$$\psi(2S) \rightarrow \phi K^{+} K^{-} \eta$$

Initial Event Selection

For charge tracks

- $N_{good} = 4$
- $\Sigma Q_i = 0$
- $|V_r| < 1$ cm , $|V_Z| < 10$ cm
- Polar angle $|cos\theta| < 0.93$

For good photons

- TDC time requirement :
  $0 \leq t \leq 14$ (50ns)
- $\theta_{\gamma,charge} \geq 10^{\circ}$
- $8 \geq N_{\gamma} \geq 2$
- E >25 MeV for barrel EMC ($|cos\theta|$<0.8)
  E >50 MeV for endcap EMC
  (0.86<$|cos\theta|$<0.92)

PID

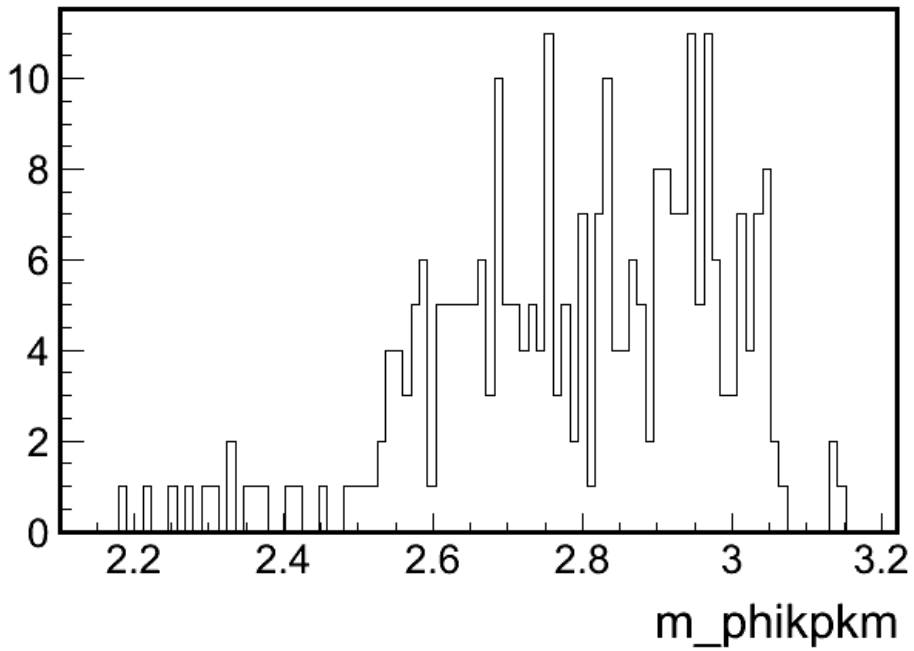
- For K:
  $Prob(K) > Prob(\pi)$
  $Prob(K) > Prob(p)$

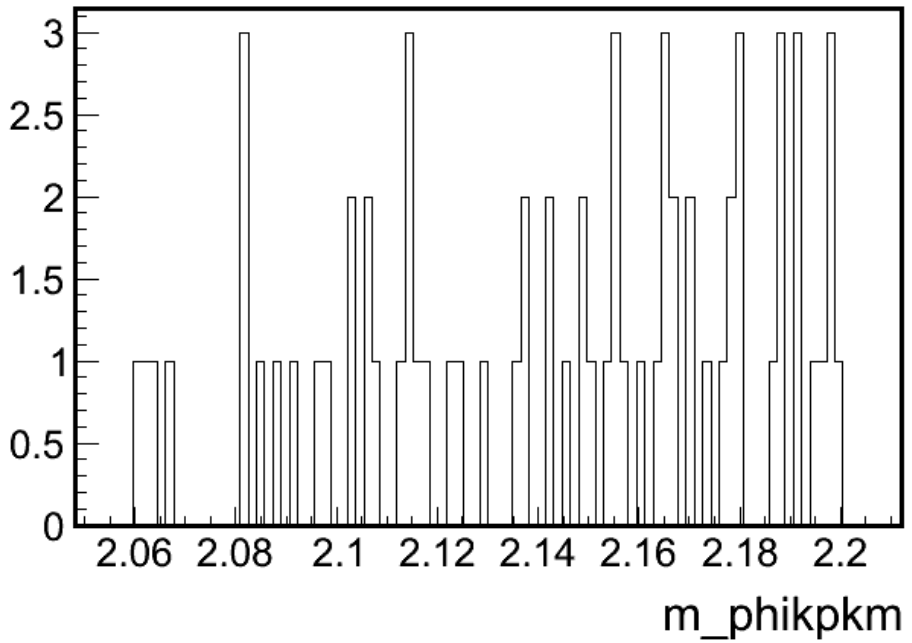
Vertex fit is not performed:

Kinematic fit

- 4C kinematic fit was performed and the one with the minimum χ^2_{4c} value is chosen.
- The ϕ candidates are distinguished by looping all K^+K^- combination. There is only one K^+K^- pair decaying from ϕ is distinguished in an event, and the one with minimum of $\sqrt{(M_{K^+K^-} - m_{\phi})^2}$ is regarded as K^+K^- decaying from ϕ .

