Status of the bias comprehension in the D*lv q/p Analysis

•Old Problem: bias in the B^0 BKG sector:

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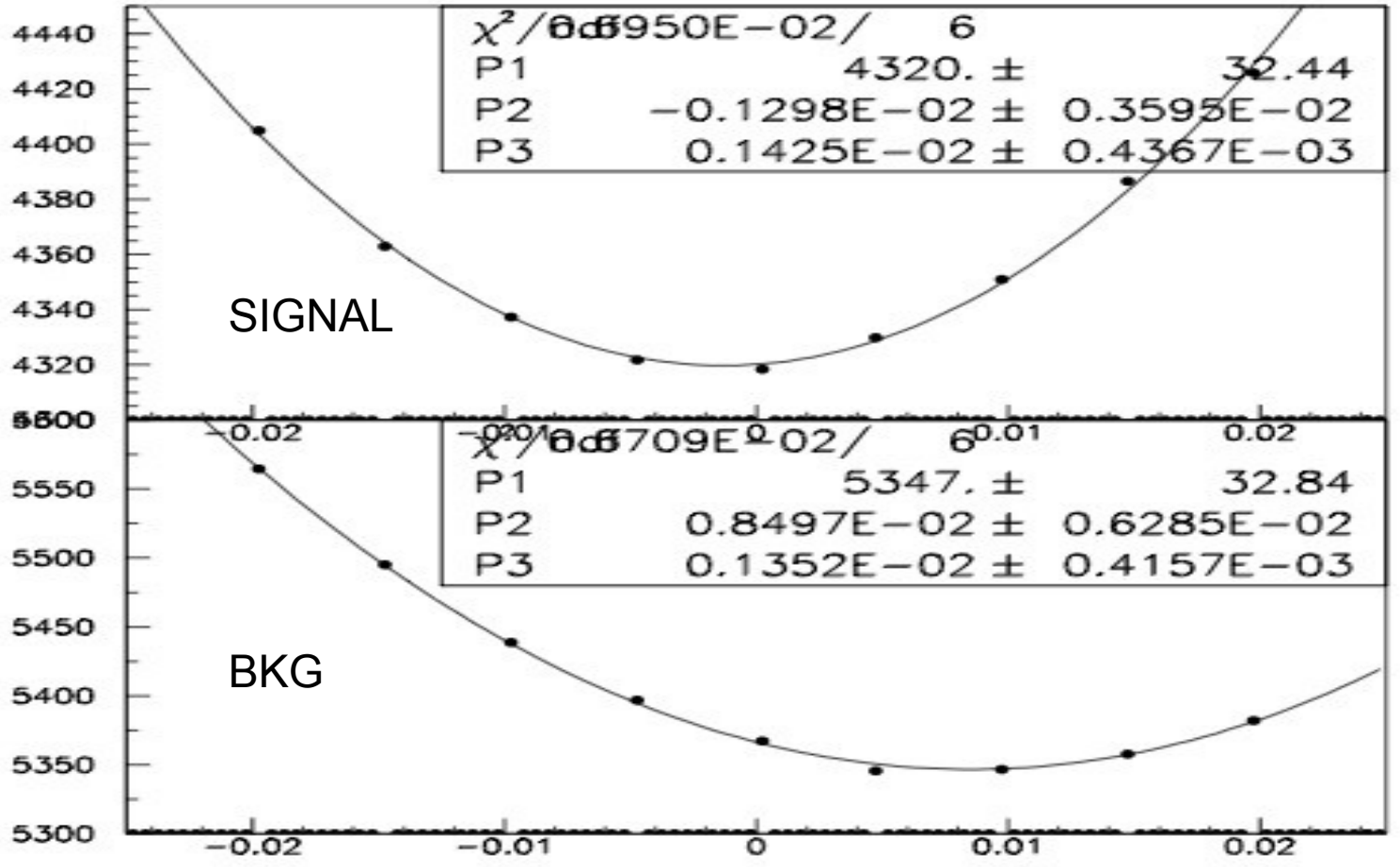
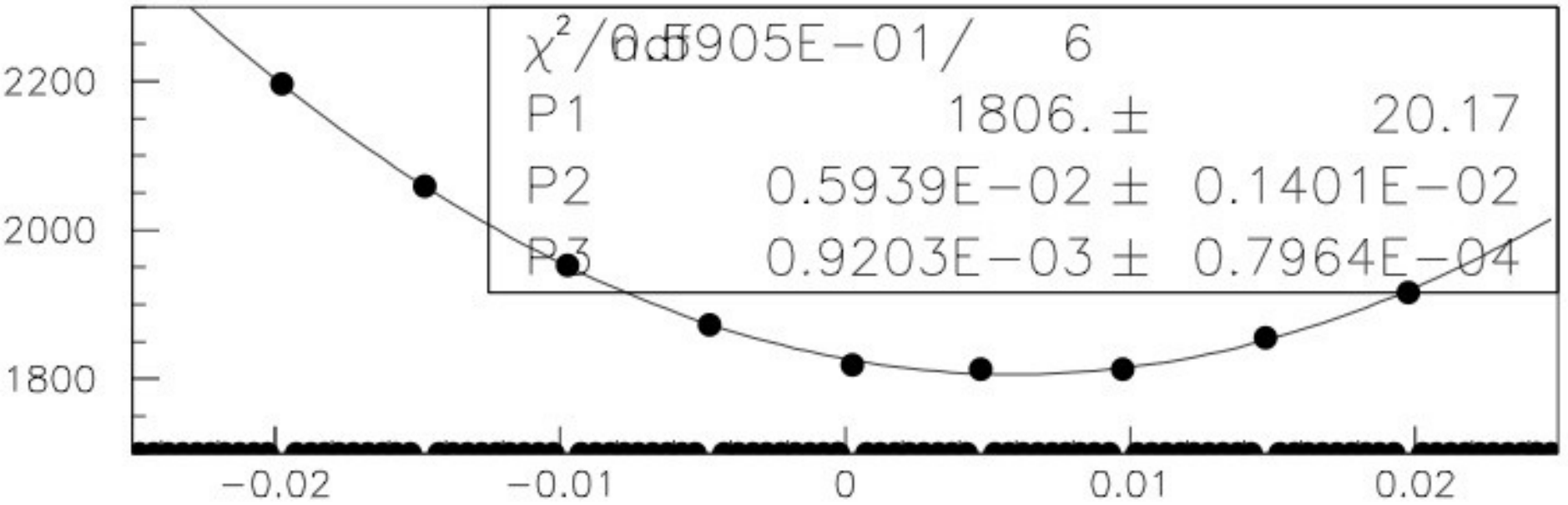
12/2/08



