Collins Effect Update

A Lot More 7GeV MC

Fast Simulation result

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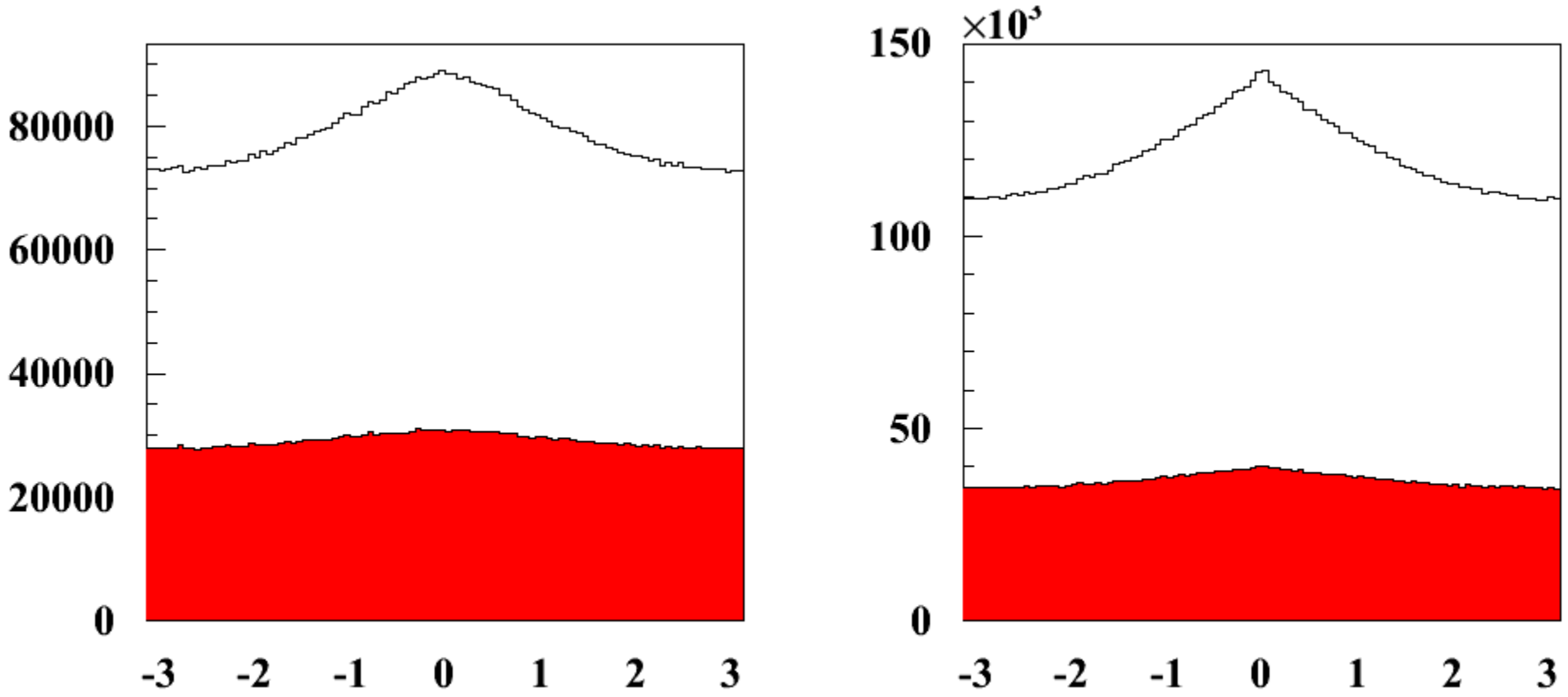
More 7GeV MC

qqbar	cms	ccross section (b)	event number	luminosity (b-1)	tot lumi = 1ab-1	scale
	5GeV	1.5300047E-08	944000	6.16992E+13	1.00E+18	16207.67691
	6GeV	6.0879803E-09	640000	1.05125E+14	1.00E+18	9512.469219
	7GeV	5.0291572E-09	418000	8.31153E+13	1.00E+18	12031.47656
More qqbar	7GeV	5.0291572E-09	12,670,000	2.51930E+15	1.00E+18	396.9342699

