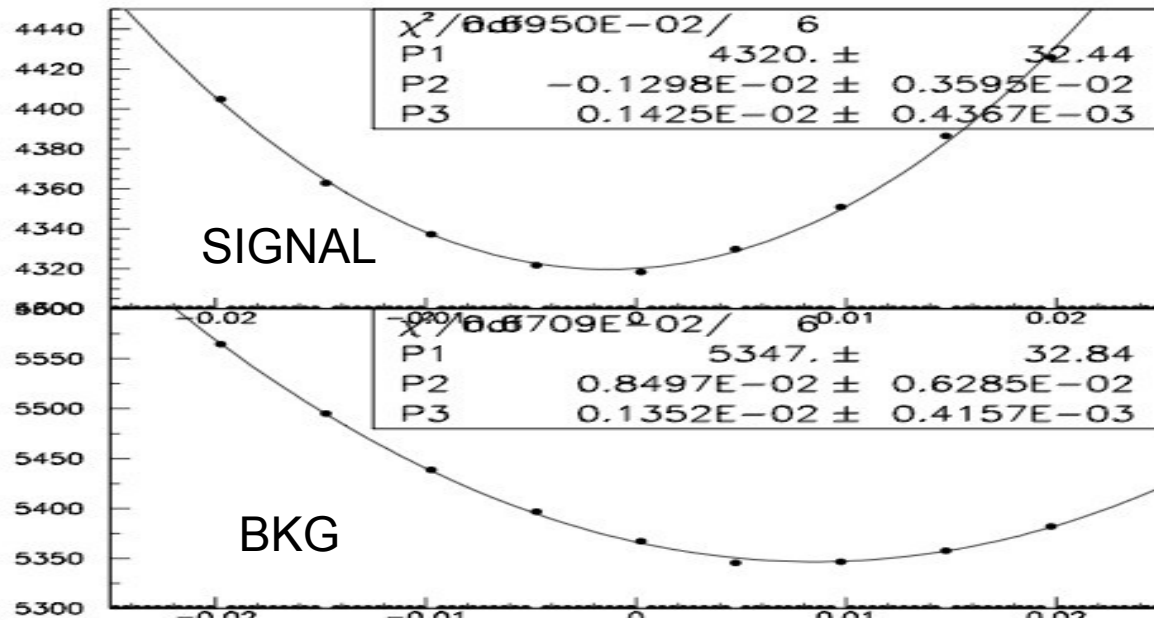
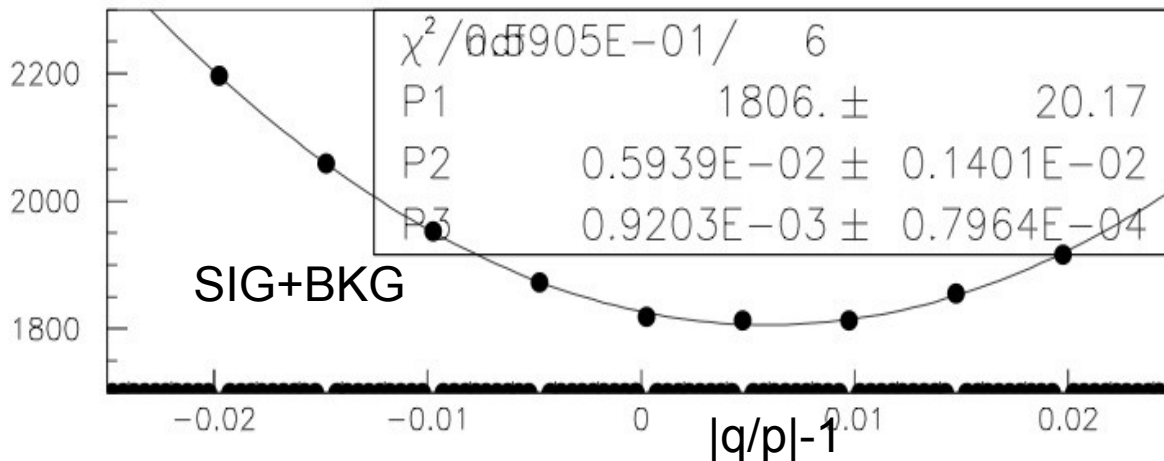


