RC Meeting, May 30 2012

Priority Items, as discussed during Ferrara CM:

- Update the documentation
  -  BAD 1738 V16 uploaded with all the description of the new analysis
- Redo MC validation and Real Data results floating also the resolution parameters
  -  Preliminary results OK, more iterations needed
- Perform a Toy MC Study for the determination of the statistical error
  -  Huge Spread observed, separate likelihood scans needed for the different generated experiments... (?)

BAD 1738 V16

http://www.slac.stanford.edu/BFROOT/www/Physics/BAD/vol15/01738.016.pdf

Measurement of CP Violation in $B\overline{B}$ Mixing on the Recoil of partially reconstructed $\overline{B}^0 \to D^{*+}\ell^-\bar{\nu}_\ell$ using Kaon Tags

The *BABAR* Collaboration

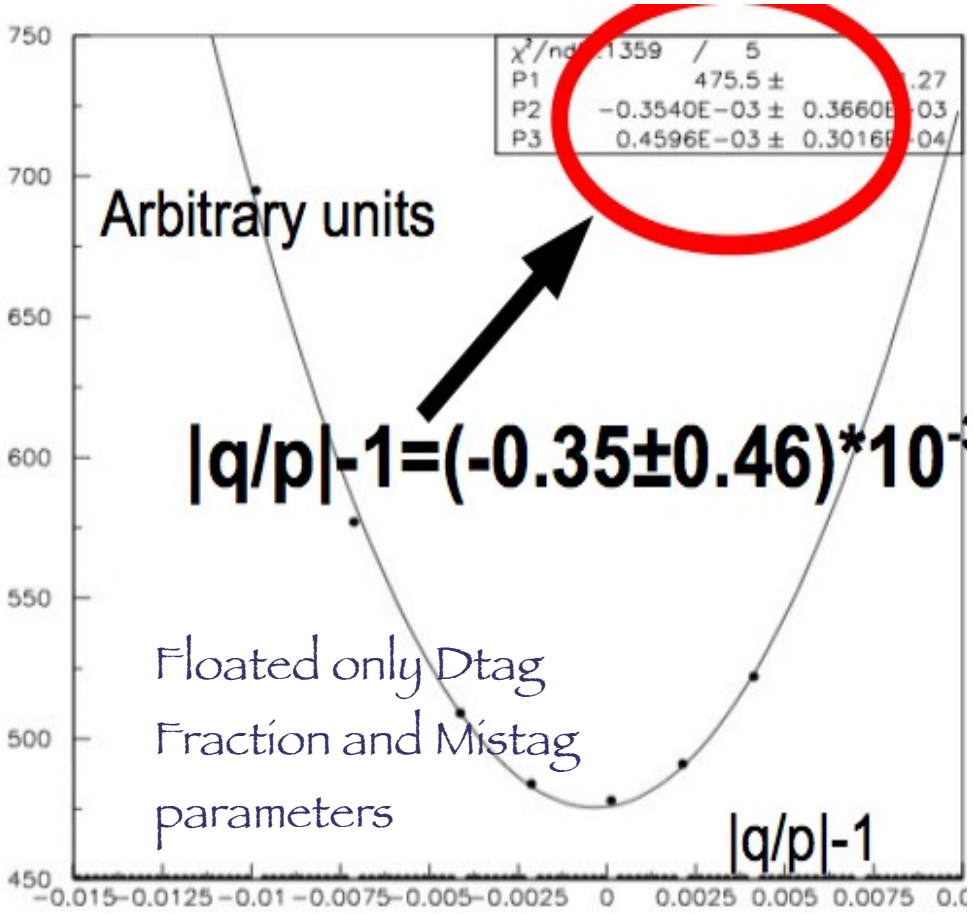
May 28, 2012