产生了$\frac{1}{396.9}ab^{-1}$的qqbar MC

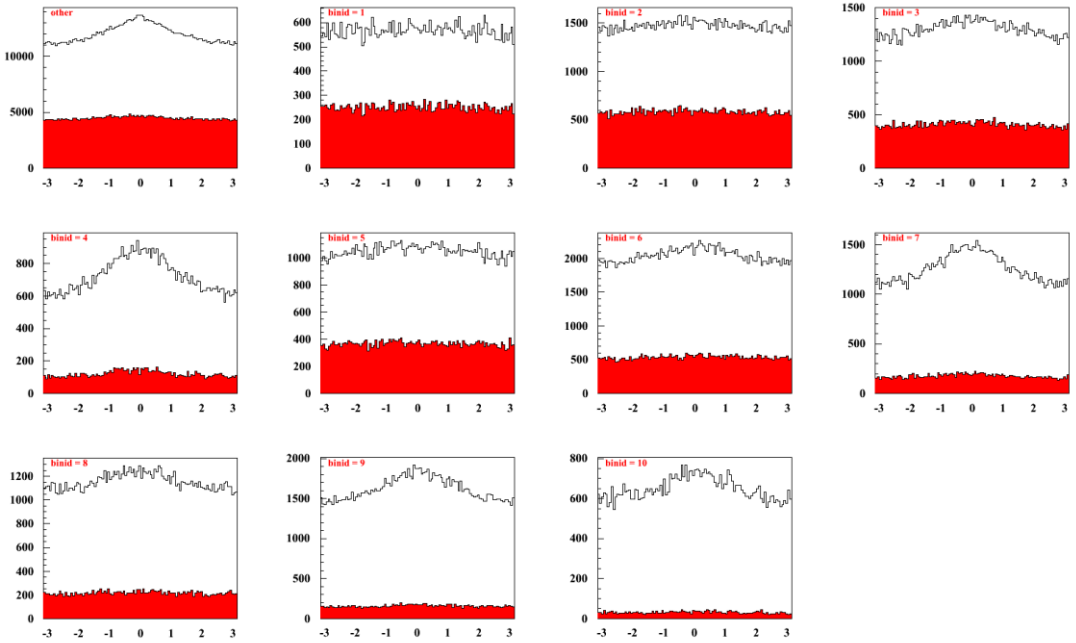
Truth angular distribution and weak/K-π bkg in qqbar

1. truth $\pi\pi$, no cut, red: weak/K-π bkg

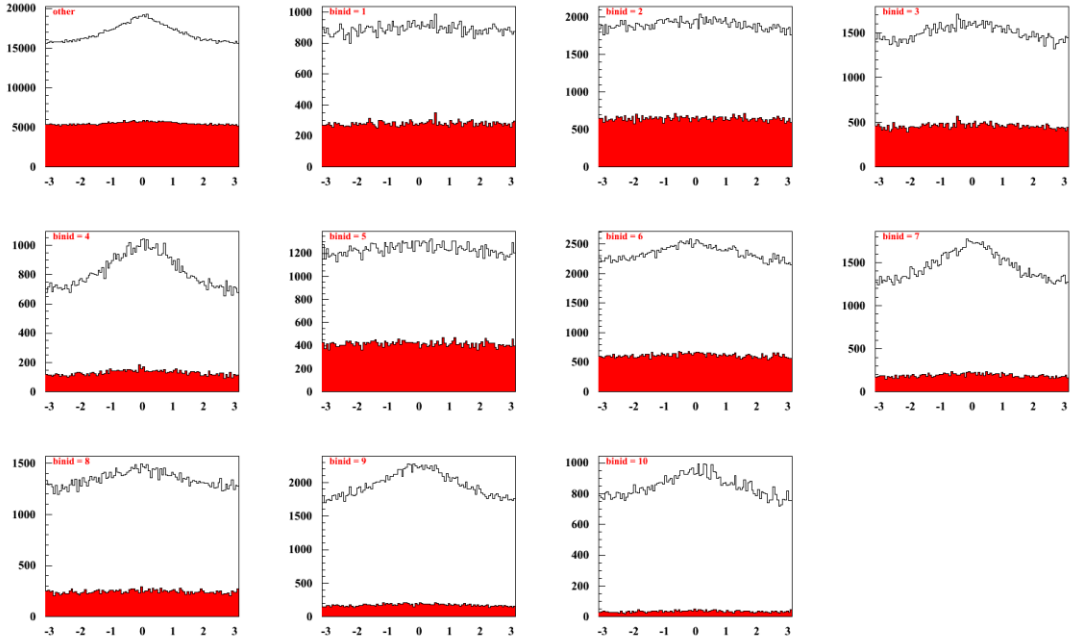


Truth angular distribution and weak/K-π bkg in qqbar
2. truth $\pi\pi$, cut: open angle>120, red: weak/K-π bkg