# Status of the Analysis bias comprehension in the $D^*lv$ q/p Analysis

Martino 1/13/09



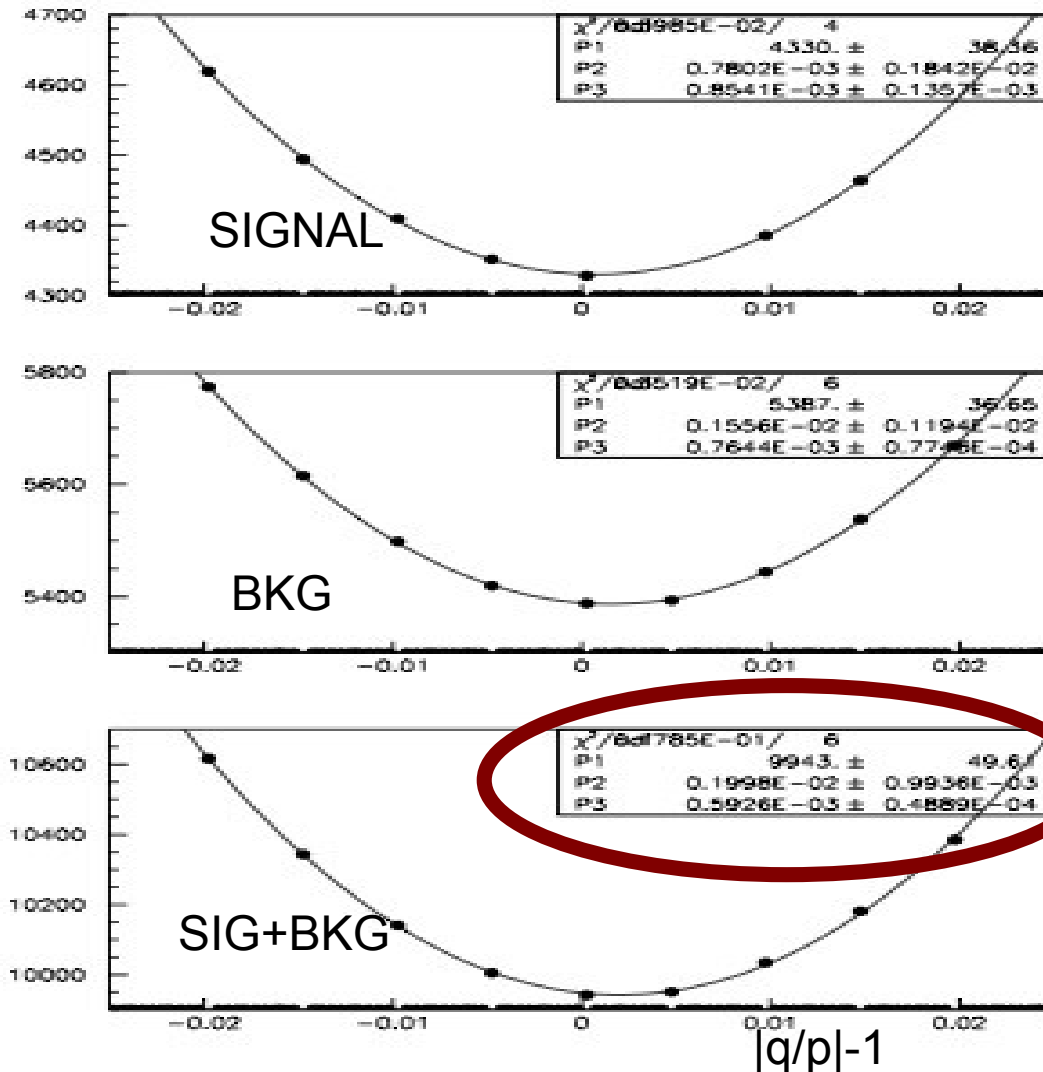
- Old Problem: huge bias in the  $B^0$  BKG sector



- Average bias in the  $B^0$  SIGNAL+BKG Fit  $\sim 0.006$

# Last AWG Meeting: Bias reduced by a factor 3

- Reconstruction Asymmetry determination improved using in addition the Untagged event sample;
- Bug found in the analytical expression for Signal Fraction vs  $m^2v$ ;
- Residual Global Fit Bias  $\sim 0.002$