...Which results in a ~average bias in the B^0 SIGNAL+BKG Fit:

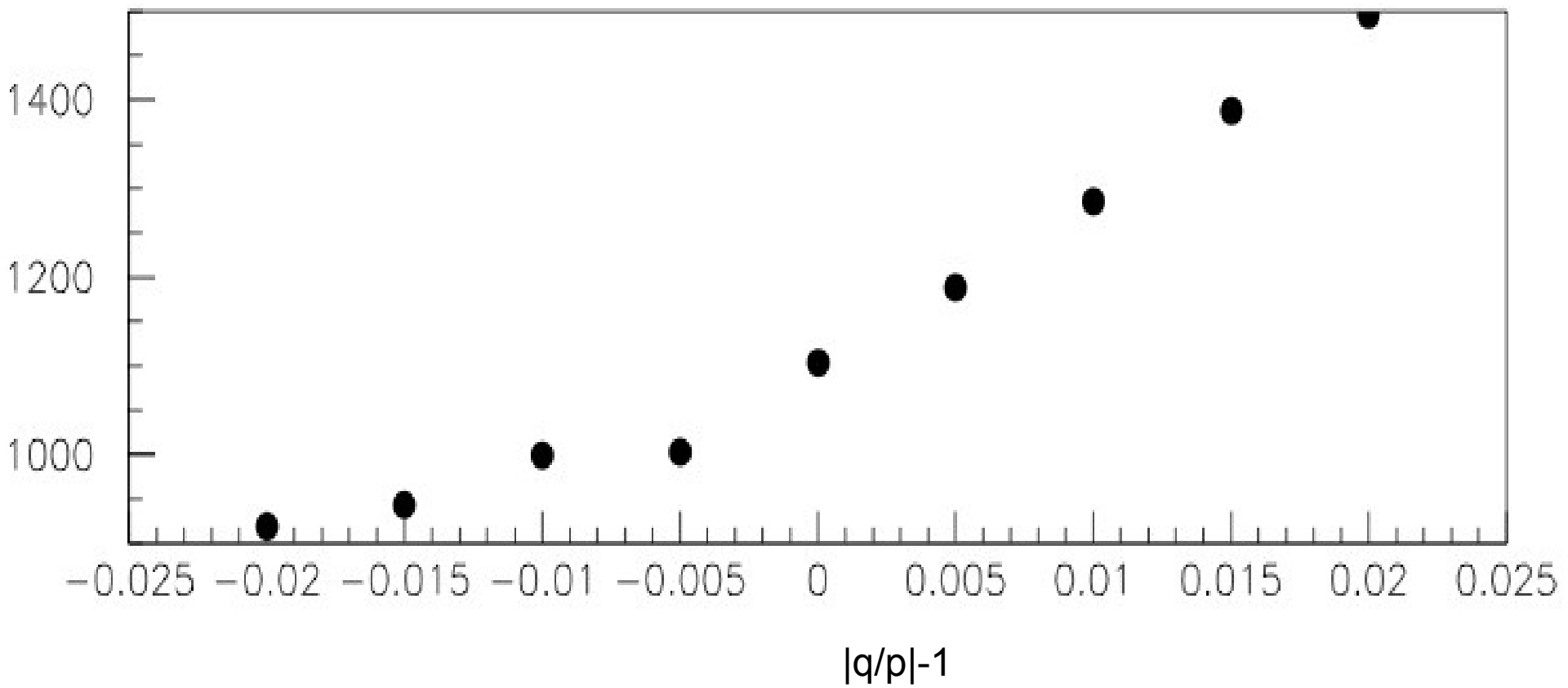


|q/p| comes from a binomial constraint on the mixed positive vs mixed negative events.

•Try to avoid the BKG influence in the global fit by using two alternative strategies:

1) Remove the BKG sample from the binomal constraint;