Like-Sign

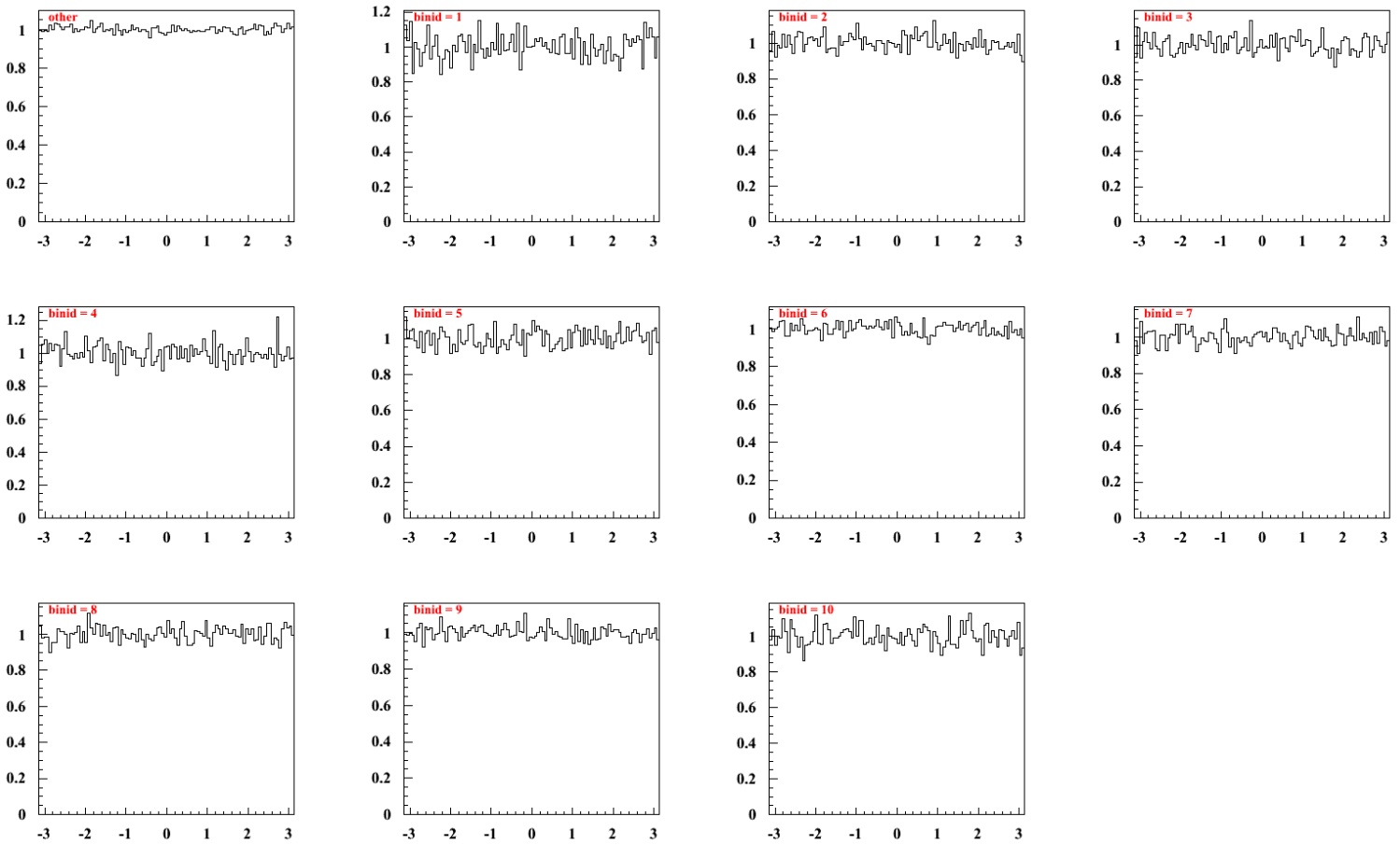


Unlike-Sign

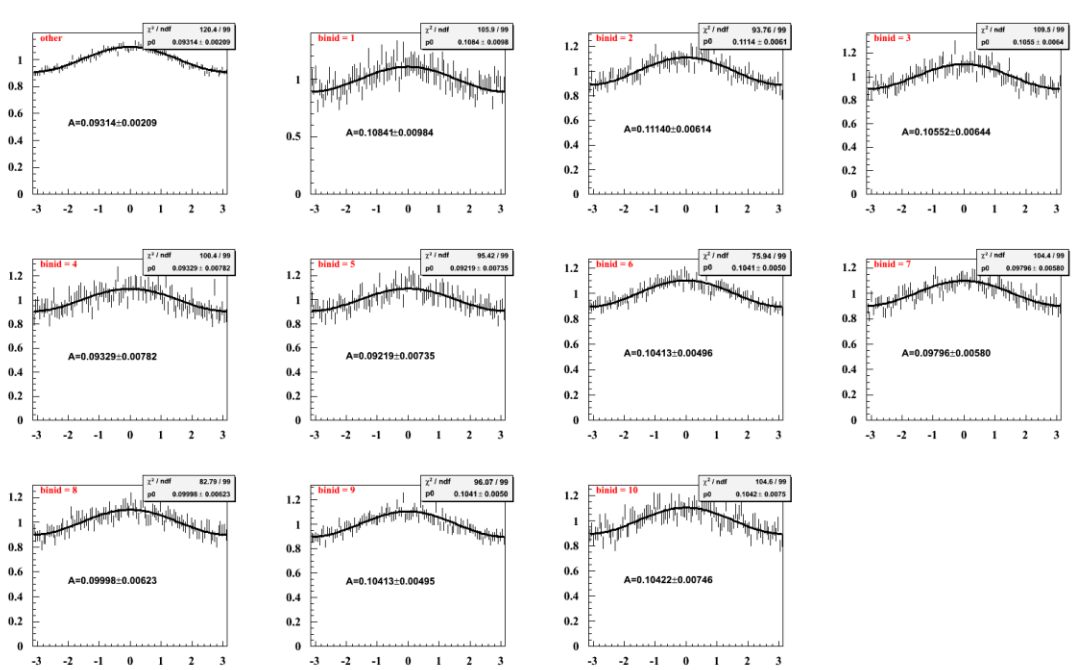


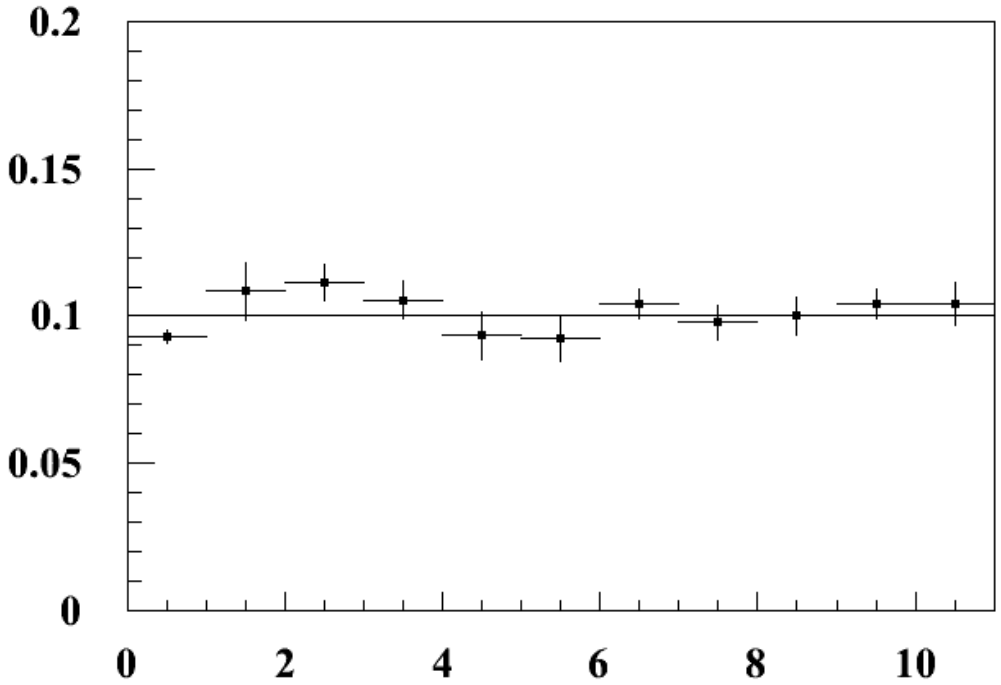
Truth angular distribution and weak/K-π bkg in qqbar