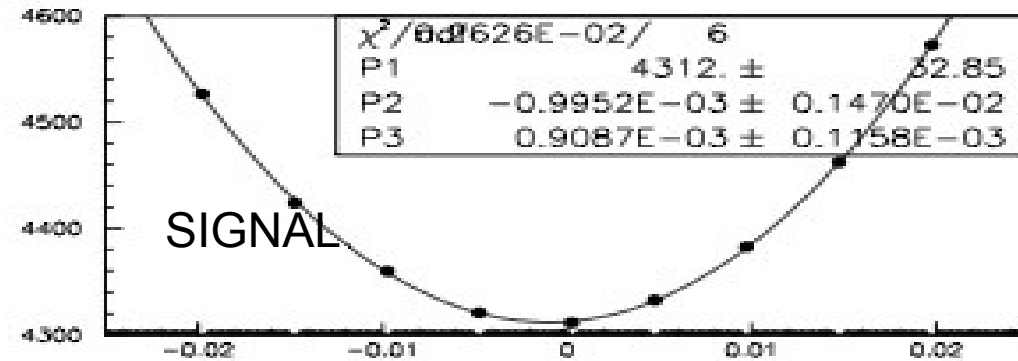


The question was:  
Is the residual bias due to the small discrepancy between the Signal & BKG reconstruction asymmetry?

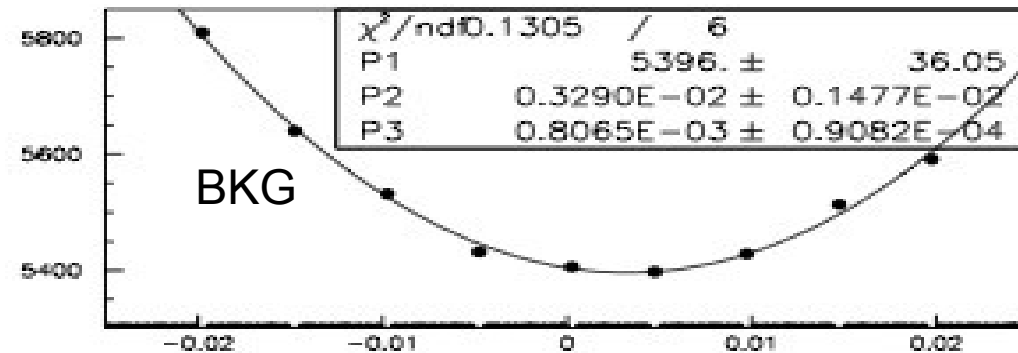
...Checked by using separate values for Areco(SIG) & Areco(BKG) (next page)...

# FIT Results with Areco(BKG)≠Areco(SIG)

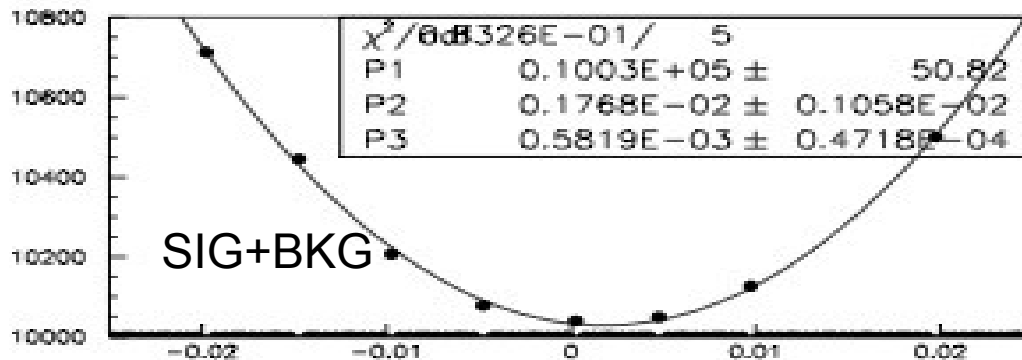
SIGNAL Fit: still OK



The BKG Bias does increase to 0.004!



Still the 0.002 bias in the global fit...