12data 4K谱

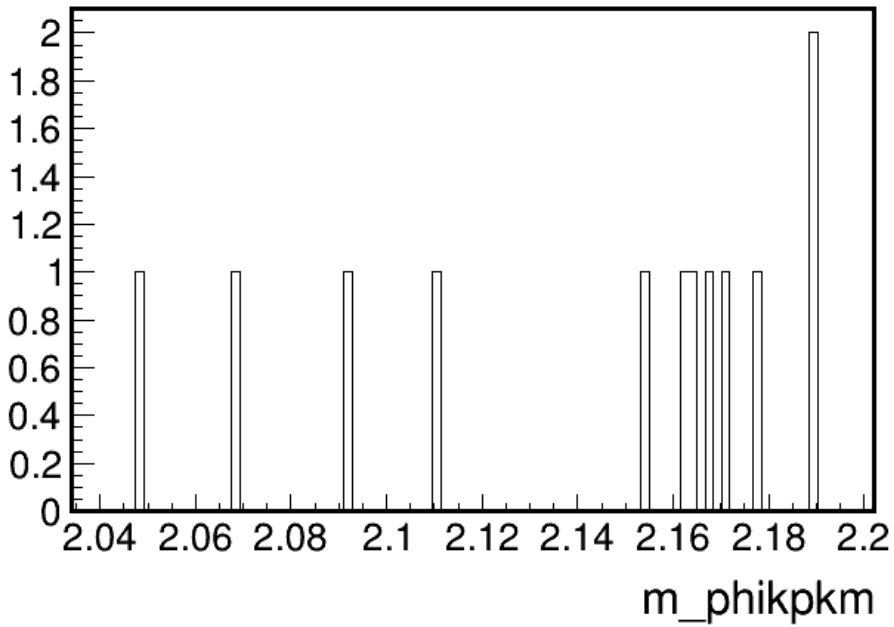




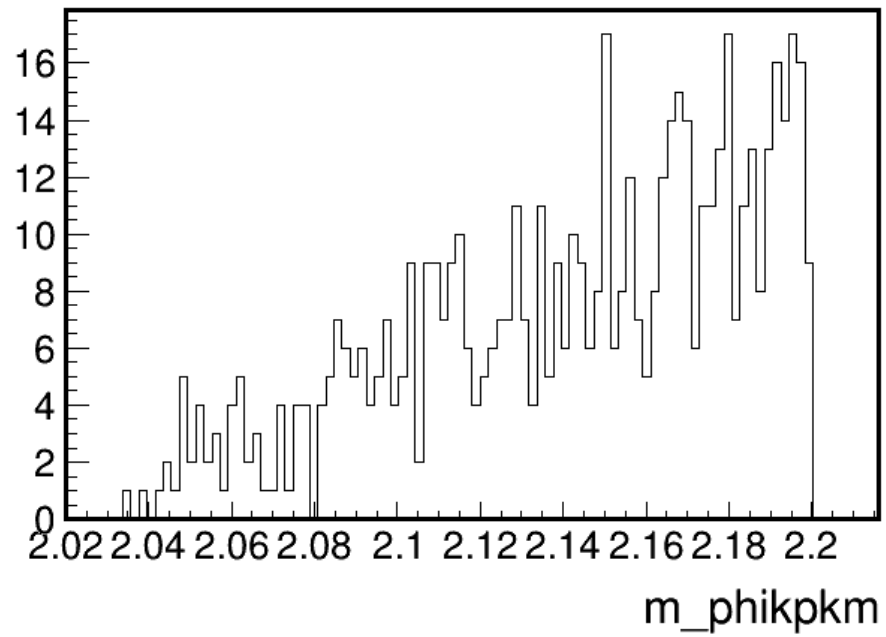
chi4c<50&&abs(mg1g2-0.548)<0.015&&abs(m_phikpkm-3.097)>0.03

abs(m_phikpkm-3.097)>0.03&&m_phikpkm<2.2

091221data



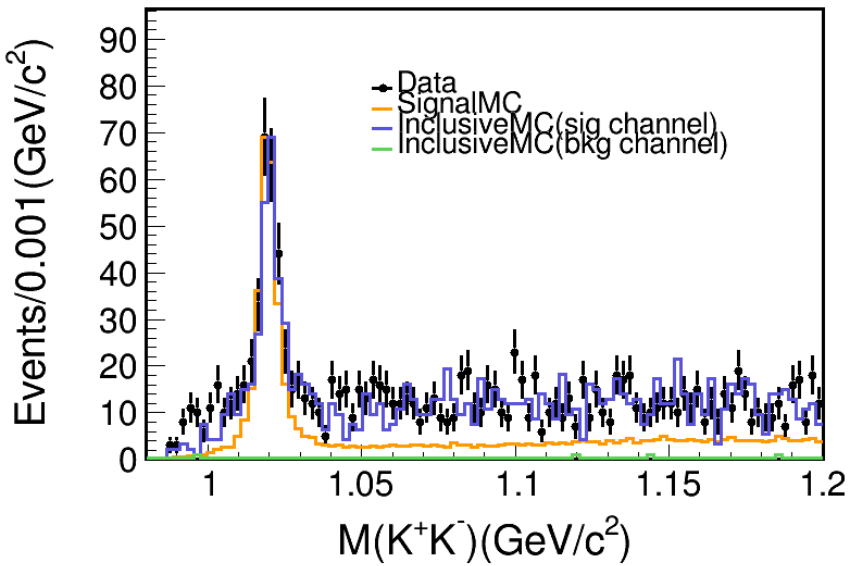
h4->Draw("m_phikpkm","abs(m_phikpkm-3.097)>0.03&&m_phikpkm<2.2&&abs(mg1g2-0.548)<0.015")