3. $\frac{Like}{Unlike}$, cut: open angle>120, red: weak/K-π bkg



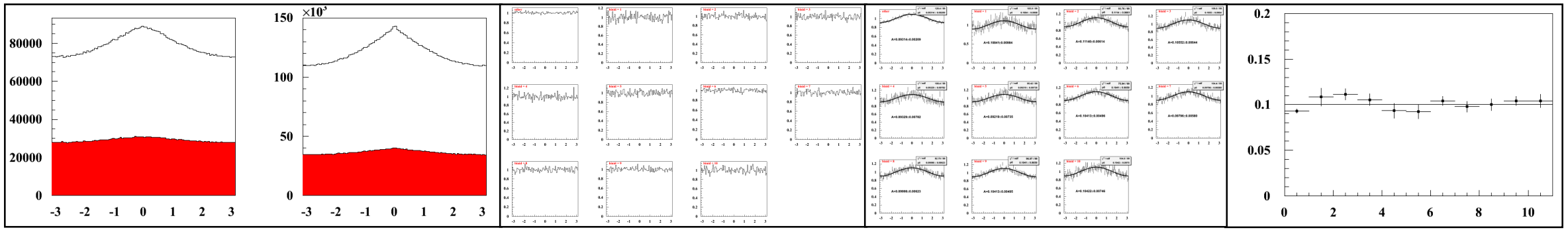
Truth angular distribution and weak/K-π bkg in qqbar
4. I/O check in qqbar, input = 0.1