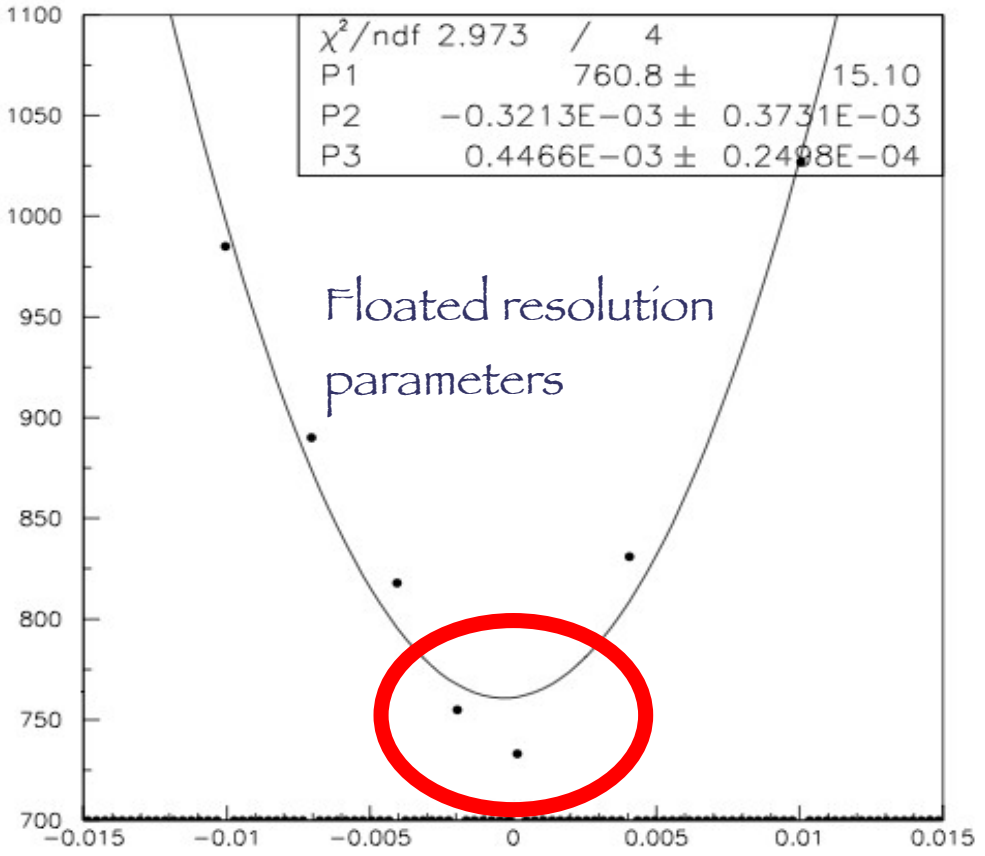
Abstract

In this analysis we use the total Run1-6 dataset, Release 24-Analysis 5 to measure the $|q/p|$ parameter, governing CP violation in the $B^0\overline{B}^0$ mixing. $\overline{B}^0 \to D^{*+}\ell^-\bar{\nu}_\ell$ decays are selected by using partial reconstruction of the D^{*+} while the flavor of the un-reconstructed B is tagged from the charge of a kaon identified among its decay products. Detector related charge asymmetries are disentangled from the physical semileptonic one, without relying on control samples, by exploiting the charge asymmetries of the B^+ background and of the subsamples of kaons coming from the partially reconstructed D^{*+}.

MC validation with free resolution

- Likelihood minimum moves by "+3 10^{-5}" w.r.t. The previous one:
- Statistical error unchanged