2) Use an additional effective |q/p| parameter for the BKG.

Strategy 1: Remove BKG events from the binomial constraint:

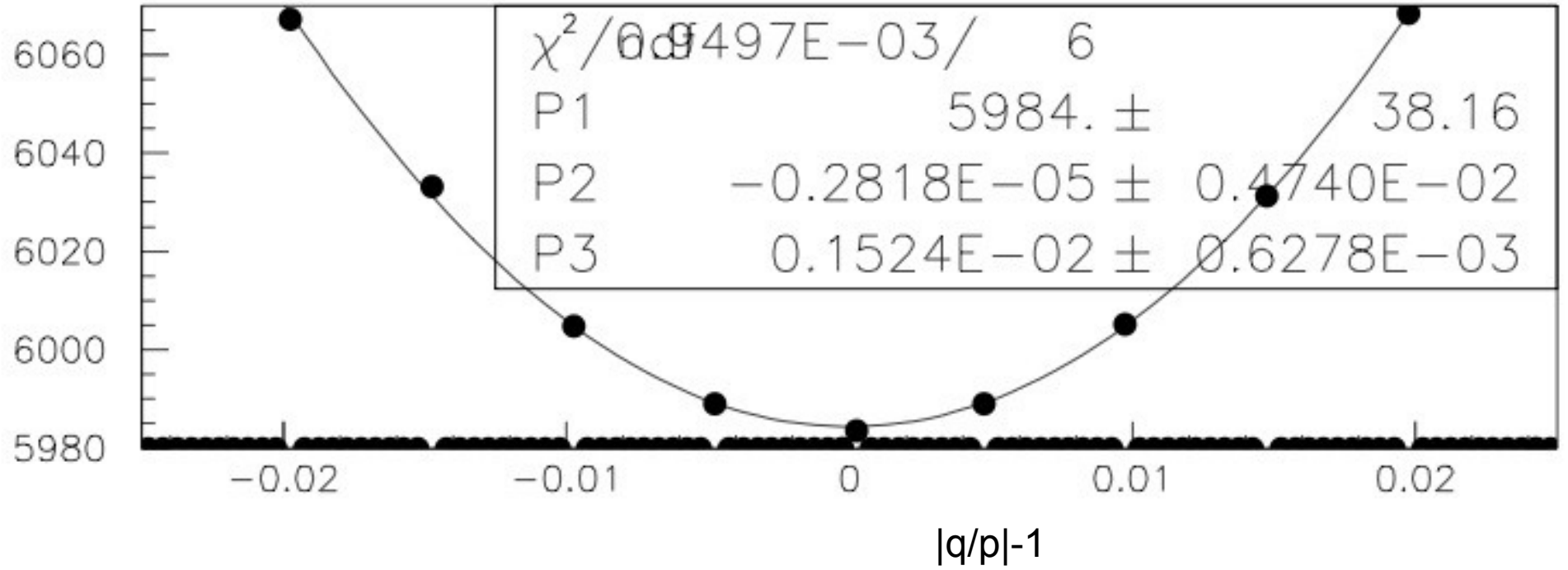


Result worst than before by using just signal events... Why?

Possible explanation: wrong Signal fraction in the B^0 sample which reflects in a wrong estimation for the signal events amount(?)