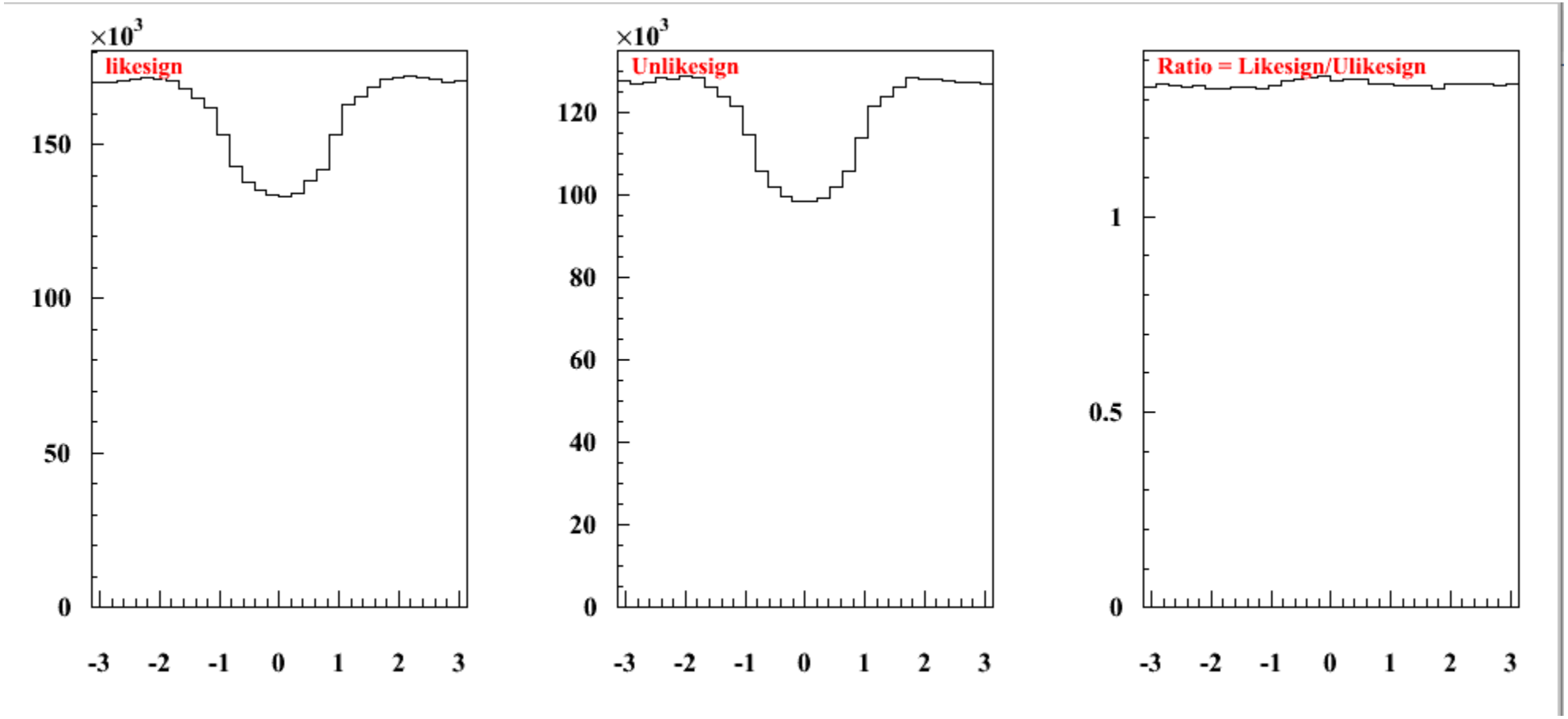


Truth angular distribution and weak/K-π bkg in qqbar
5. Summary

- 1. We generate 1/396 ab-1 MC, using lundArlw.
- 2. Though Like/Unlike sign itself is not flat, the retio $R = \frac{Like}{Unlike}$ is flat.
- 3. We did an I/O check at the truth level.