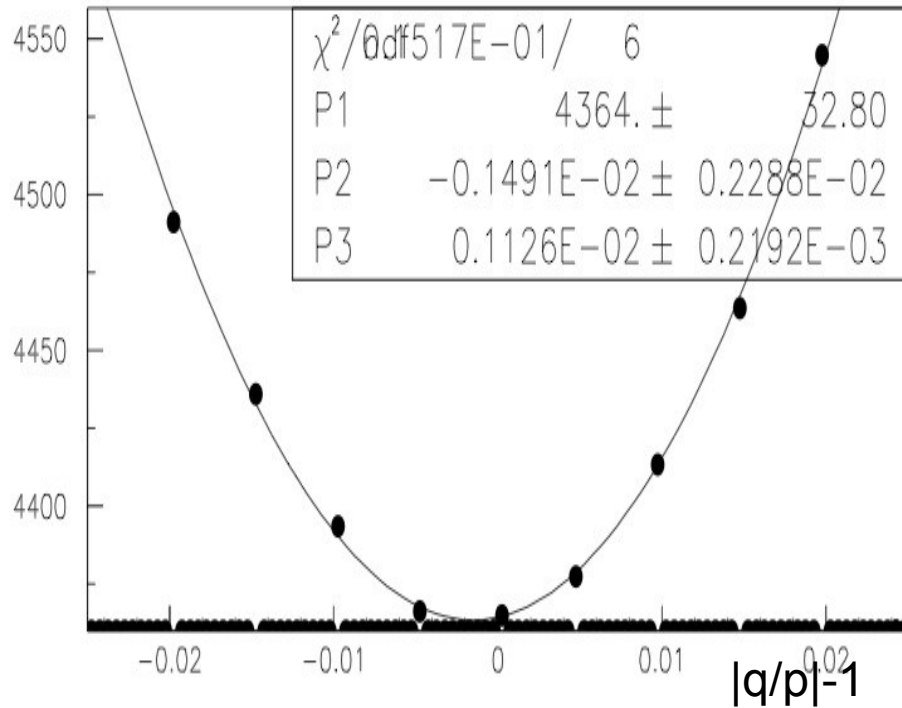


Look separately at the electron & muon sample...

