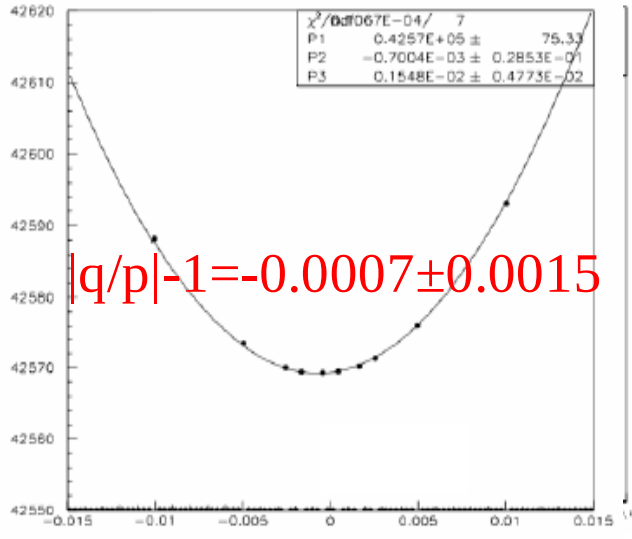
Status of the Analysis on CPV in mixing using P.R. D*lν and K-tag

Martino, 9/23/2008

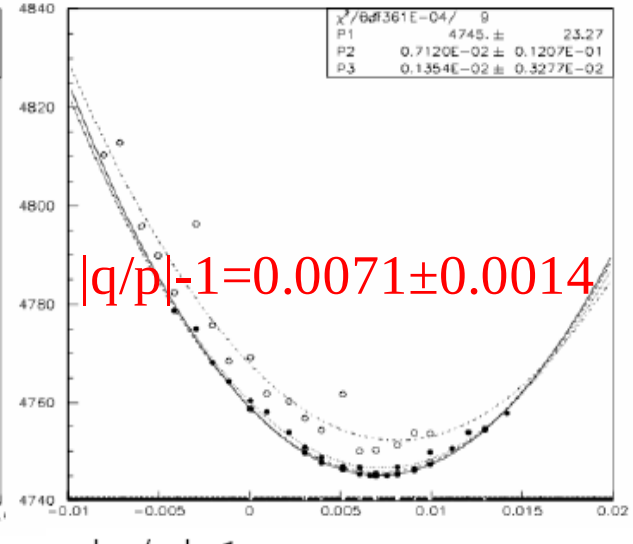
- Reason why we missed the Summer Conferences;
- Work in progress;
- Next Steps.