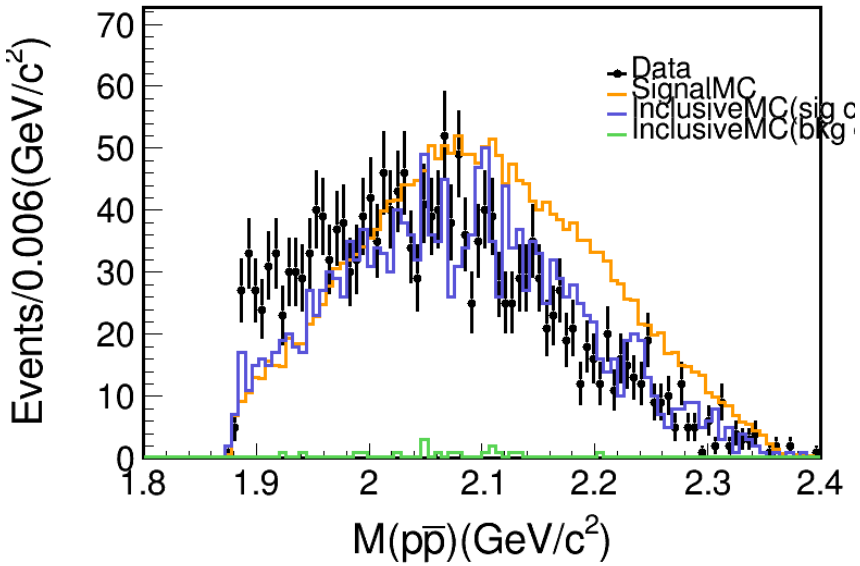


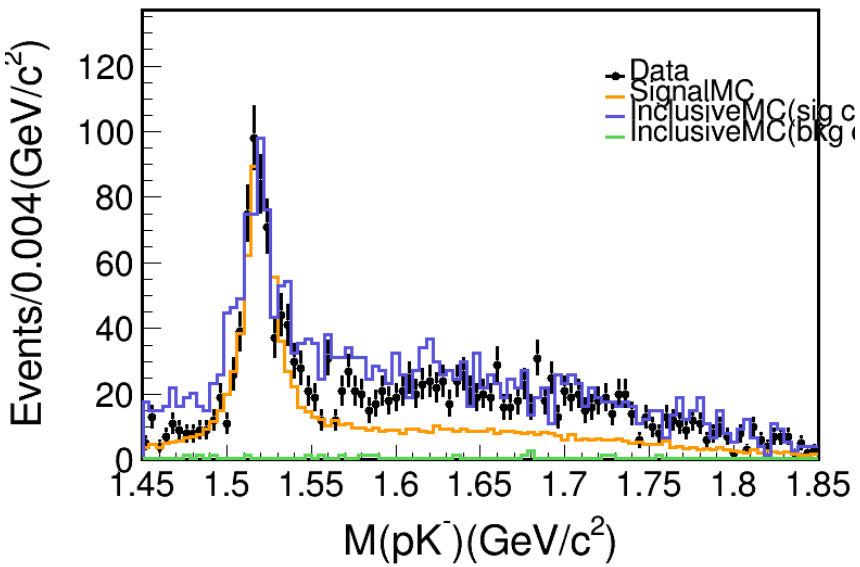
h4->Draw("m_phikpkm","abs(m_phikpkm-3.097)>0.03&&m_phikpkm<2.2")

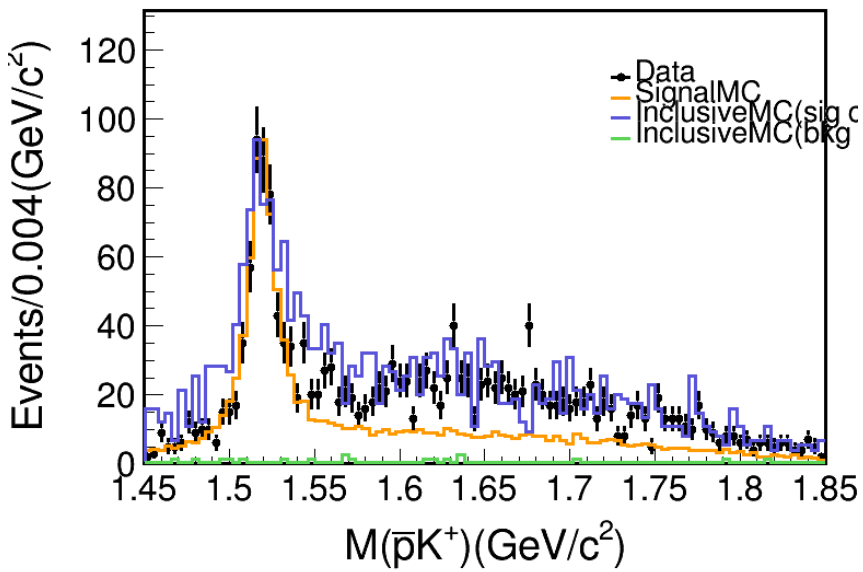
$$\chi_{cJ} \rightarrow p\bar{p}K^{+}K^{-}$$