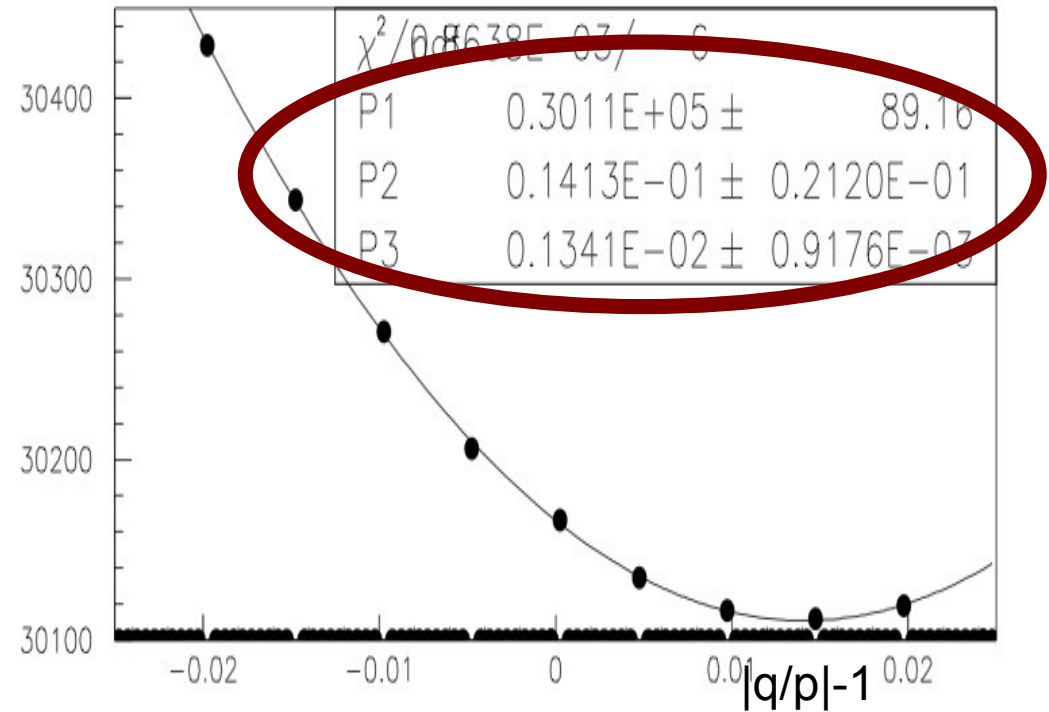
$|q/p|-1$

# BKG Fit: e vs $\mu$ sample:

e



$\mu$



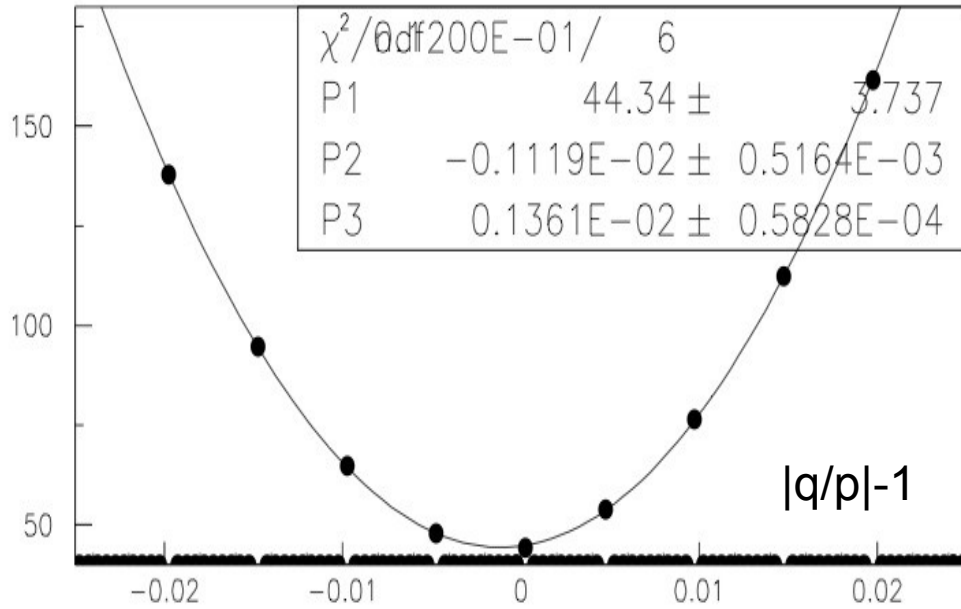
**Huge bias just in the  $B^0$  BKG muon sample!**

$|q/p|$  obtained from the SL Asymmetry: not depending on time.