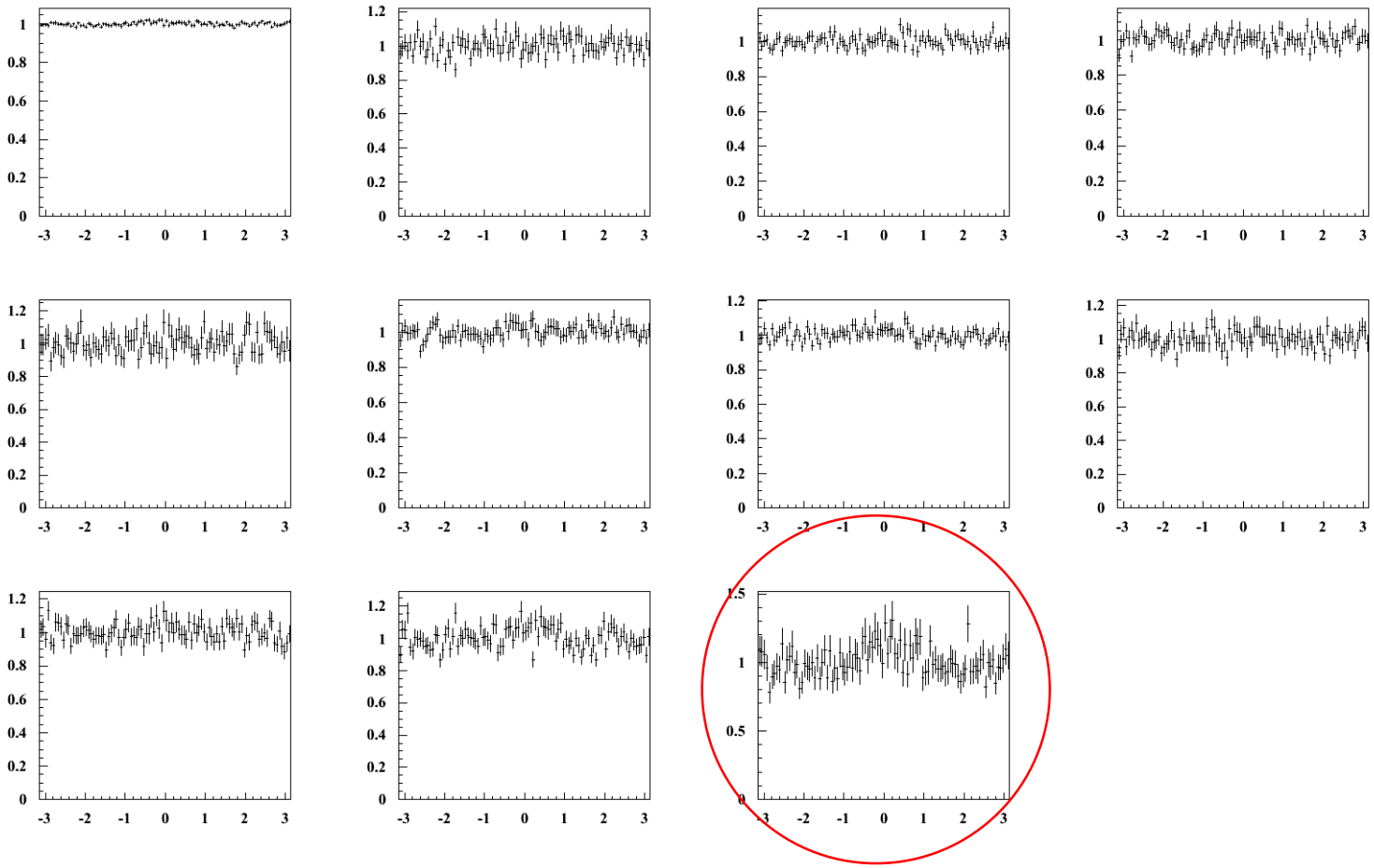


Fast Simulated result
1. first glance



Fast Simulated result

2. $R = \dfrac{Like\ (pure\ hadronic)}{Unlike\ (pure\ hadronic)}$

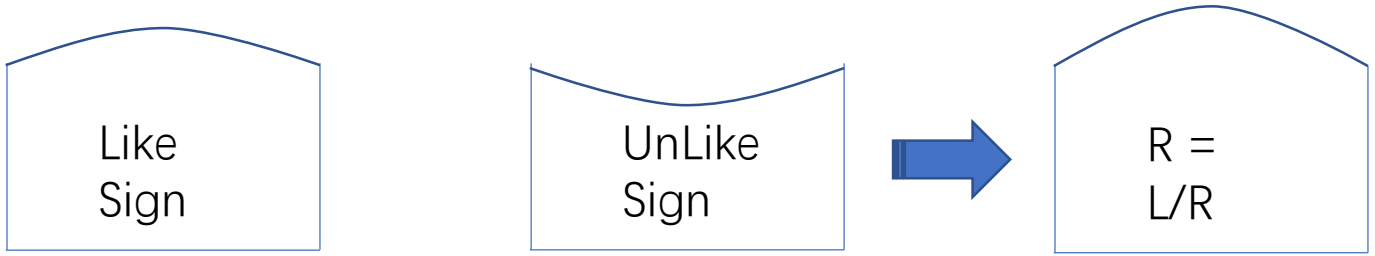


Fast Simulated result
3. parameterization

Assume:

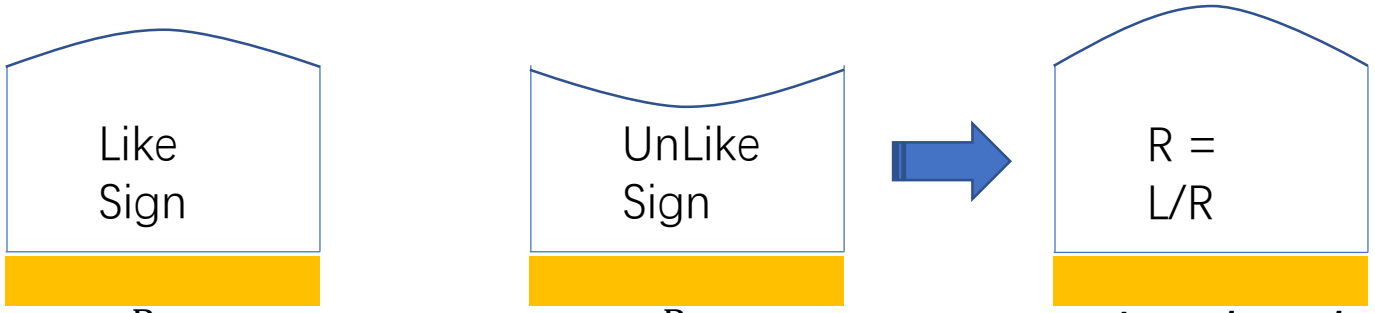
$$k = \frac{A}{A+B} < 1$$
$$\alpha' = k\alpha$$

1) For Pure signal



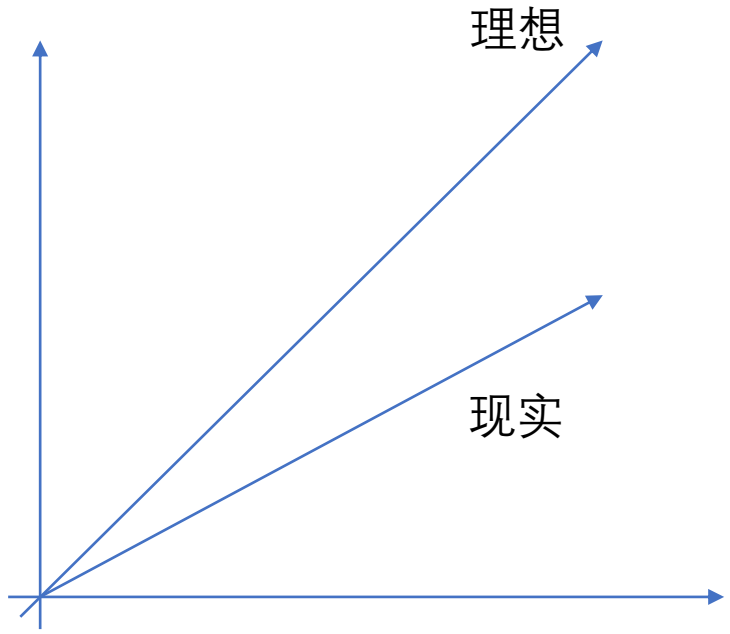
$A_1(1 + \alpha_1 \cos\phi)$ $A_2(1 + \alpha_2 \cos\phi)$ $\alpha = \alpha_1 - \alpha_2$

