]/GeV

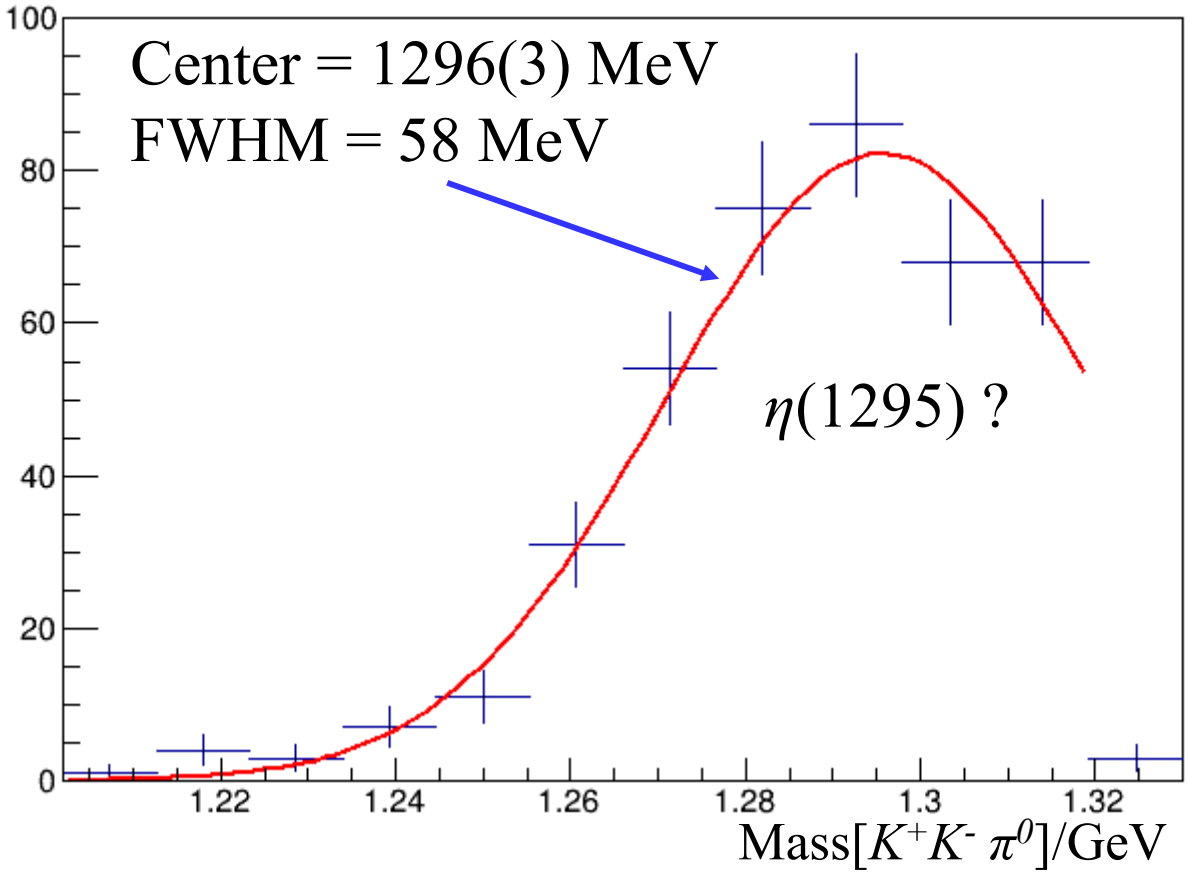
Mass[$K^+K^-\pi^0$]


Center = 1296(3) MeV
FWHM = 58 MeV
100
80
60
40
20
0
1.22
1.24
1.26
1.28
1.3
1.32
Mass[$K^+K^-\pi^0$]/GeV

Mass[$K^+K^-\pi^0$]