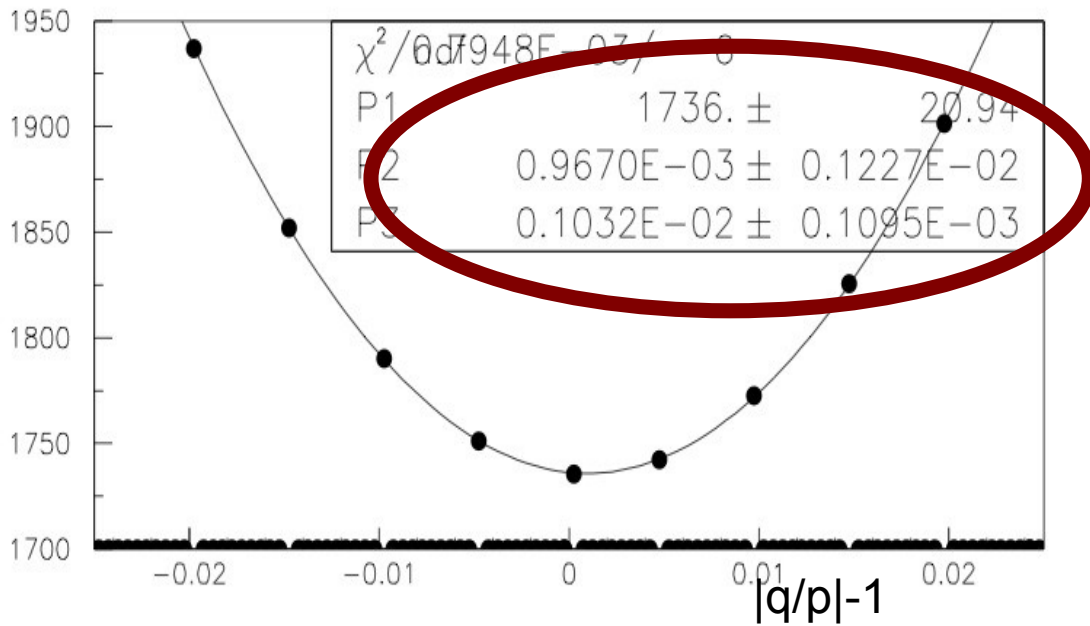
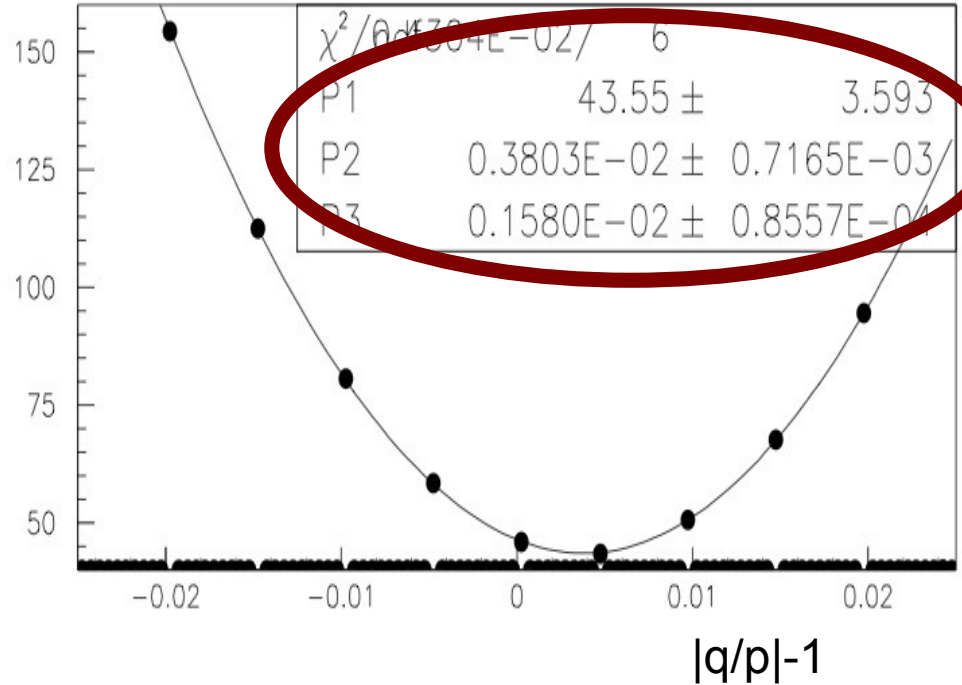
Check the fit by using just the binomial constraint on the integrated number of mixed positive vs negative event yields (no information on PDF( $\Delta t, \cos\theta_{KI}$ ) shape...