Check of the Signal Fraction in the B^0 sample:

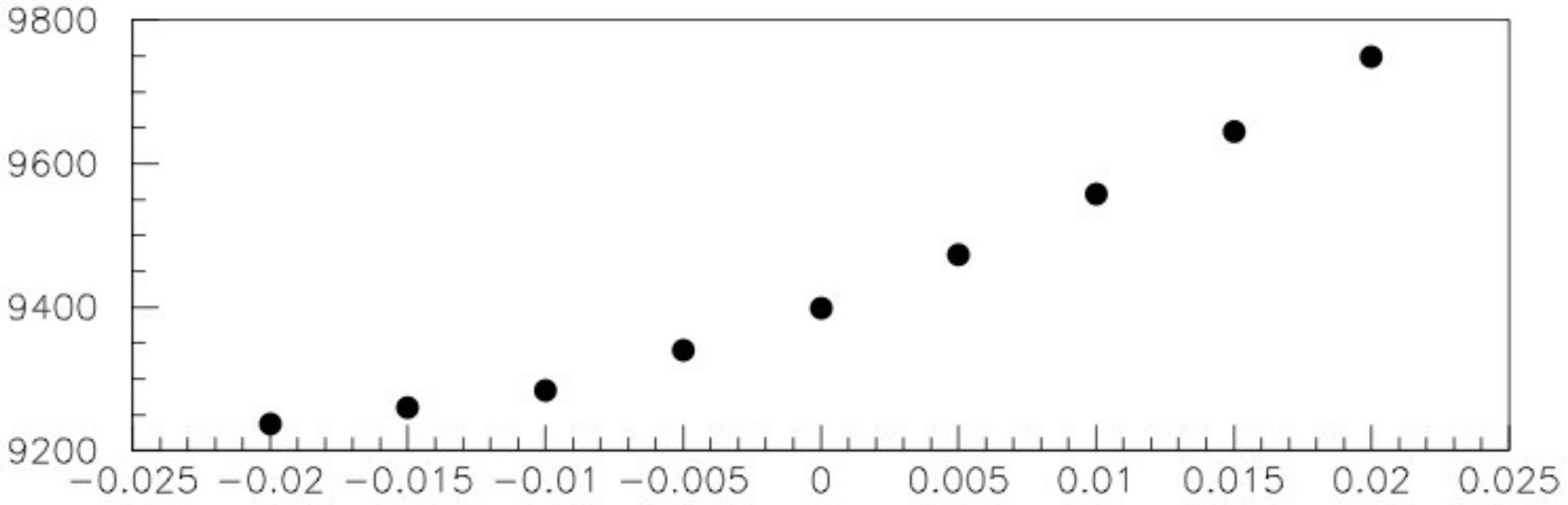
1) Pure Signal fit with binomial constraint from the Signal+BKG global fit (should be bad if the Signal fraction is not correct):



No Bias: Signal Fraction OK!

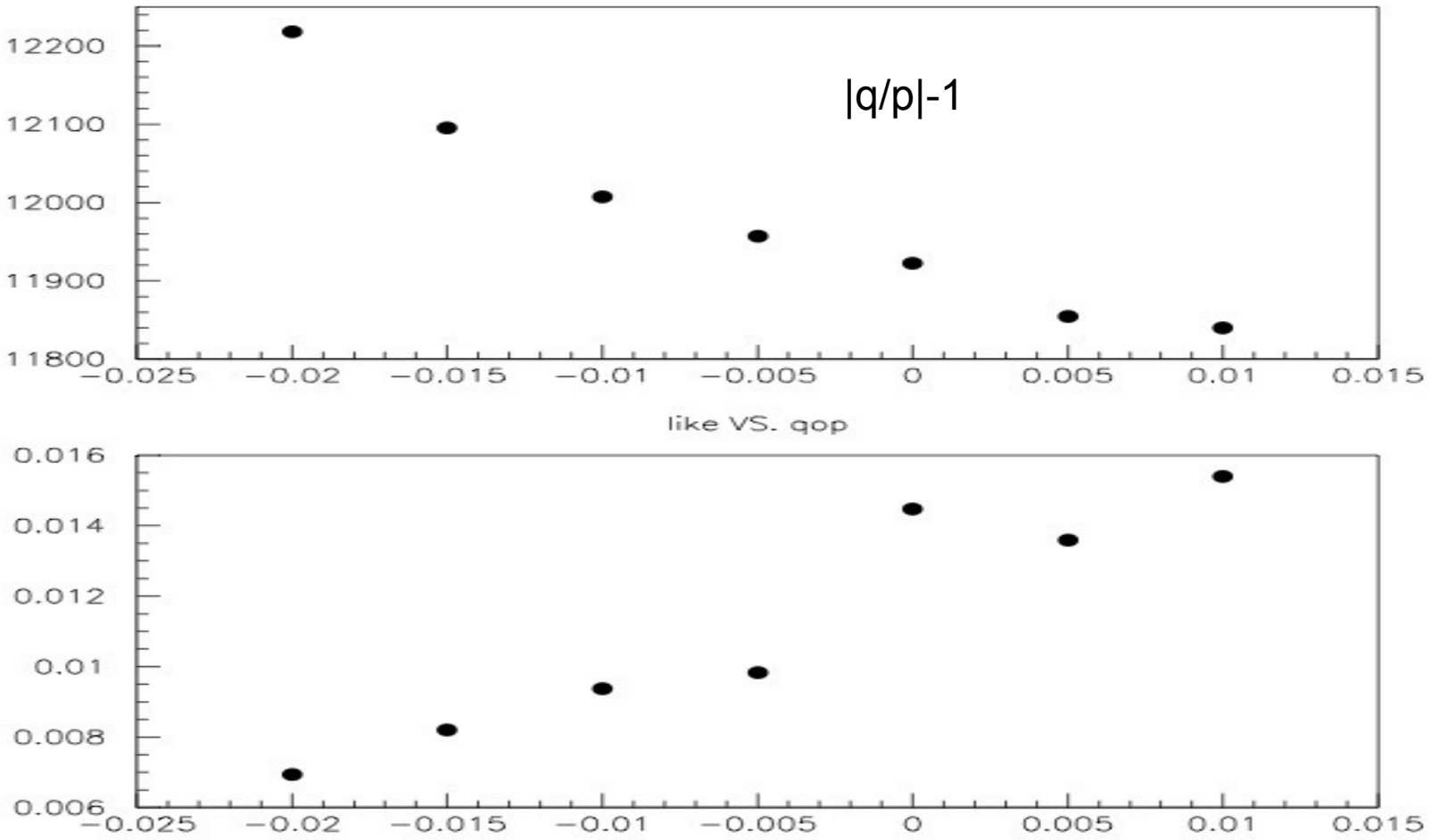
Check of the Signal Fraction in the B^0 sample:

2) Same scan as “Strategy 1” with signal constraint from the pure signal fit (should be fine if the problem comes from the signal vs BKG fraction in the B^0 sample):



Huge bias: Effect does not depend on Signal vs BKG fraction in the B^0 sample.

Strategy 2: use 2 different |q/p| parameters Signal vs BKG

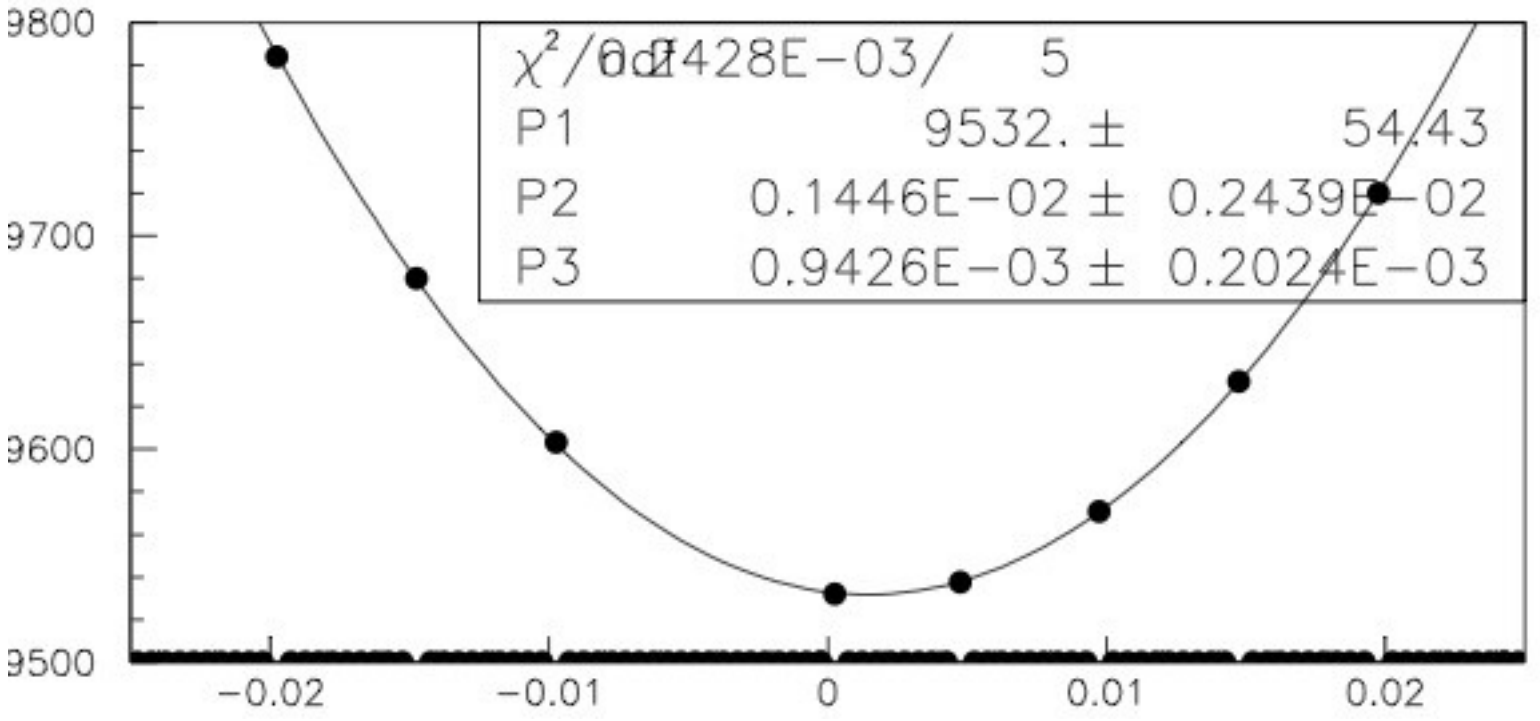


|q/p|-1 (BKG) VS |q/p|-1 (SIGNAL)

Two |q/p|-1 parameters are strongly correlated... Strategy does not work

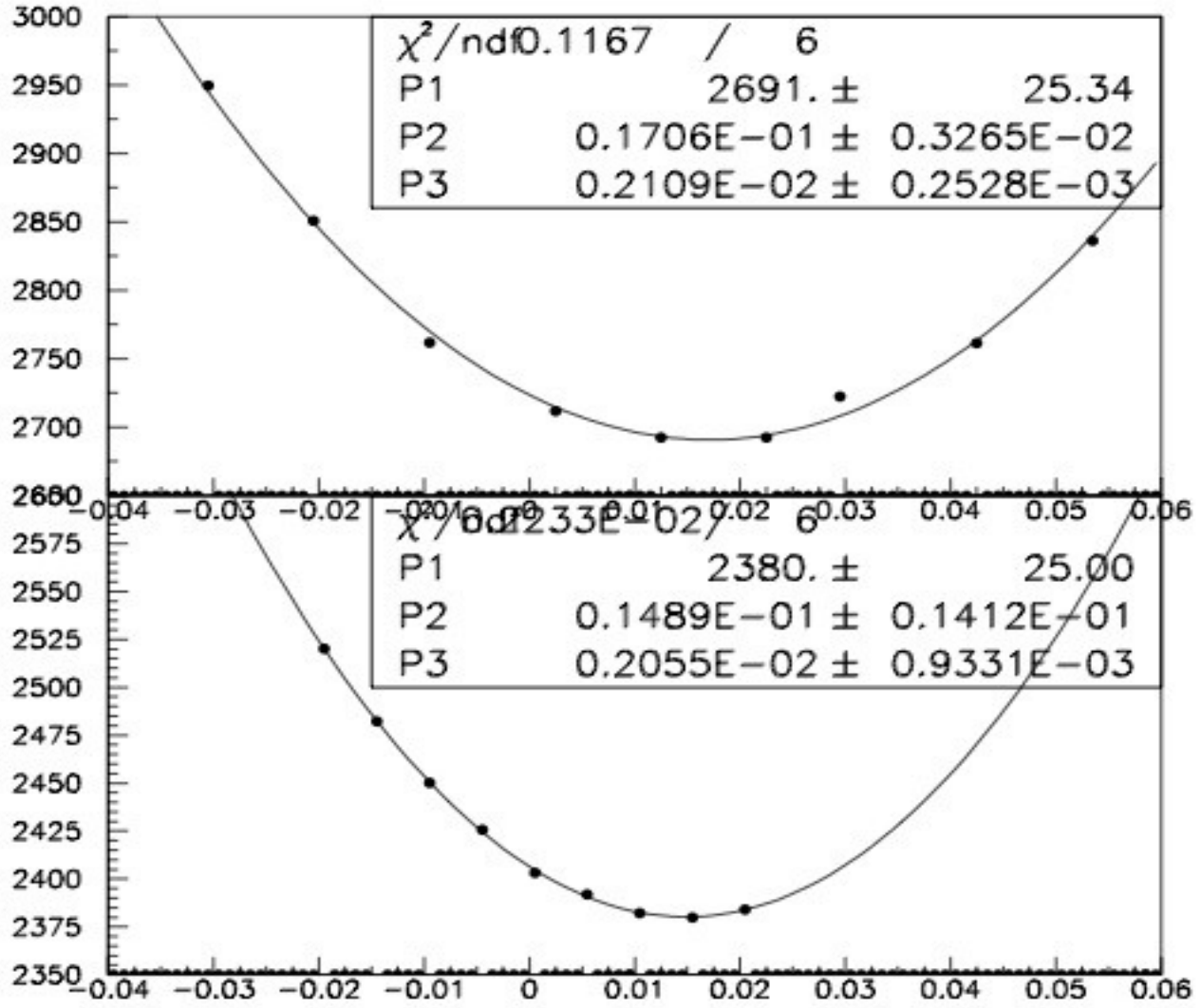
Is the Bias just a B^0 BKG feature?