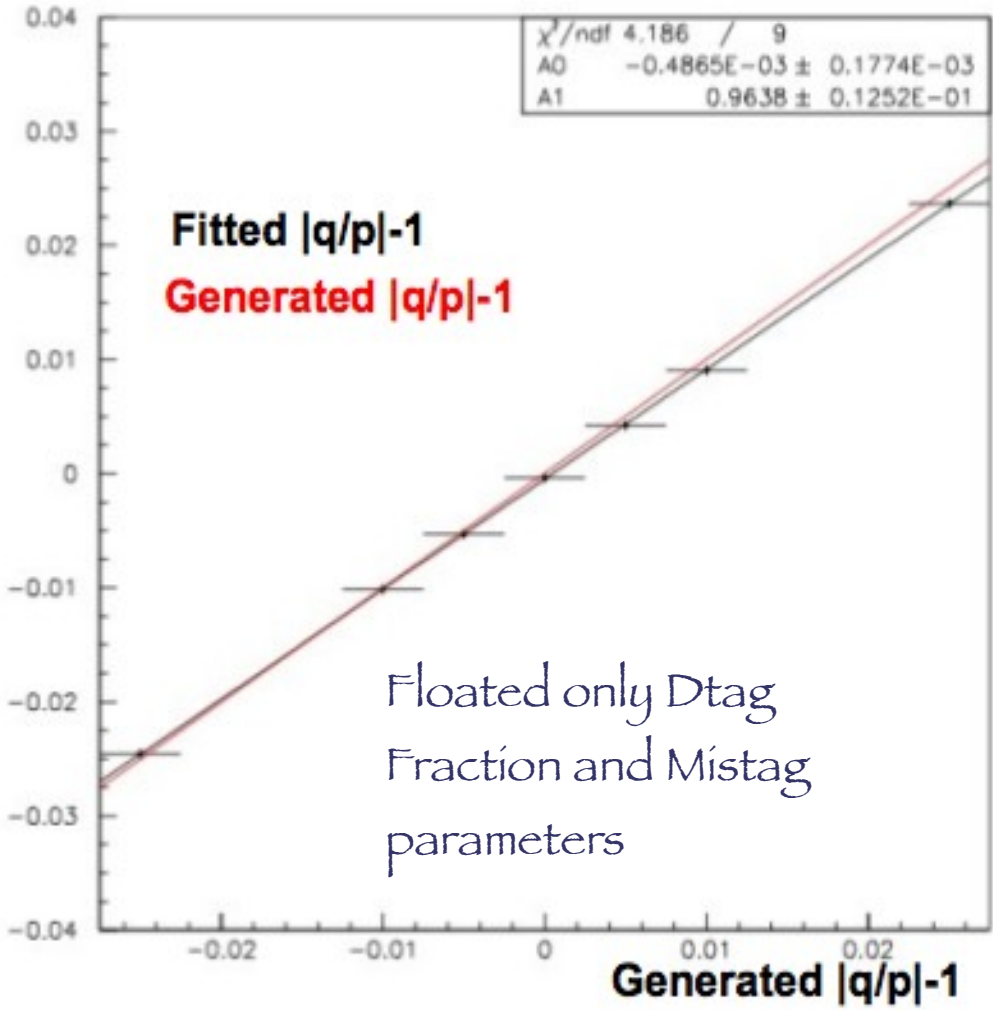


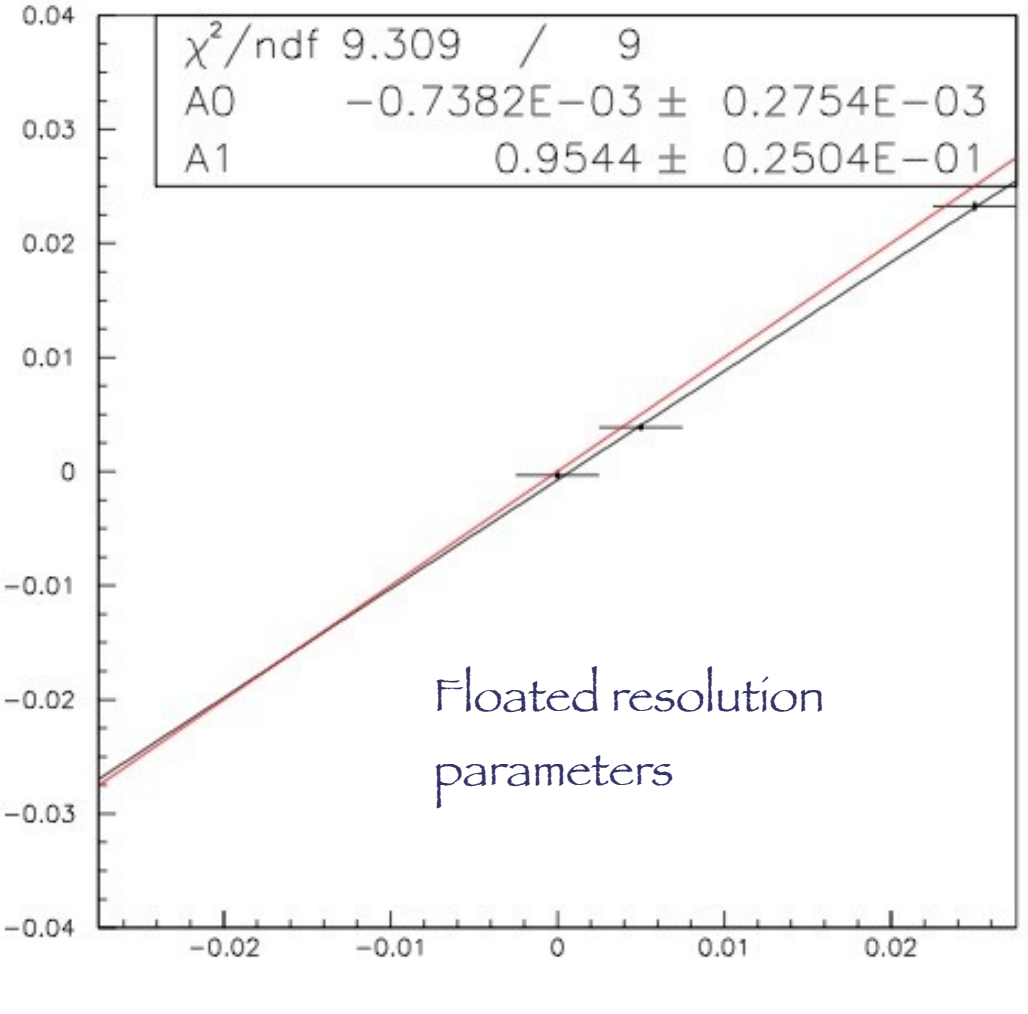
- Scan to be optimized with more iterations