chic0　　用自己的分支比

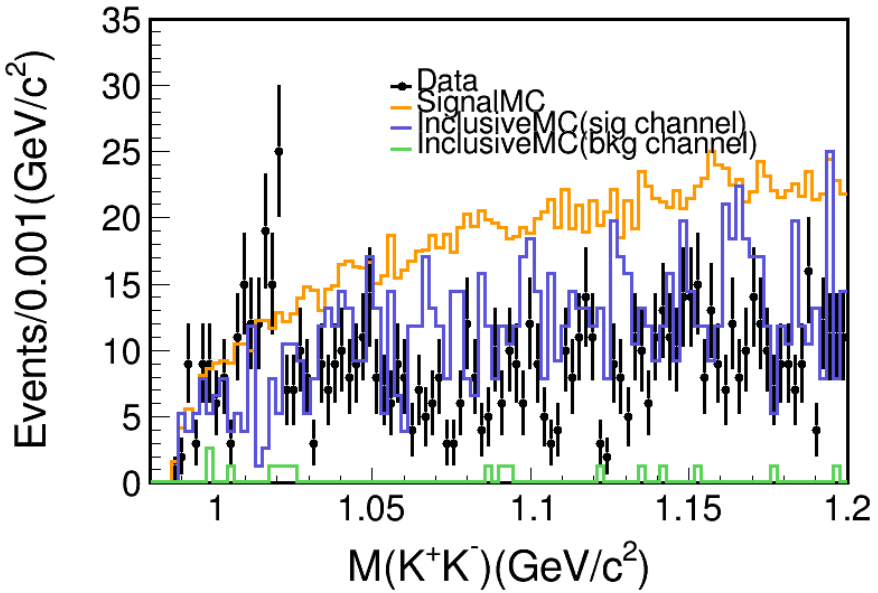


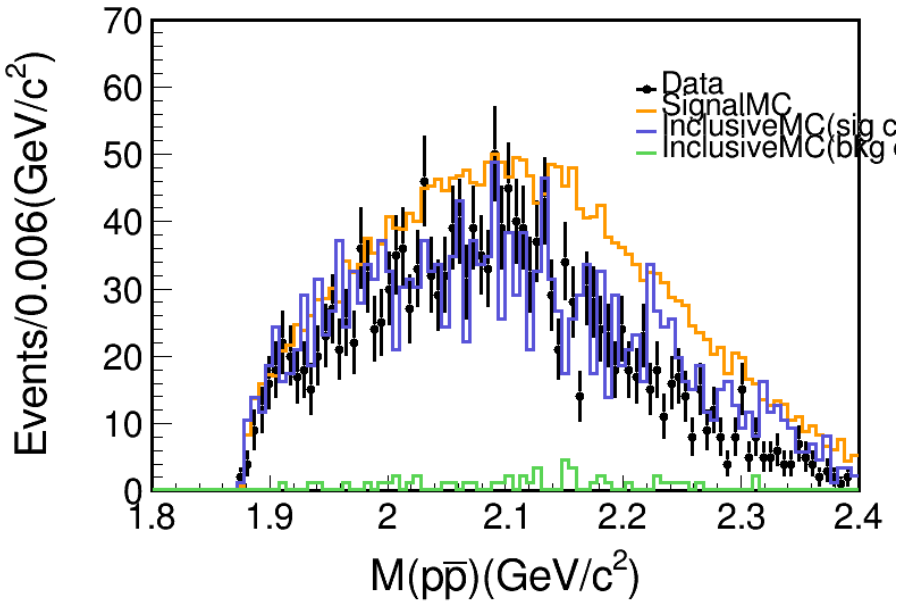


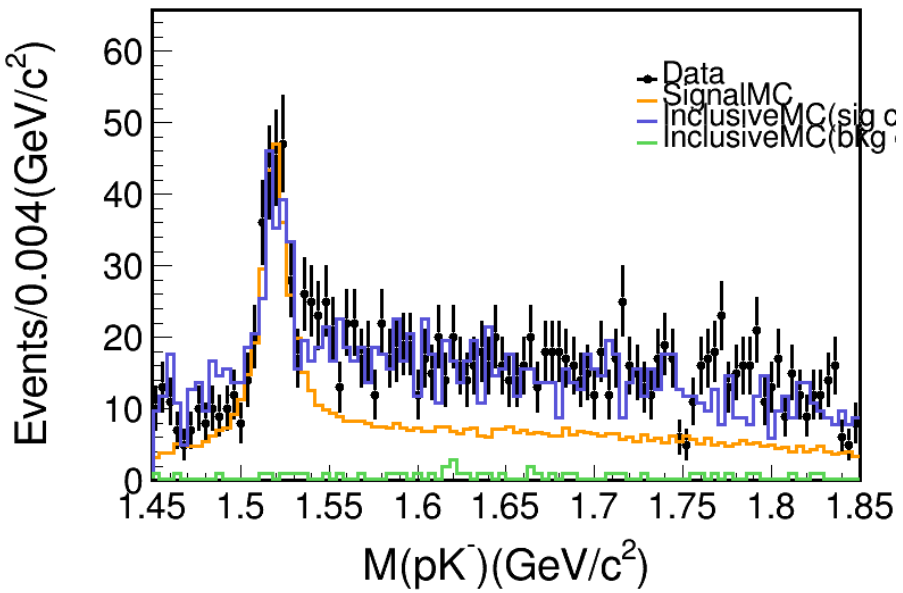


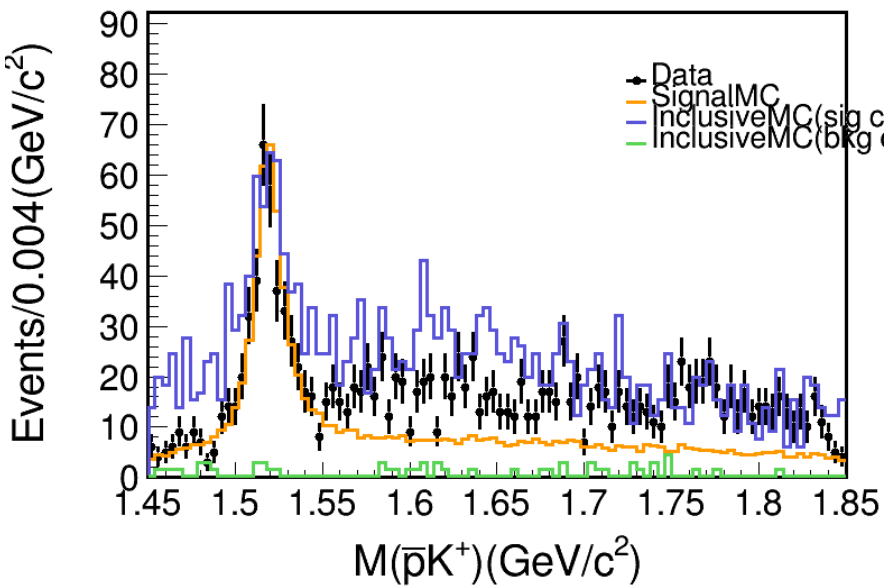


chic1


Data
SignalMC
InclusiveMC(sig channel)
InclusiveMC(bkg channel)
Events/0.001(GeV/c²)
M(K⁺K⁻)(GeV/c²)