# BKG Fit without PDF( $\Delta t, \cos\theta_{kl}$ ) shape:

e



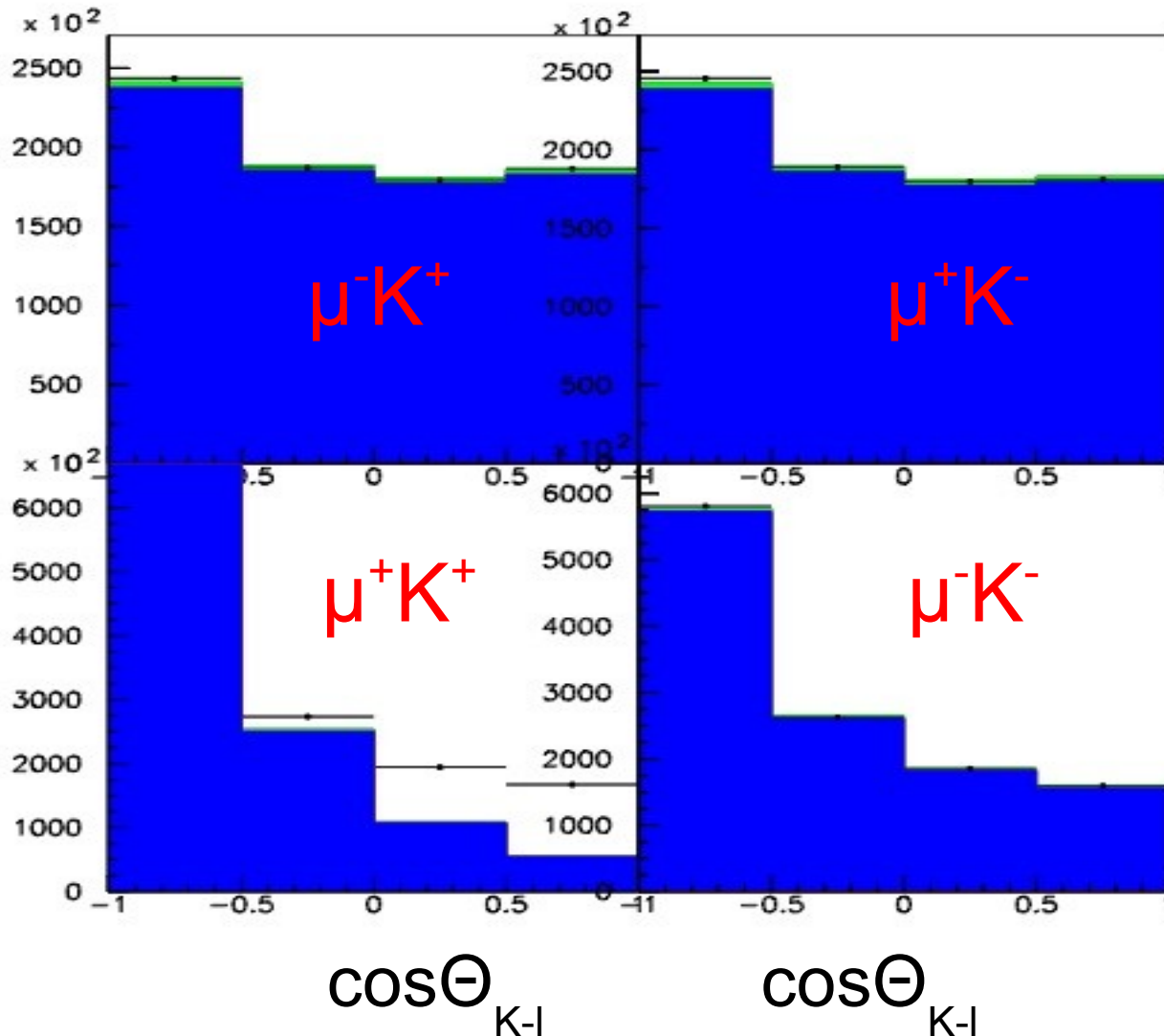
$\mu$



**BKG bias removed!!**  
 Just the PDF shape in the muon sample is affected... Look at all the relevant distributions...

# BUG Found in a Macro (mistype)...

Affecting the PDF(  $\cos\Theta_{K-l}$  ) for the BKG- $\mu$  Mixed-Positive sample:

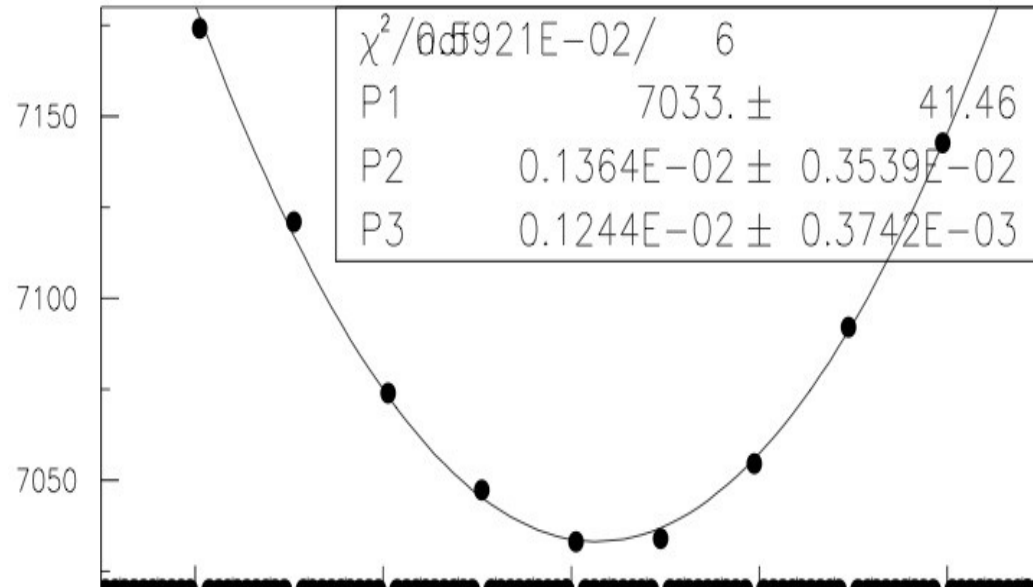


Btag+Dtag sample

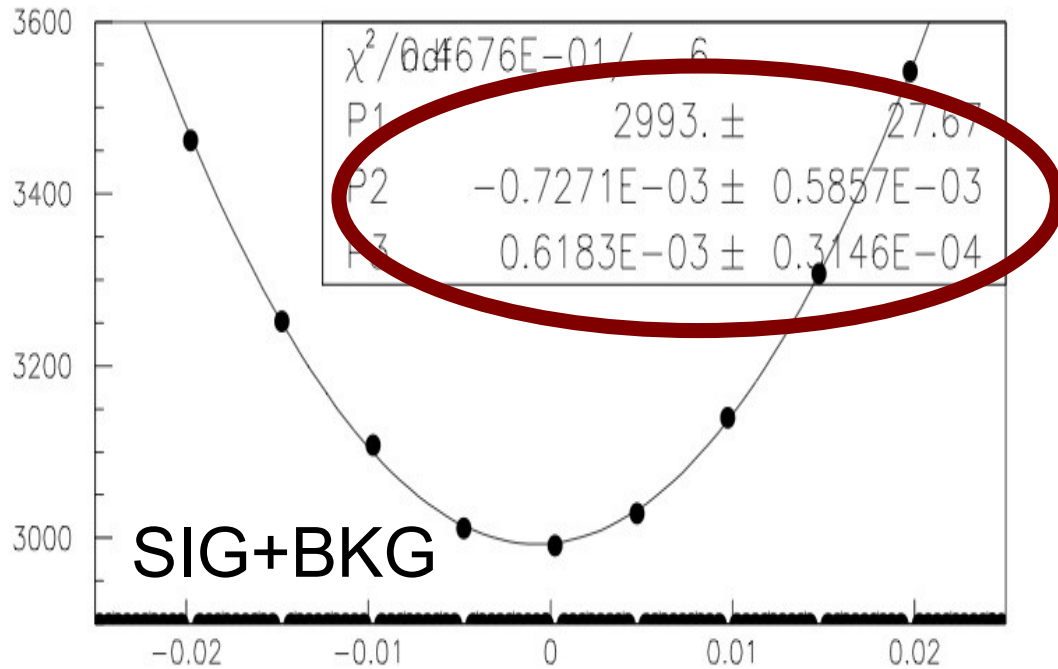
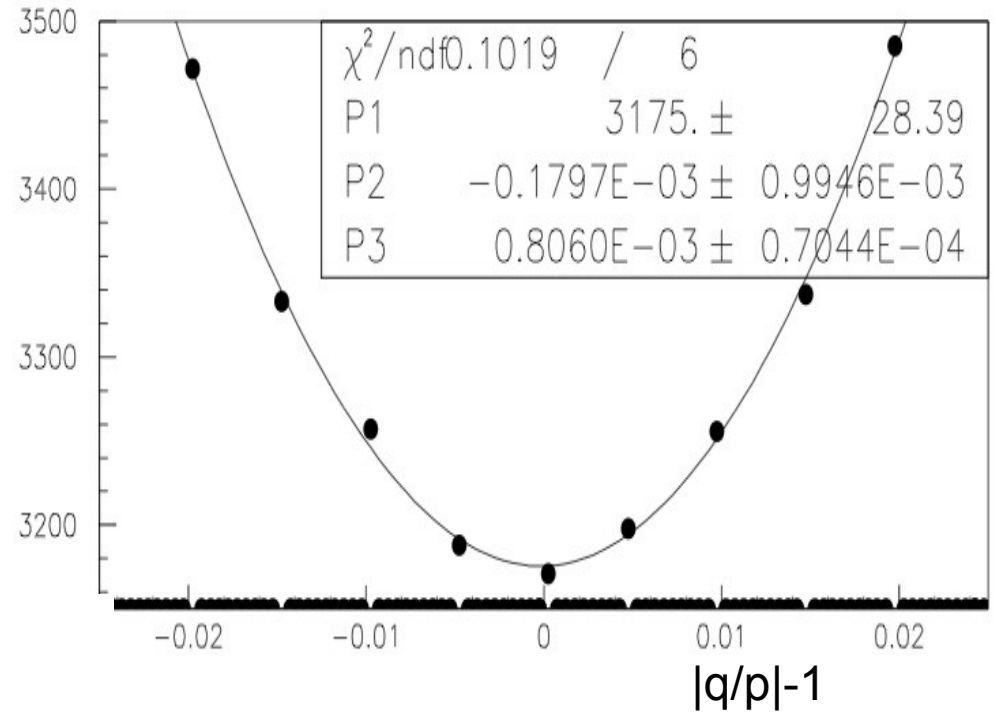
Dots: data  
Line: PDF

# Corrected Fit Results

BKG  $\mu$



BKG  $e+\mu$



**Bias completely removed from the SIG+BKG  $B^0$  Global fit!**

# CONCLUSIONS

## Analysis bias in the $B^0$ BKG sector removed:

- Improved determination of the Reco Asymmetry by using in addition the untagged event sample;
- Found bug in the Signal Fraction ( $m^2v$ ) (2/3 of the effect);
- Found bug in the PDF(  $\cos\Theta_{K-l}$  ) for the Mxed Positive muon subsample (1/3 of the effect)

## Next steps

- Optimize the fit strategy (fixed/floated parameters);
- Add the remaining subsamples (B+/Continuum) to the Global fit;

Enrico Feltresi is going to define the strategy for:

- Toy MC validation;
- Systematics computation.