1) For signal + bkg

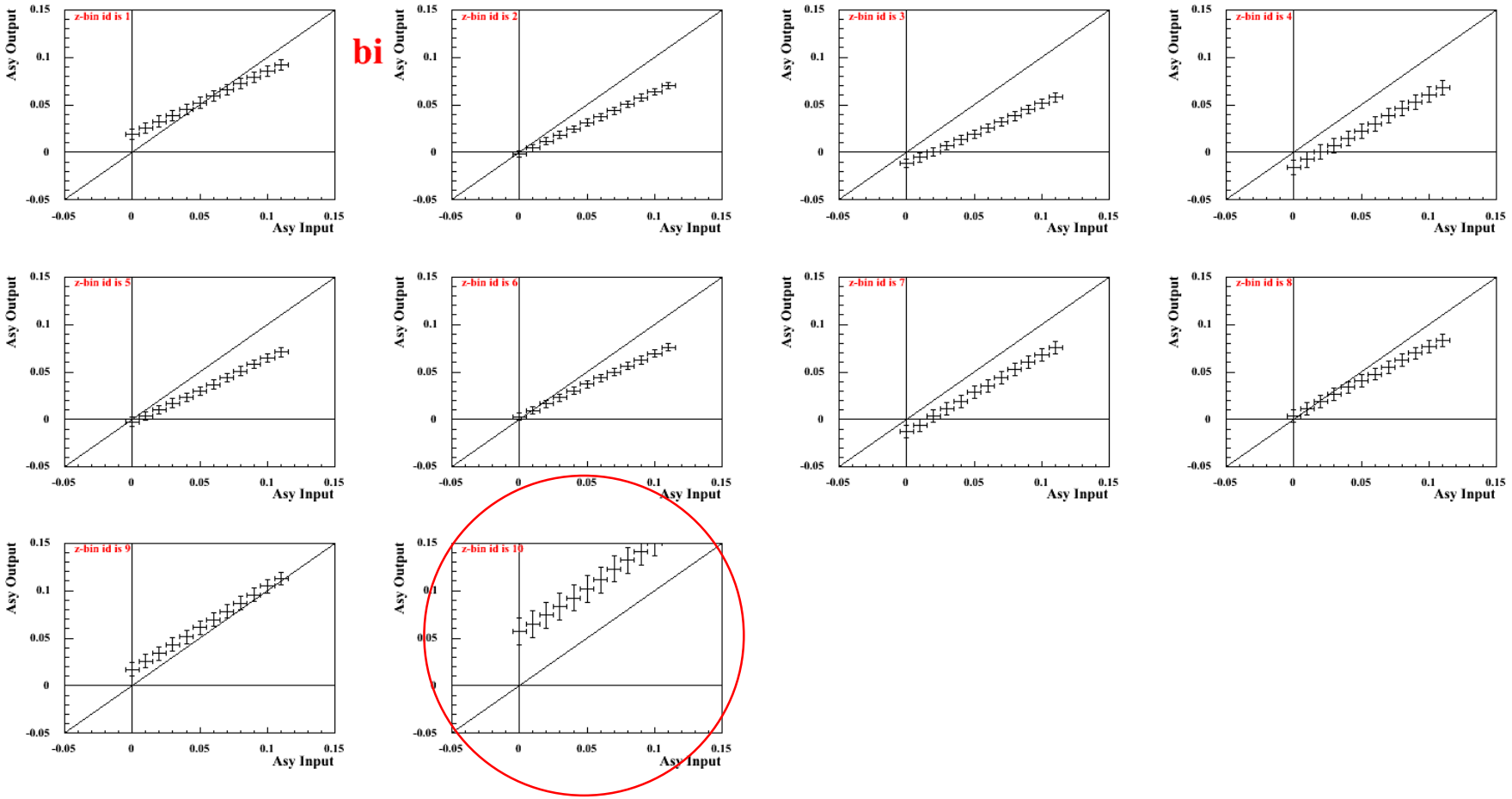


$A_1(1 + \frac{B_1}{A_1} + \alpha_1 \cos\phi)$ $A_2(1 + \frac{B_2}{A_2} + \alpha_2 \cos\phi)$ $\alpha' = \alpha_1' - \alpha_2'$