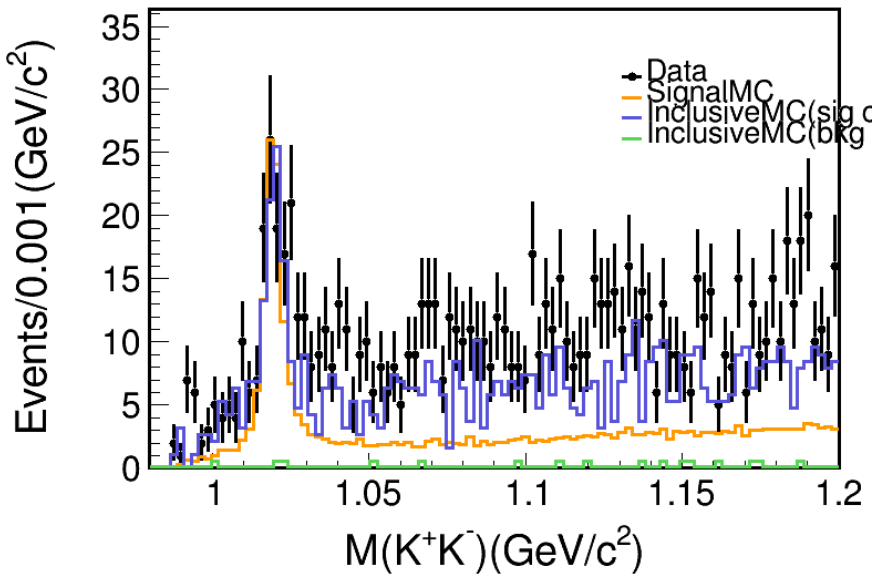

Data
SignalMC
InclusiveMC(sig c
InclusiveMC(bkg
Events/0.006(GeV/c²)
M(pp̄)(GeV/c²)

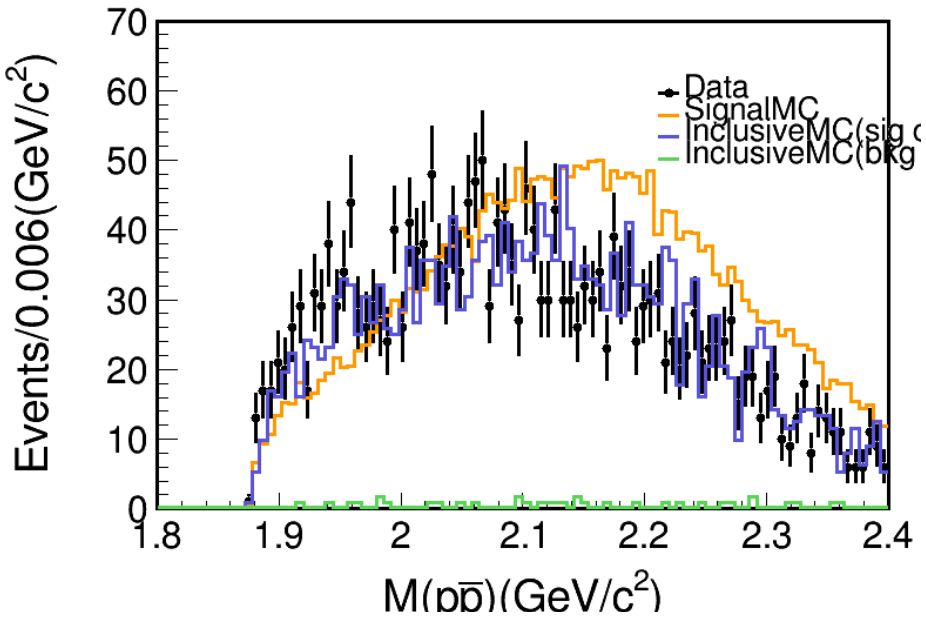

Data
SignalMC
InclusiveMC(sig c
InclusiveMC(bkg
Events/0.004(GeV/c²)
M(pK⁻)(GeV/c²)

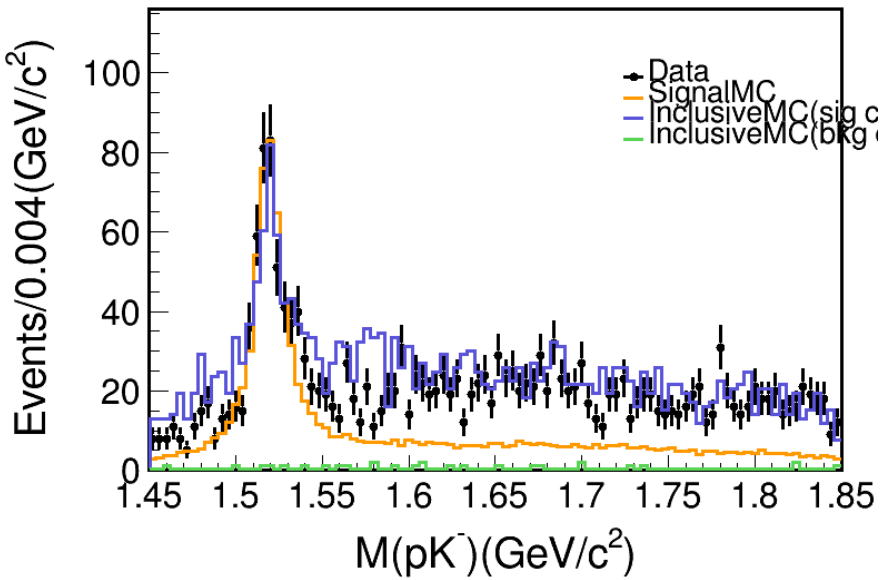

Data
SignalMC
InclusiveMC(sig c
InclusiveMC(bkg
Events/0.004(GeV/c²)
M(p̄K⁺)(GeV/c²)