Analysis Bias on |q/p| from MC

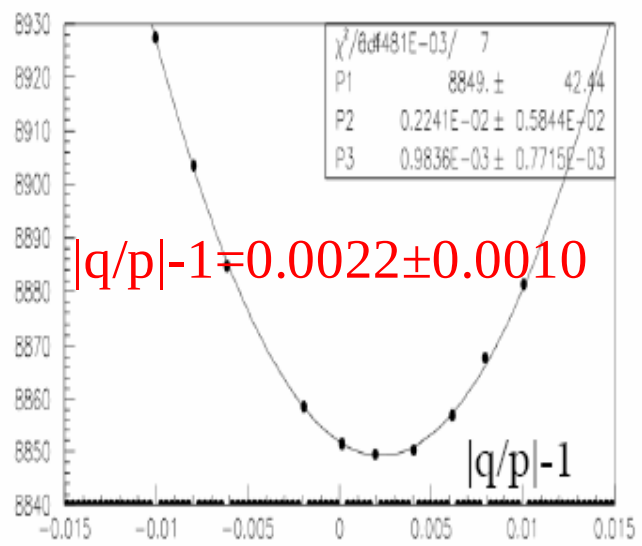
Pure B^0 SIGNAL



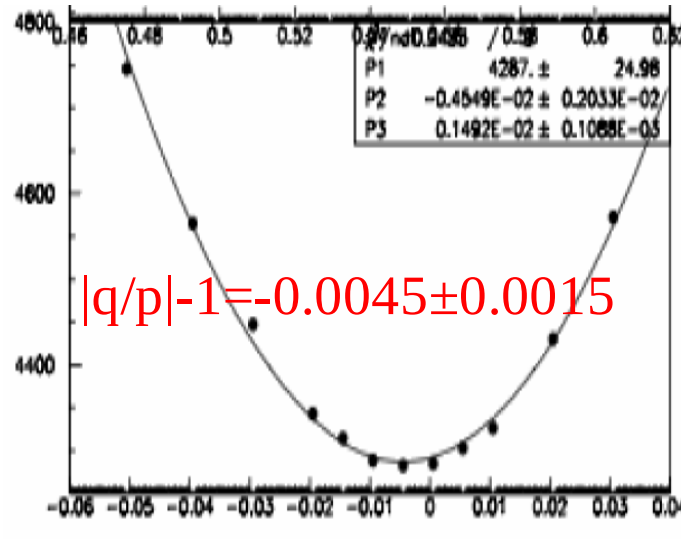
B^0 BKG



B^0 SIGNAL+BKG



Full MC FIT



|q/p|-1

- No bias on B^0 Signal
- Very Strong bias on B^0 BKG
- Strong bias on Full MC (~Alessandro thesis)
- Problem still present by using different detector asymmetries for SIG & BKG
- RC & authors agreed to skip Summer Conf. to reach a full comprehension of the problem before publication

Possible source of bias: Dtag fraction misdetermination

- |q/p| obtained from Semileptonic Asymmetry of Btag B^0 Signal sample: Asl=-2(|q/p|-1)

- **Standard Approach:** Dtag events fraction for ALL the event categories ($B^{0(+)}$, SIGNAL/BKG, mixed/unmixed) determined in the global fit from:
  - ➔Narrower Δt distribution w.r.t. Btag sample;
  - Distribution of the angle between the tagging K and the lepton from the P.R. Decay;