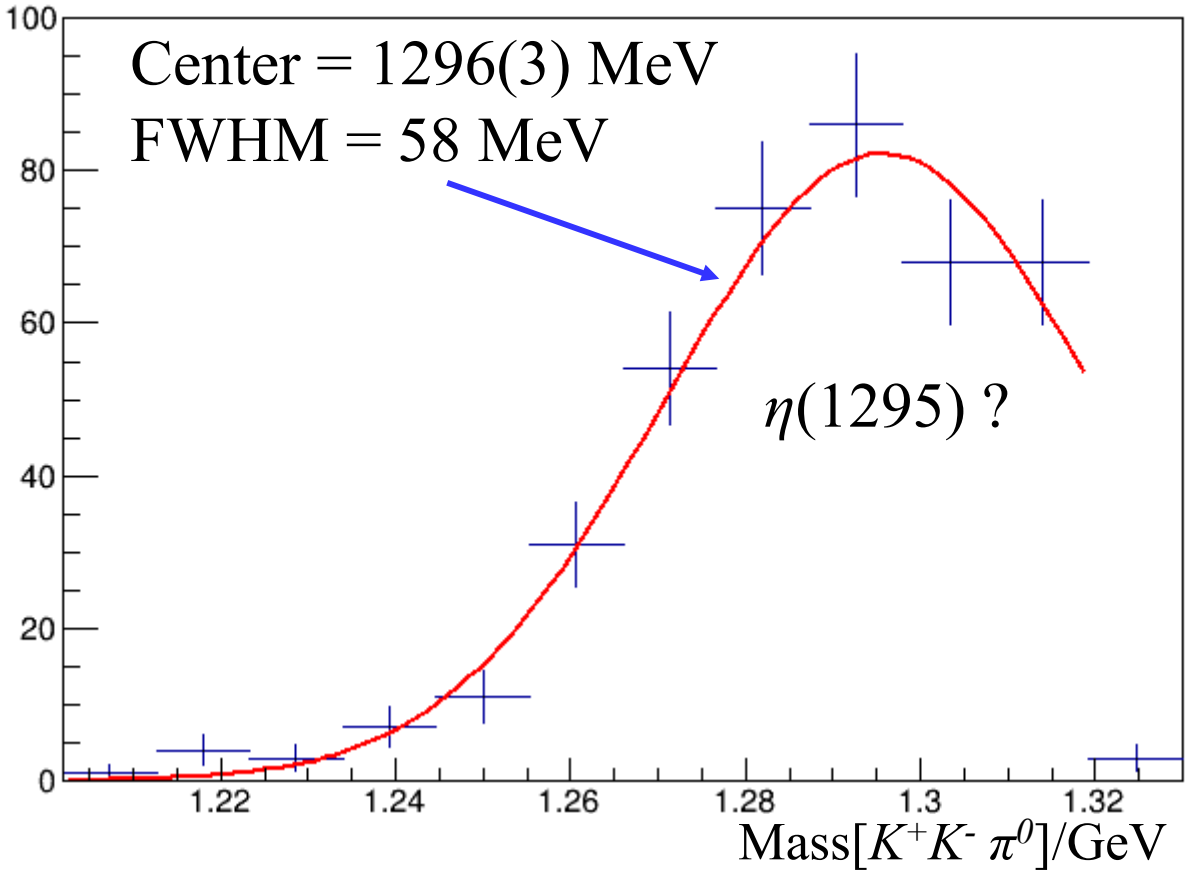

Center = 1296(3) MeV
FWHM = 58 MeV
η(1295) ?
100
80
60
40
20
0
1.22
1.24
1.26
1.28
1.3
1.32
Mass[K+K- π0]/GeV

Mass[$K^+K^-\pi^0$]



$\eta(1295)$ PDG: mass = 1294(5) MeV, width = 55(5) MeV

Mass[$K^+K^-\pi^0$]



η(1295) PDG: mass = 1294(5) MeV, width = 55(5) MeV

Consistent with measured value ☺

Definition of (θ,φ)

- The (θ,φ) angles defined from polar and azimuthal angles of the K^+K^- isobar, in helicity frame of $K^+K^-\pi^0$ system: z-axis coincident with the K^+K^- π^0 system and y-axis in direction of cross product of beam with z-axis

Definition of (θ,φ) and (θ_H,φ_H)

- The (θ,φ) angles defined from polar and azimuthal angles of the K^+K^- isobar, in helicity frame of $K^+K^-\pi^0$ system: z-axis coincident with the $K^+K^-\pi^0$ system and y-axis in direction of cross product of beam with z-axis

- The (θ_H,φ_H) angles defined from polar and azimuthal angles of the K^+, in the helicity frame of the K^+ K^- : z_H-axis coincident with the K^+ K^- and the y-axis in direction of cross product of z-axis (from above) with the z_H-axis

Not used in this presentation, but to be used in the near future

Initial PWA setup

- Used AmpTools for PWA

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ASU

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  - $L = 0$
  - $L = 1$, with m_L = -1, 0, 1 contributions added coherently
  - The L=0 and L=1 are added incoherently
- Neglecting Isobar decay (θ_H,φ_H) for now

Initial PWA results

Fit fraction of L=0 : 0.78(8)

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Initial PWA results

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Fit fraction of L=1, m_L = +1 : 0.1(3)