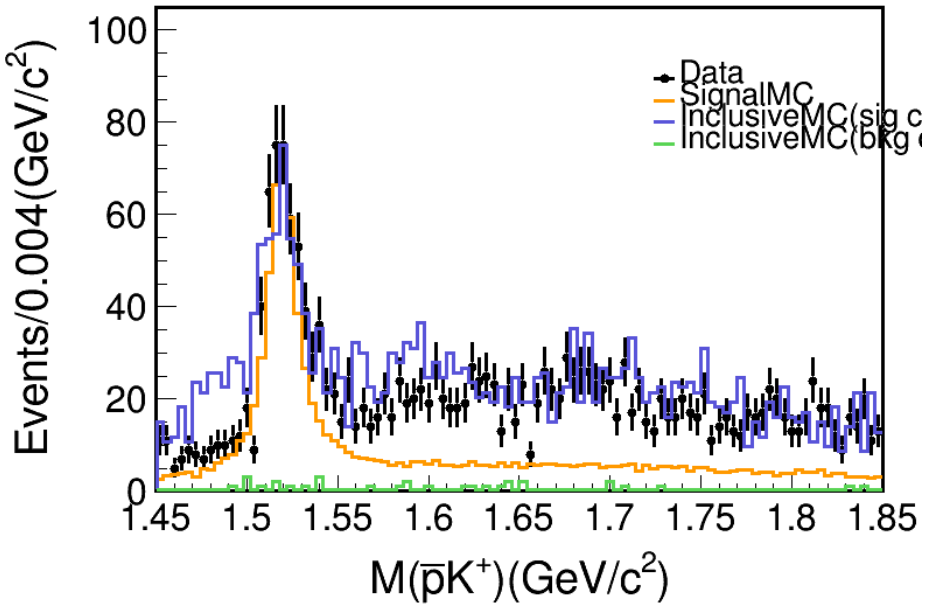
chic2

/besfs5/groups/jpsi/jpsigroup/user/lliu/664p03/gamPPbarKpKm/2ppkk/2chicJ/draw

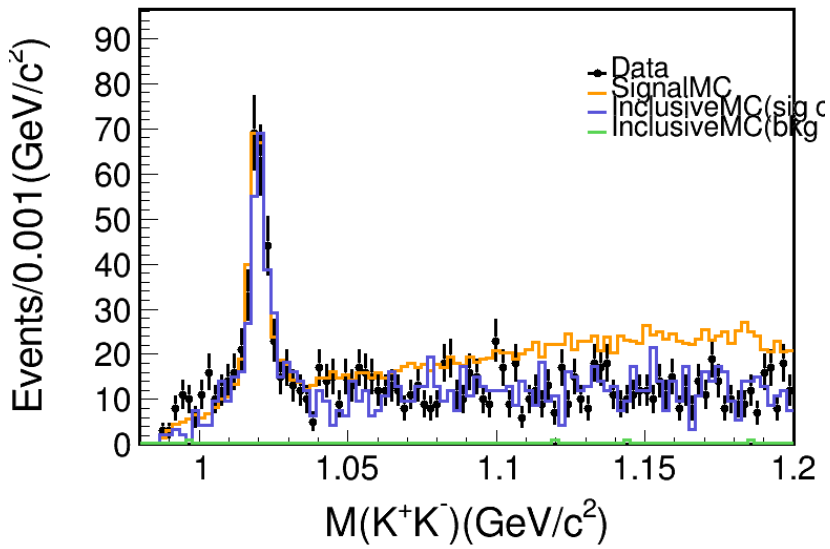


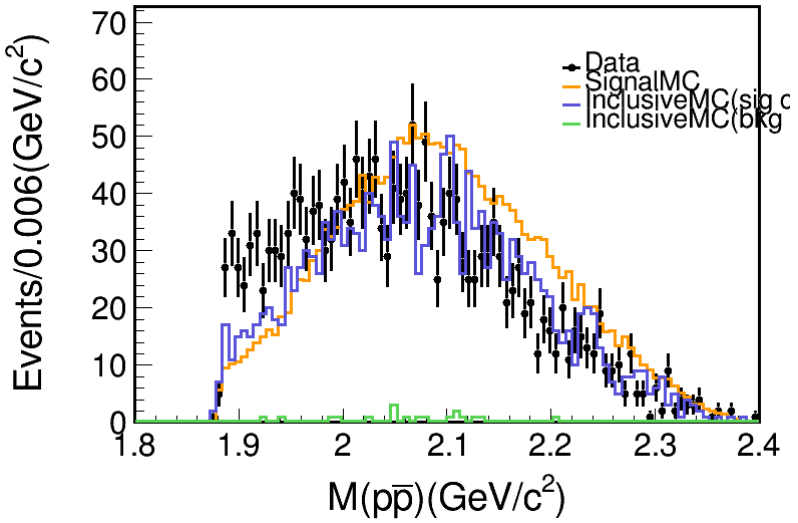


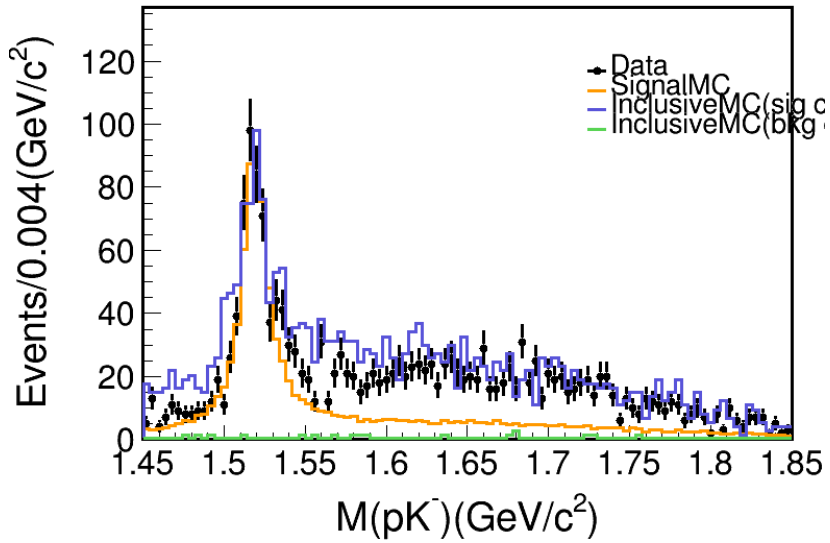


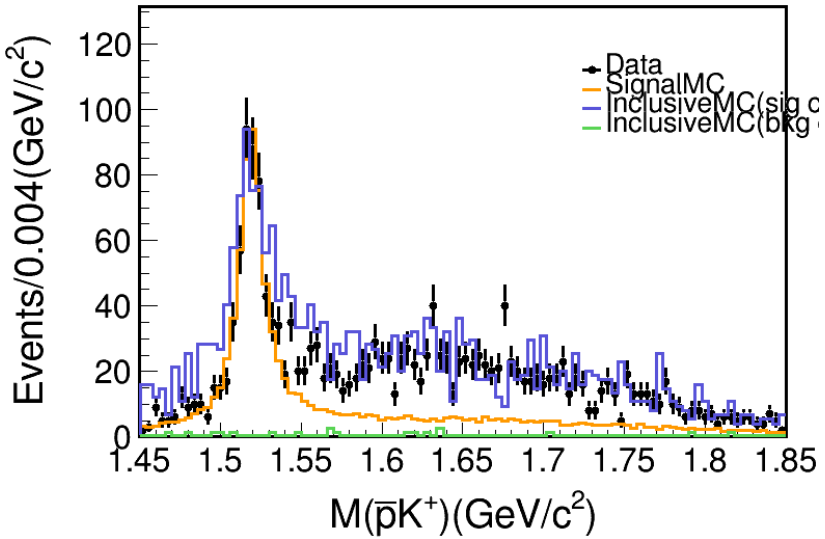


耿聪的分支比 chic0

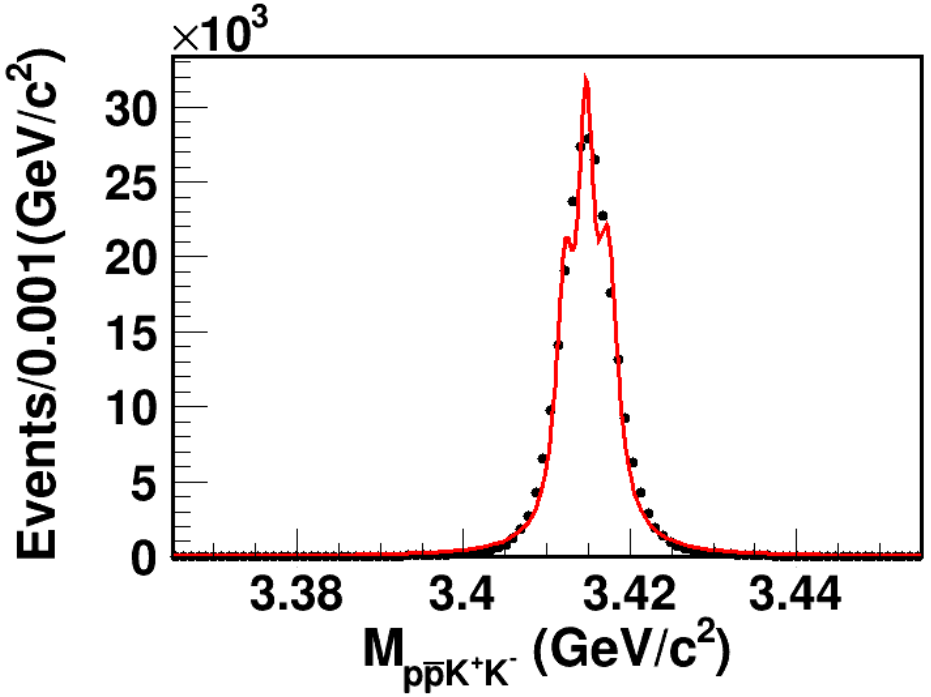








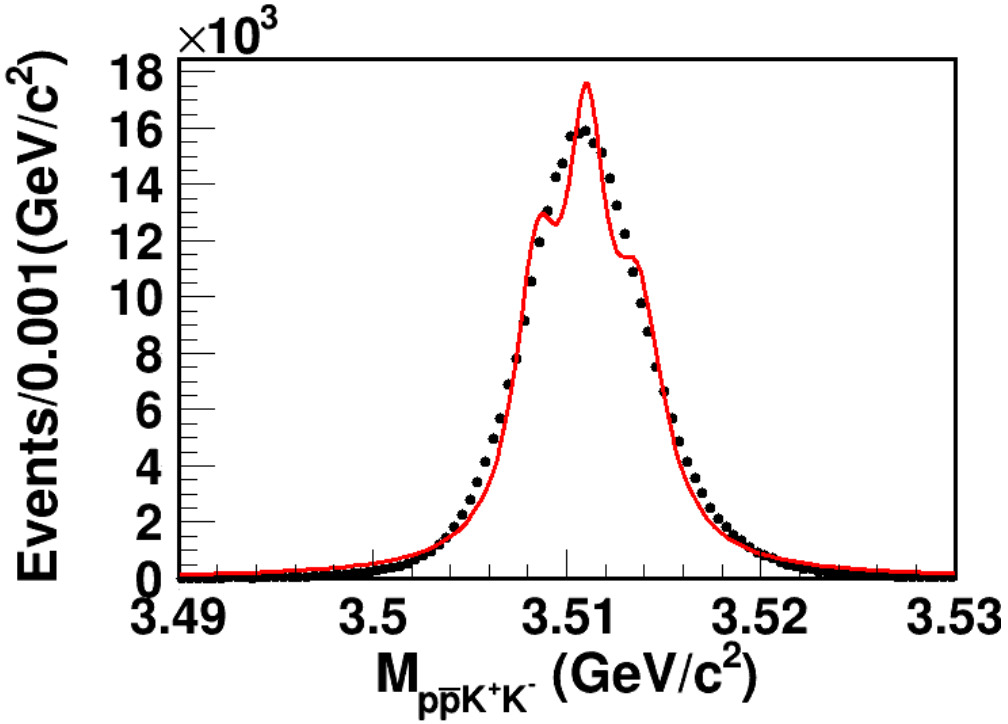
Amplitude Analysis



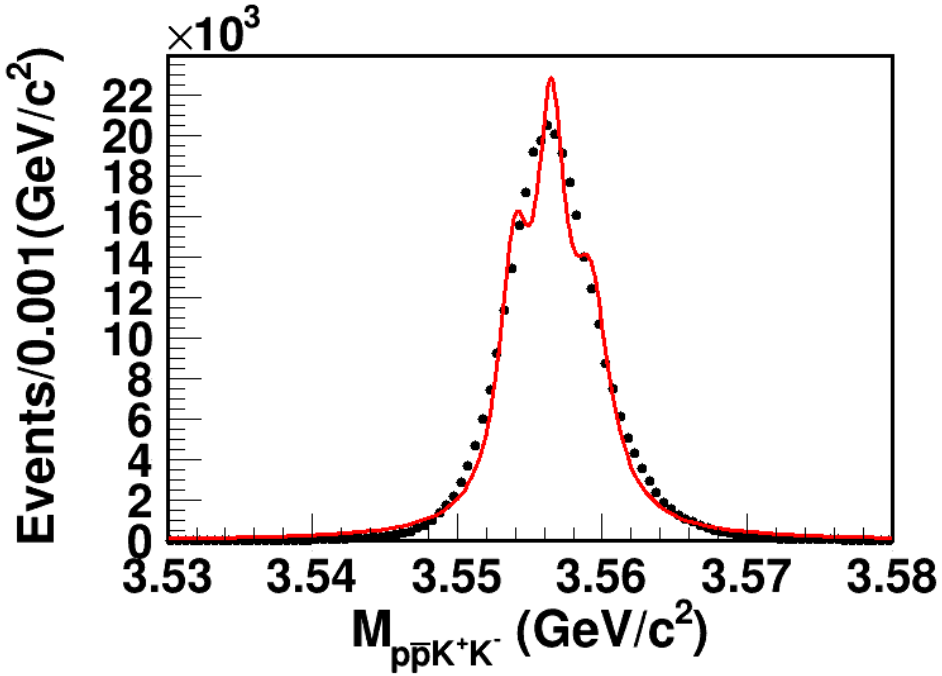
COVARIANCE MATRIX CALCULATED SUCCESSFULLY
FCN=-3.92054e+06 FROM HESSE STATUS=OK 91 CALLS 958 TOTAL
EDM=4.04042e-05 STRATEGY= 1 ERROR MATRIX ACCURATE

EXT NO.	PARAMETER NAME	VALUE	ERROR	INTERNAL STEP SIZE	INTERNAL VALUE
1	mean0	3.41218e+00	2.92320e-05	1.88034e-05	1.10990e+00
2	mean1	3.41472e+00	3.00239e-05	1.42075e-05	1.11309e+00
3	mean2	3.41736e+00	2.95949e-05	1.82391e-05	1.11642e+00
4	n1	6.94495e+04	1.43566e+03	1.35462e-03	-1.19591e+00
5	n2	9.83694e+04	1.39447e+03	1.38795e-03	-1.12352e+00
6	n3	8.41317e+04	1.60275e+03	1.30752e-03	-1.15767e+00