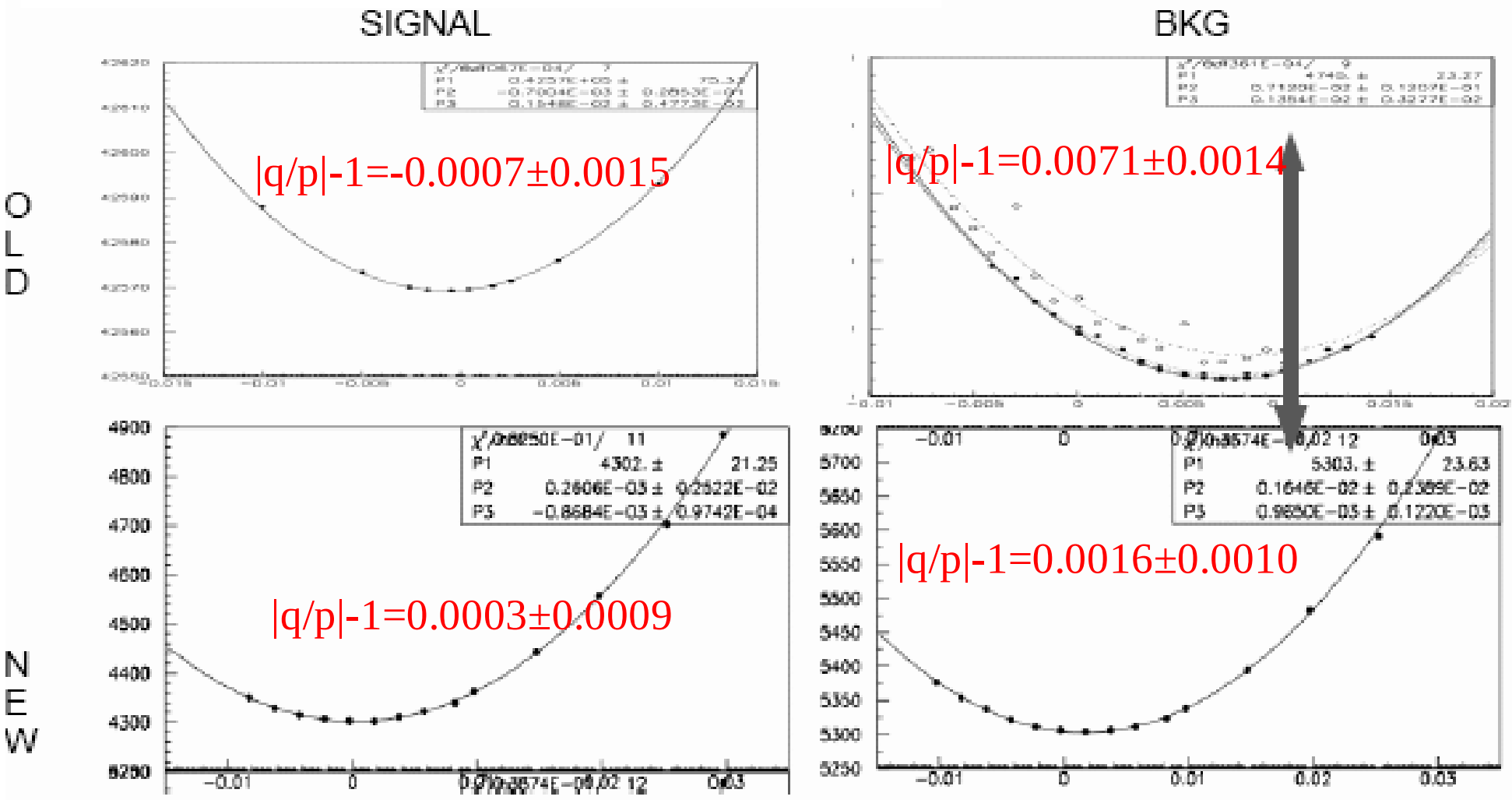
- B^0 BKG PDF(Δt) does not reproduce correctly the data: BIAS in the |q/p| determination from the B^0 BKG;

- Due to the very similar shape of the Δt and Θ_{K-l} distributions for the different samples, the corresponding Dtag fractions are strongly correlated:
  - ➔Wrong F(Dtag) for B^0_{BKG} reflects in a wrong F(Dtag) for B^0_{SIG} if fitted together
  - ➔Not possible to determine simultaneously ALL the Dtag Fractions for the different samples without intoducing a bias.

[Btag: K, lepton from different B^0 decays; Dtag: K, lepton from same B^0 decay]

Exercise:

- Dtag Fraction from MC

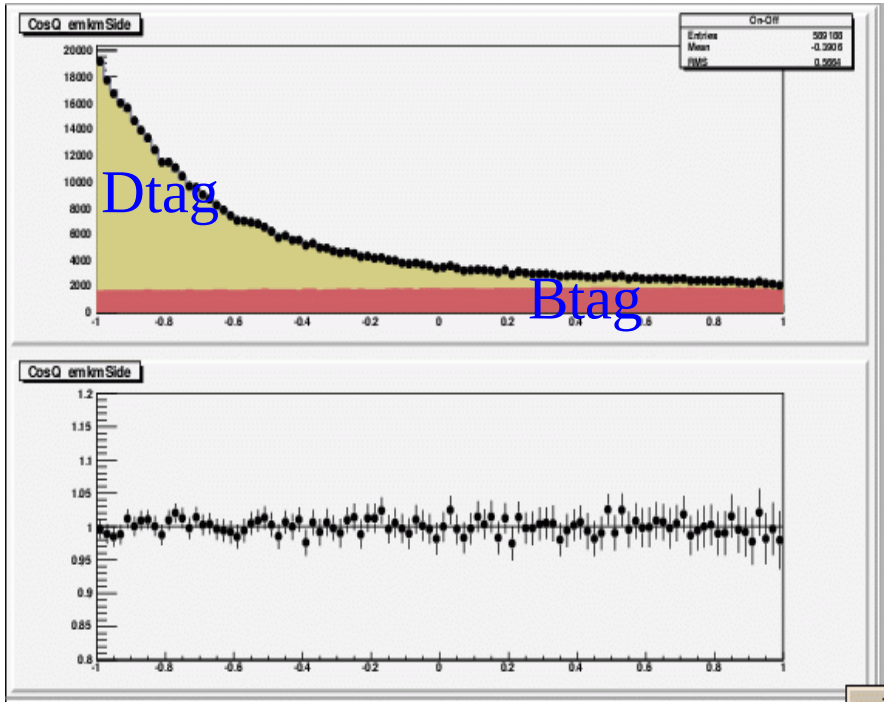


q/p bias disappeared on B^0 combinatorial BKG!

New Approach (in progress):

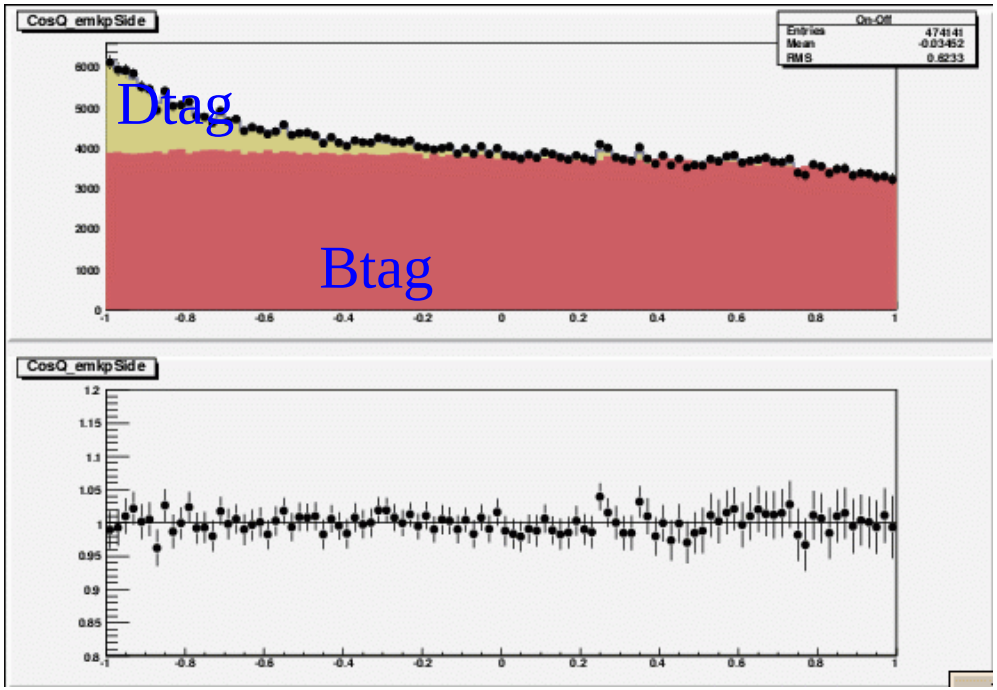
•Determine the Dtag fraction from an external fit on $\Theta_{K\text{-}l}$ as in the B^0 τ & Mixing Analysis (Franco):

Mixed e^-K^-



$\cos(\Theta_{K\text{-}l})$

Unmixed e^-K^+



$\cos(\Theta_{K\text{-}l})$

•Fix F(Dtag) (at least for the BKG sample) in the global fit.

Next Steps

- Enrico Feltresi is taking over the analysis responsibility;
- Check the new approach on the B^0 SIGNAL+BKG MC;
- Full fit on MC;
- Full fit on Real Data;