MC validation with free resolution

Measured vs Generated |q/p|:

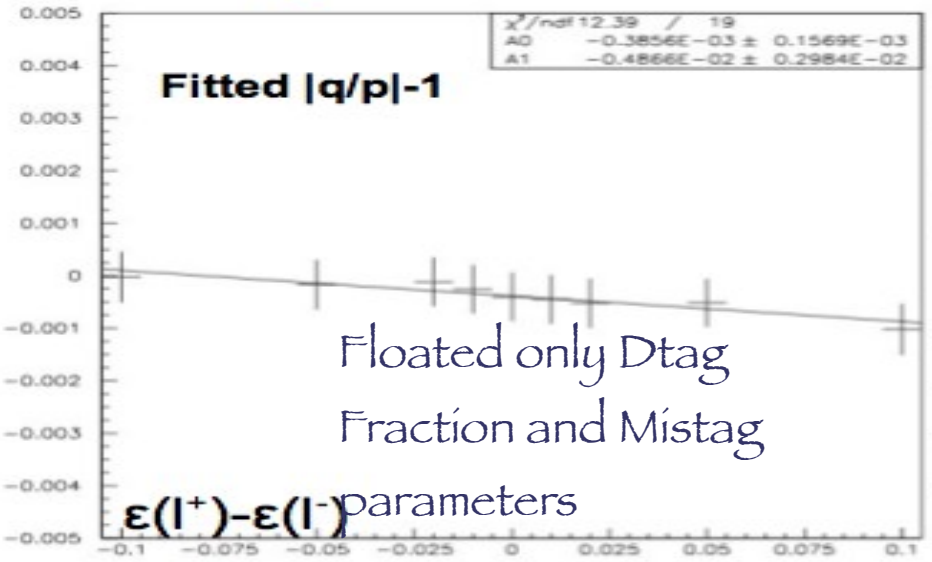
- Still very few (only 3...) optimized fits with the new strategy...