7	sigma0	2.62789e-03	2.41182e-05	3.57696e-03	-8.28933e-01
8	sigma1	2.32951e-03	2.34897e-05	2.87360e-03	-8.74229e-01
9	sigma2	2.92029e-03	2.25735e-05	3.35211e-03	-2.35497e+00

ERR DEF= 0.5




```
COVARIANCE MATRIX CALCULATED SUCCESSFULLY
FCN=-5.09504e+06 FROM HESSE     STATUS=OK             73 CALLS         494 TOTAL
                     EDM=3.88649e-05    STRATEGY= 1      ERROR MATRIX ACCURATE
 EXT PARAMETER                                   INTERNAL      INTERNAL
 NO.   NAME      VALUE            ERROR          STEP SIZE       VALUE
  1  mean0         3.51102e+00   2.75878e-05   8.61041e-07   1.25505e+00
  2  mean1         3.50847e+00   2.53416e-05   1.53589e-06   1.35406e+00
  3  mean2         3.51370e+00   3.08884e-05   1.23018e-06   1.25989e+00
  4  n1            1.27438e+05   1.92557e+03   1.97220e-05  -1.41098e+00
  5  n2            9.88440e+04   1.84670e+03   1.90536e-05  -1.43008e+00
  6  n3            9.52354e+04   1.90870e+03   1.91982e-05  -1.43268e+00