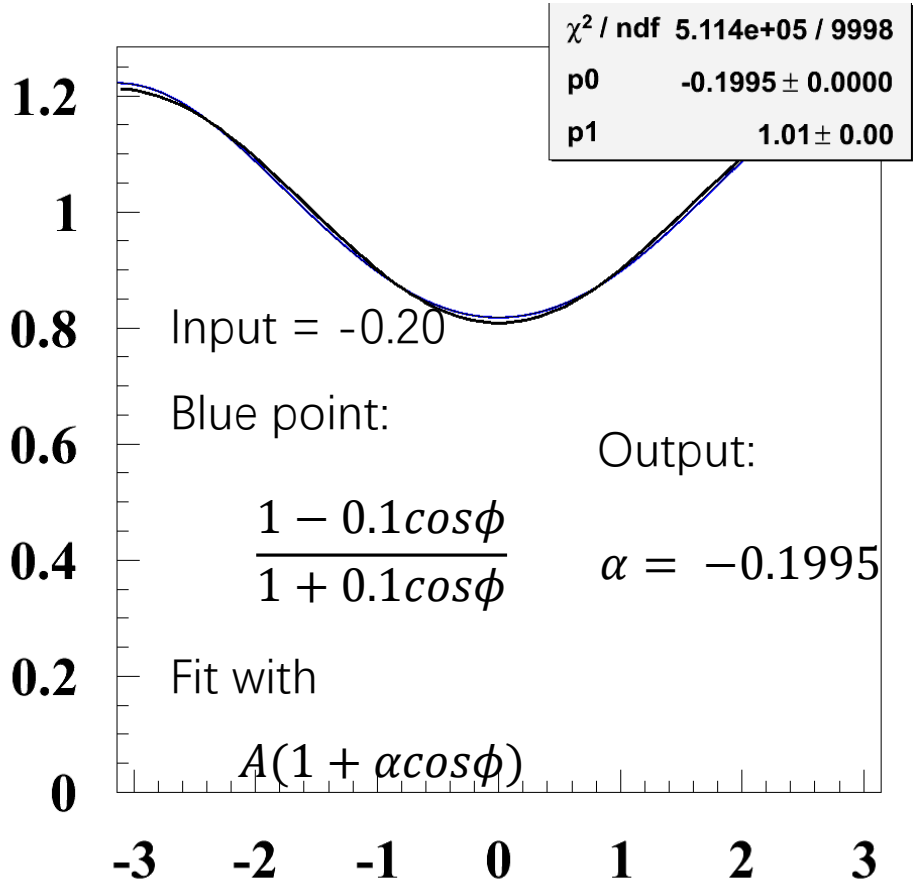
$$\alpha_1' = \frac{A_1\alpha_1}{A_1 + B_1} \qquad \alpha_2' = \frac{A_2\alpha_2}{A_2 + B_2}$$

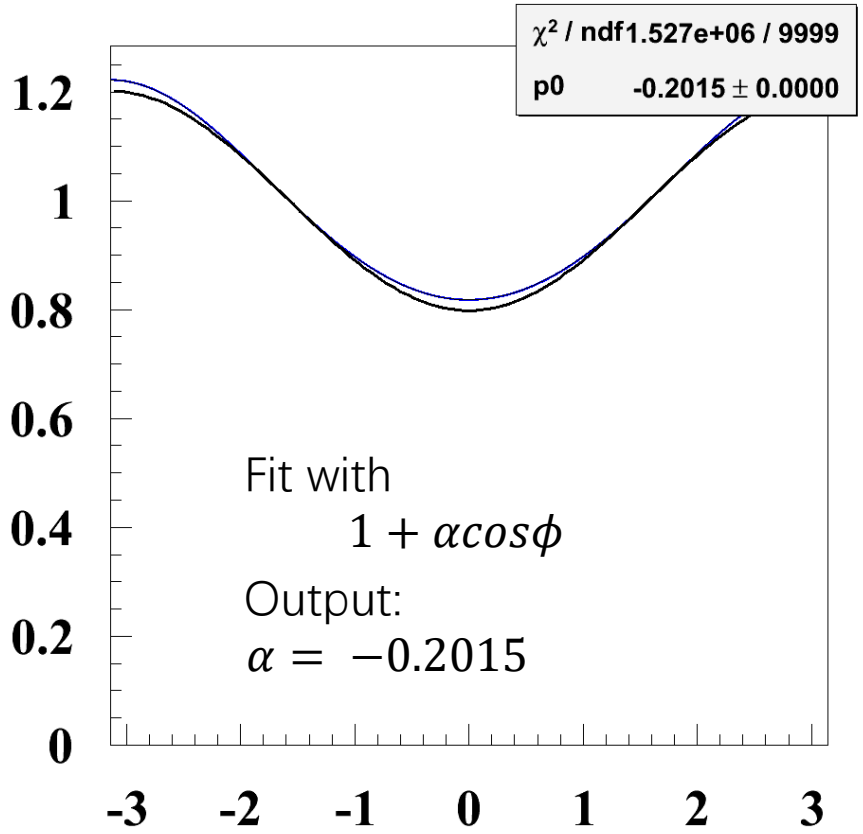


Fast Simulated result
4. Input / output check



One thing more:
systematic from the method ~ 0.0015





One thing more
I think this peak may come from the angular resolution