Exercise: Use B^0 Signal+B^+ BKG samples:



NO BIAS! ONLY B^0 BKG IS AFFECTED!

ADDITIONAL CHECKS:
TAGGING ASYMMETRY SIGNAL VS BKG

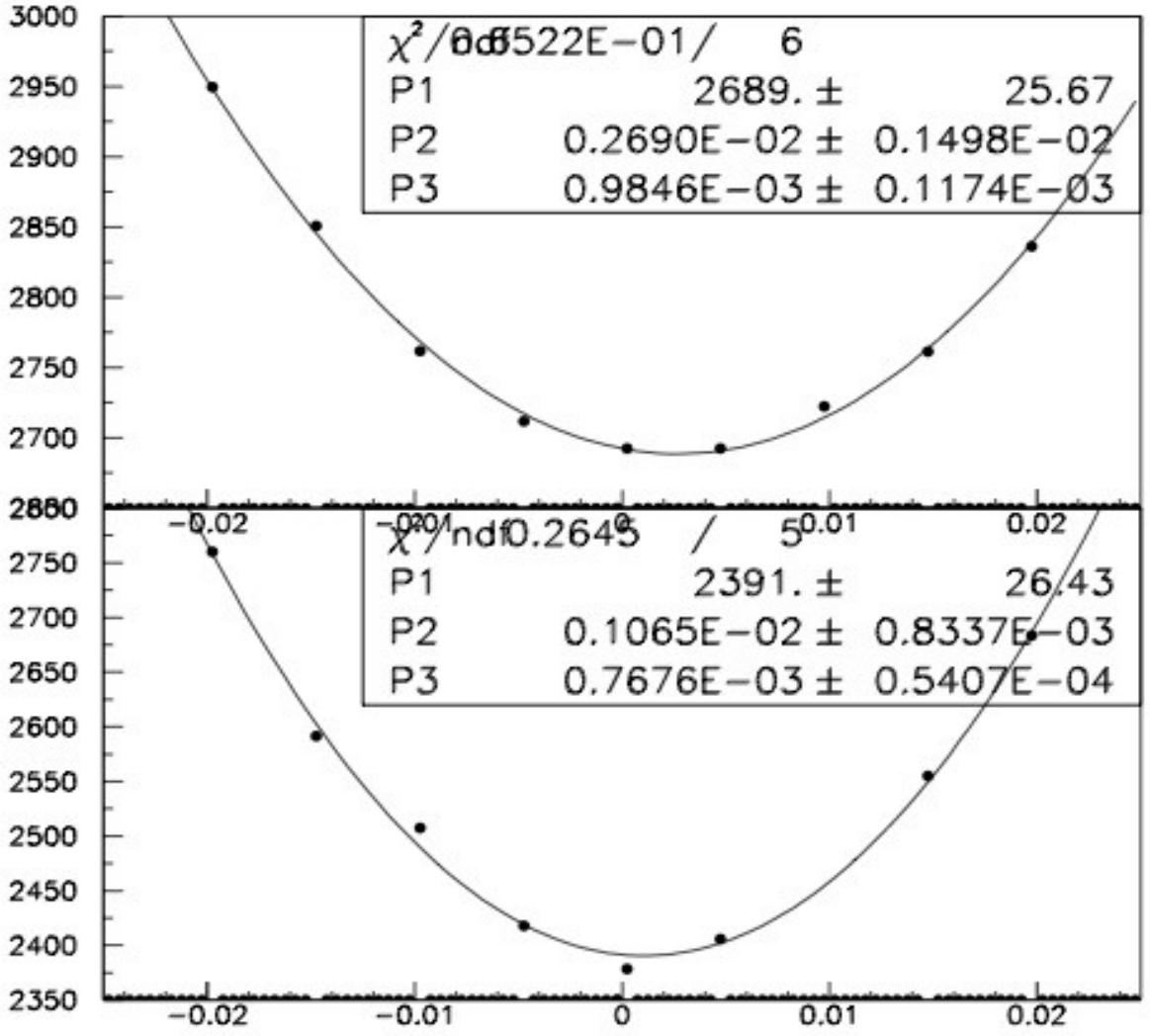


SIGNAL

BKG

Δ=0.0022±0.0030 good agreement

ADDITIONAL CHECKS:
RECO (e) ASYMMETRY SIGNAL VS BKG

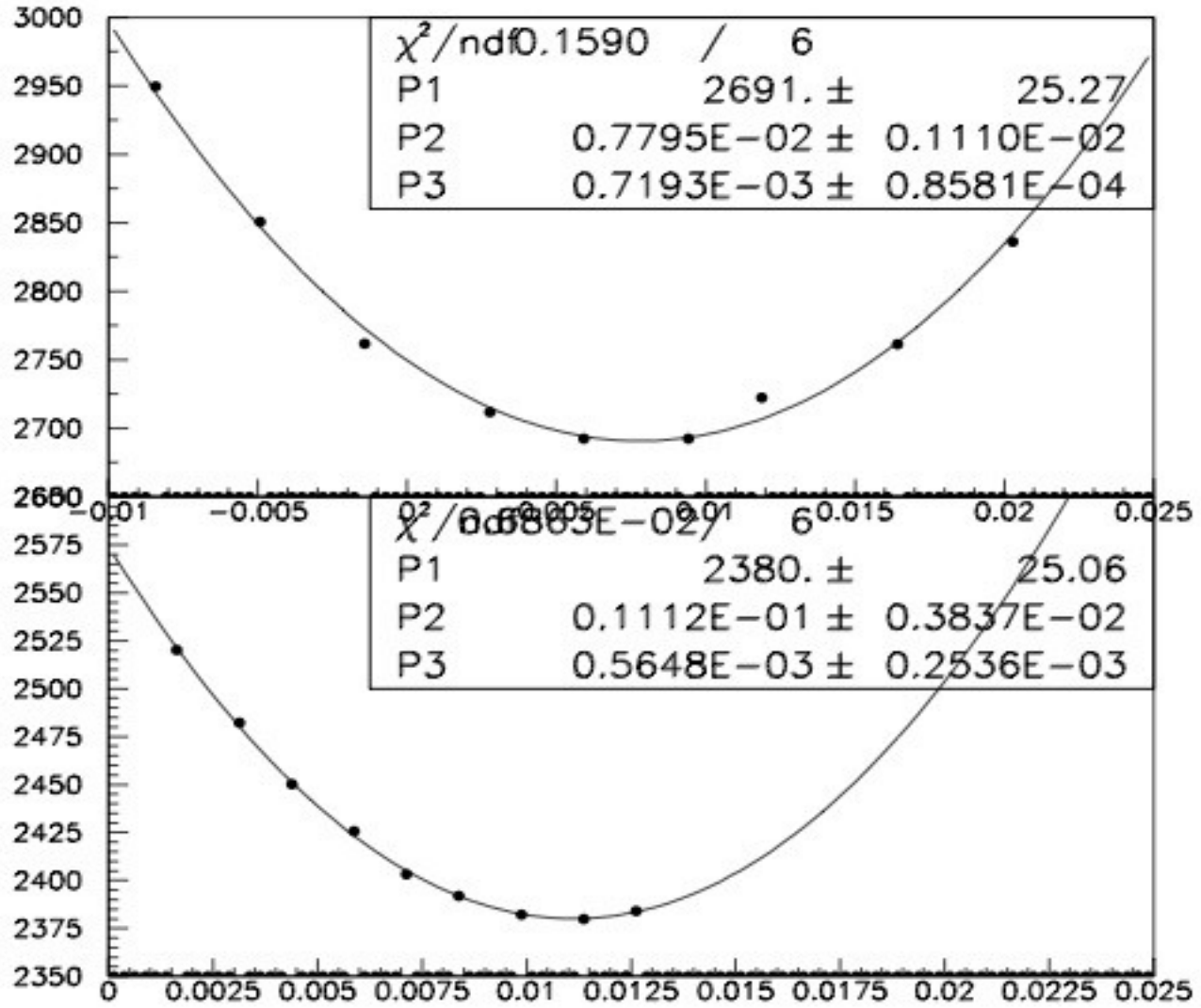


SIGNAL

BKG

$\Delta = 0.0016 \pm 0.0012$ good agreement

ADDITIONAL CHECKS:
RECO (μ) ASYMMETRY SIGNAL VS BKG



SIGNAL

BKG

Δ=0.0033±0.0009 bad agreement... to be investigated more

Conclusion & Next Steps

B^0 BKG bias stil to be understood.

IDEA: determine the detector asymmetries from the Mv^2 SIDE BANDS (very low dependence on |q/p|) and fix them in the fit.

Next few days: Check this strategy by fixing the detector asymmetries from MC counting in the fit.