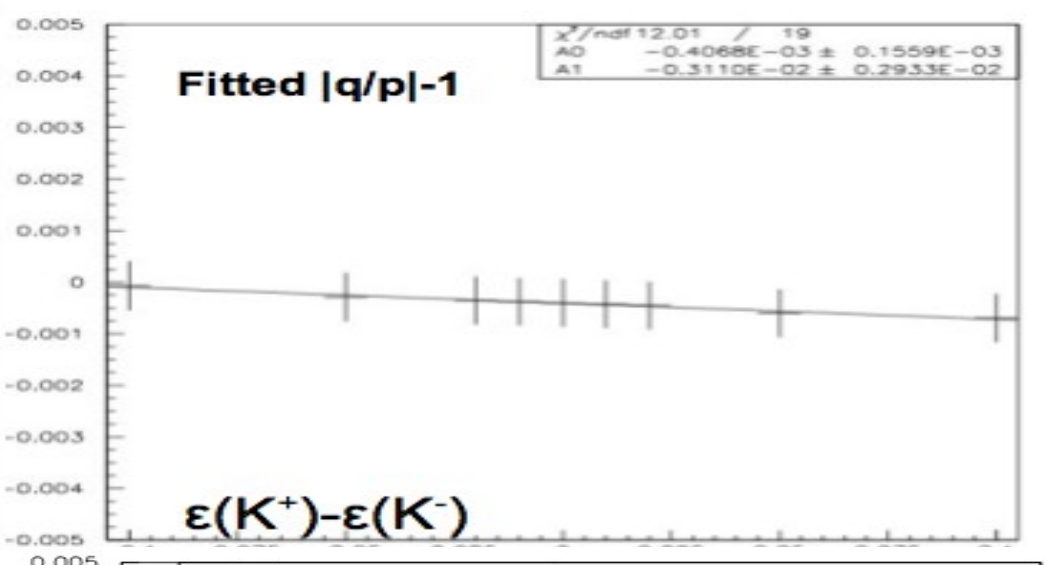




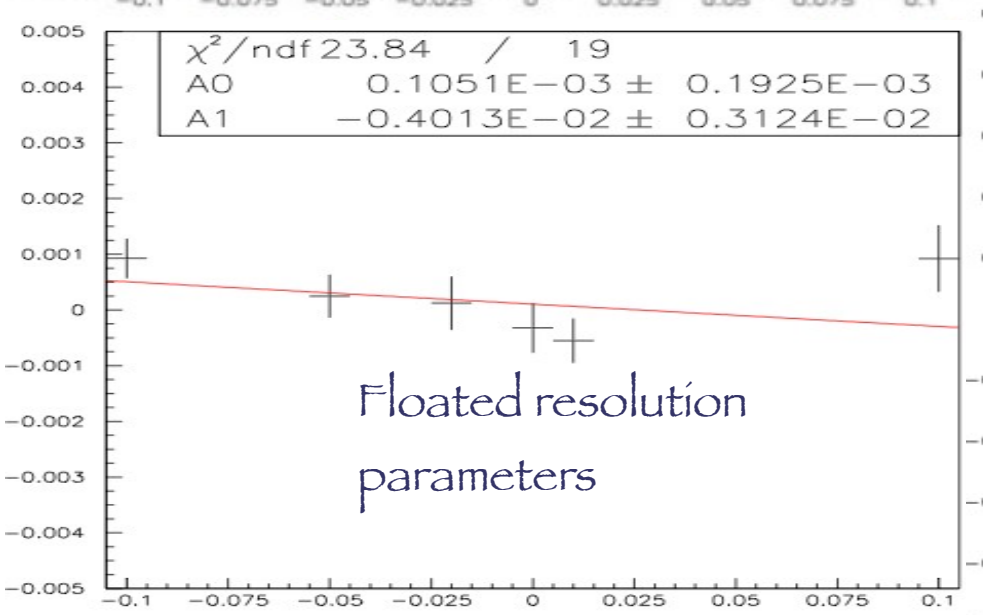
MC validation with free resolution

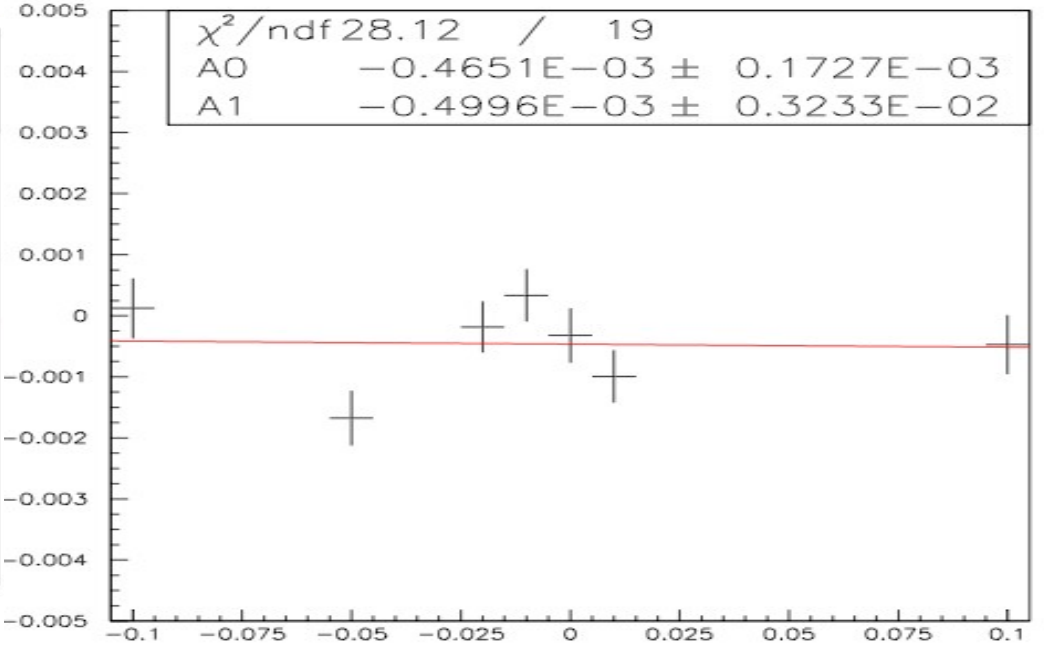
Detector Asymmetry Study: ~stable result (but it needs more iterations)