By far, the most important contribution

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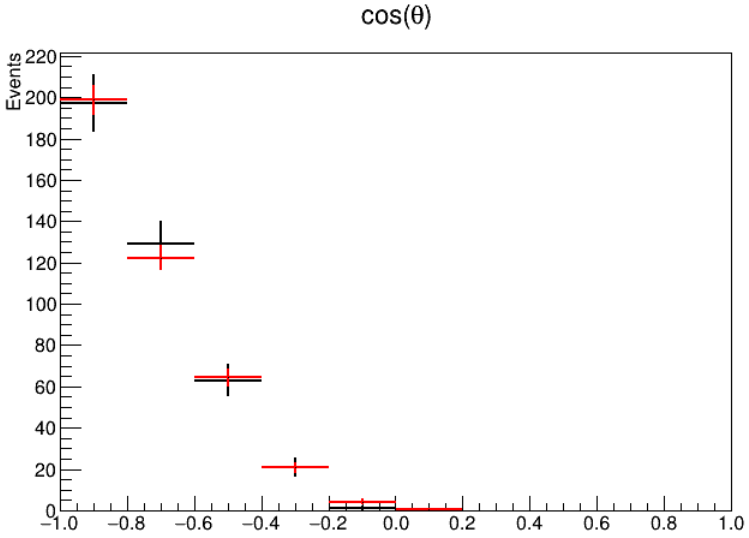
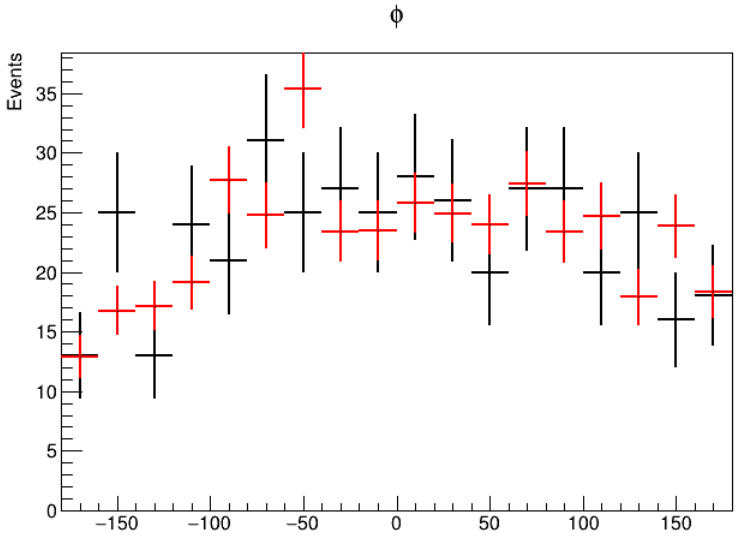
Fit fraction of L=1, m_L = 0 : 0.00(4)

Fit fraction of L=1, m_L = +1 : 0.1(3)

Data shown below:

- **BLACK = real data**
- **RED = Accepted MC weighted by fit function**





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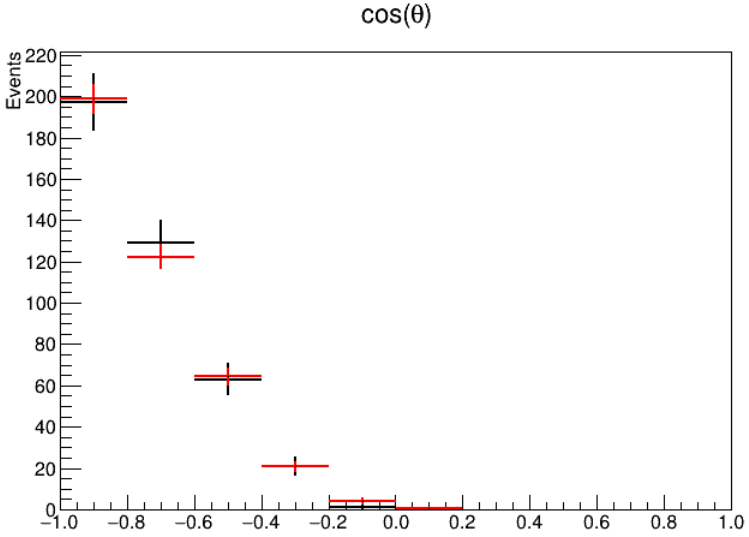
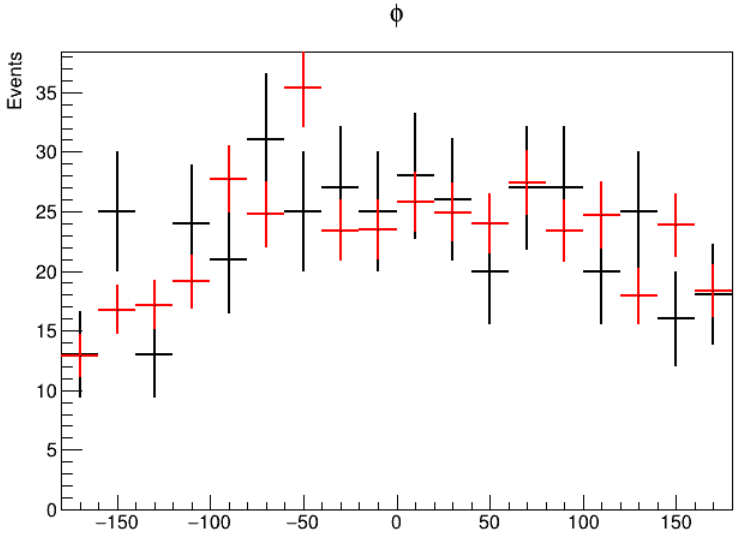
Next step:

- **Include the isobar decomposition to determine total *J* of *R***





Title