  7  sigma0        2.54236e-03   2.66148e-05   1.26466e-04  -8.41682e-01
  8  sigma1        2.81646e-03   2.32427e-05   1.46465e-04  -8.01433e-01
  9  sigma2        3.18631e-03   2.57261e-05   1.62681e-04  -7.49631e-01
                               ERR DEF= 0.5
```



COVARIANCE MATRIX CALCULATED SUCCESSFULLY
FCN=-5.12084e+06 FROM HESSE STATUS=OK 73 CALLS 572 TOTAL
EDM=5.81109e-05 STRATEGY= 1 ERROR MATRIX ACCURATE

EXT NO.	PARAMETER NAME	VALUE	ERROR	INTERNAL STEP SIZE	INTERNAL VALUE
1	mean0	3.55922e+00	2.73170e-05	9.50473e-07	1.17816e+00
2	mean1	3.55648e+00	2.28961e-05	6.29871e-07	1.17430e+00
3	mean2	3.55395e+00	2.27494e-05	3.98521e-06	1.17078e+00
4	n1	9.77156e+04	1.63895e+03	1.90387e-05	-1.43089e+00
5	n2	1.31769e+05	1.75158e+03	1.94222e-05	-1.40828e+00
6	n3	9.36885e+04	1.62063e+03	1.91993e-05	-1.43380e+00
7	sigma0	3.18601e-03	2.28650e-05	1.56844e-04	-7.49672e-01
8	sigma1	2.43392e-03	2.31184e-05	1.18029e-04	-8.58109e-01
9	sigma2	2.60753e-03	2.16594e-05	1.42100e-04	-8.31951e-01