Floated only Dtag Fraction and Mistag parameters

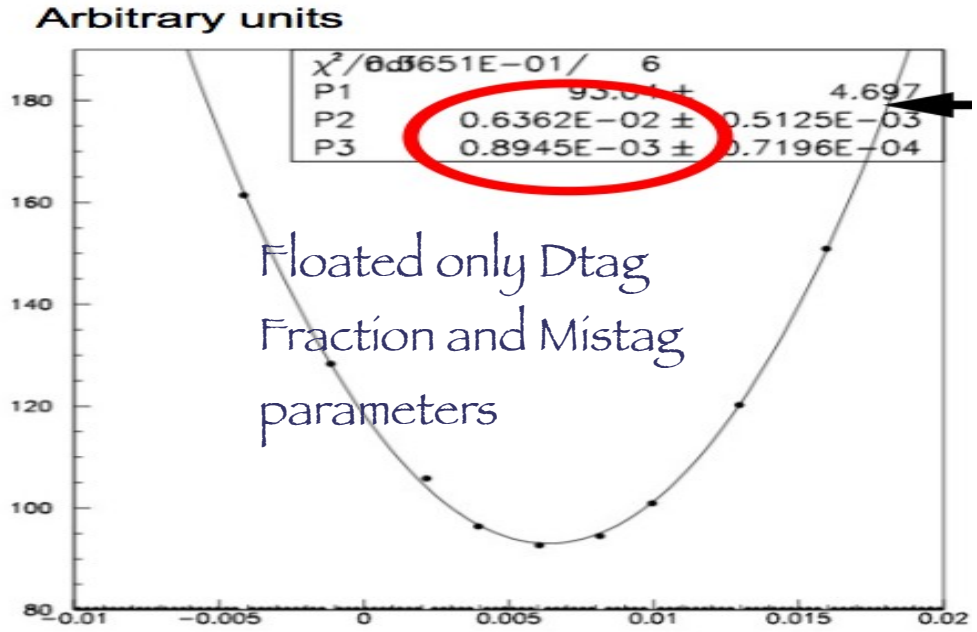


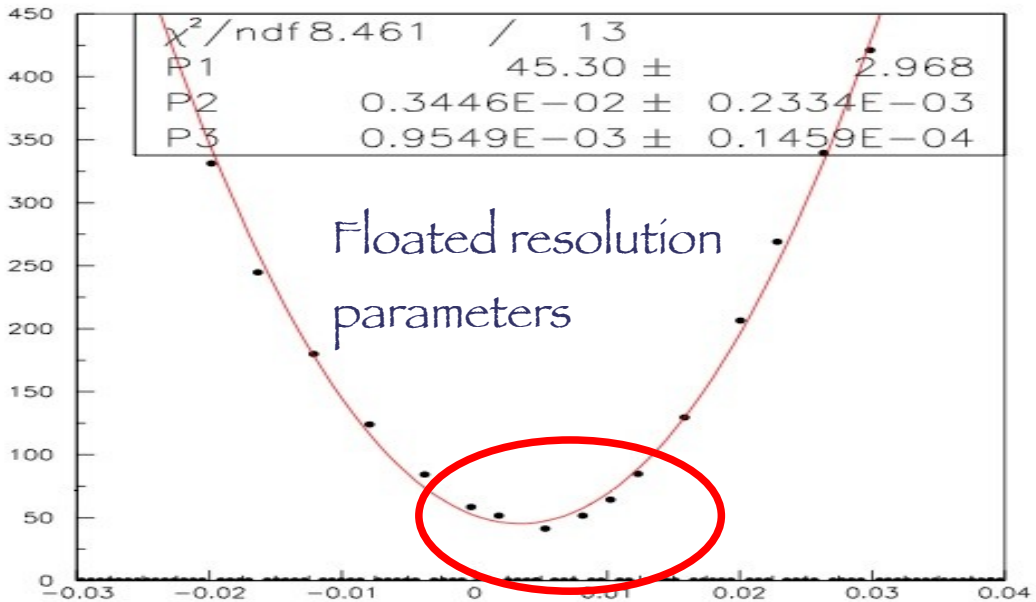


Floated resolution parameters

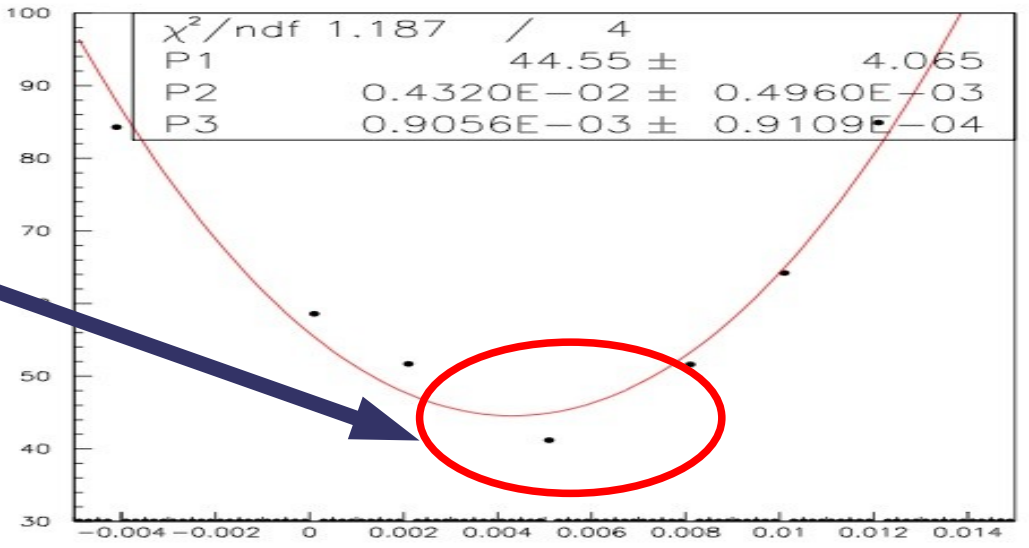
Real Data Results with free resolution

Likelihood minimum moves by "~1/~3 10^{-3}" w.r.t. The previous one



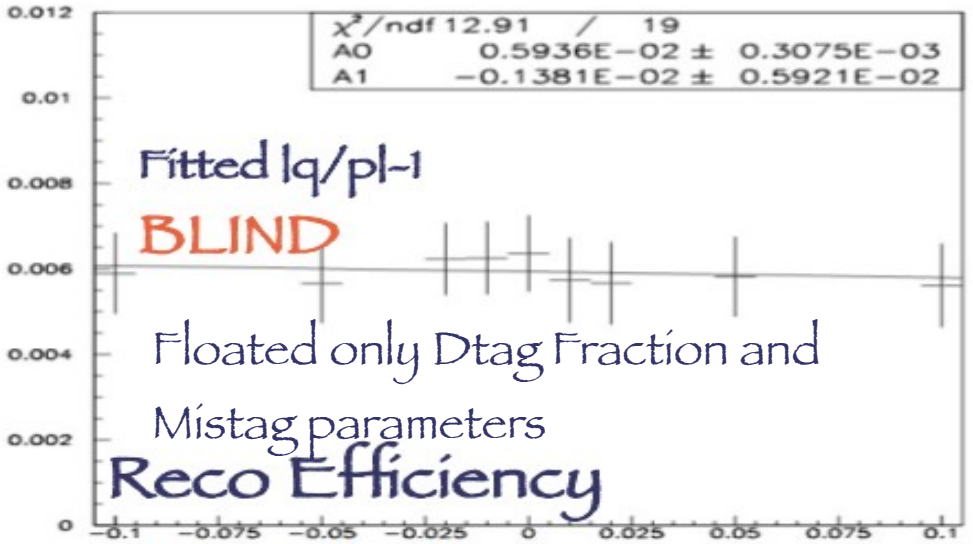


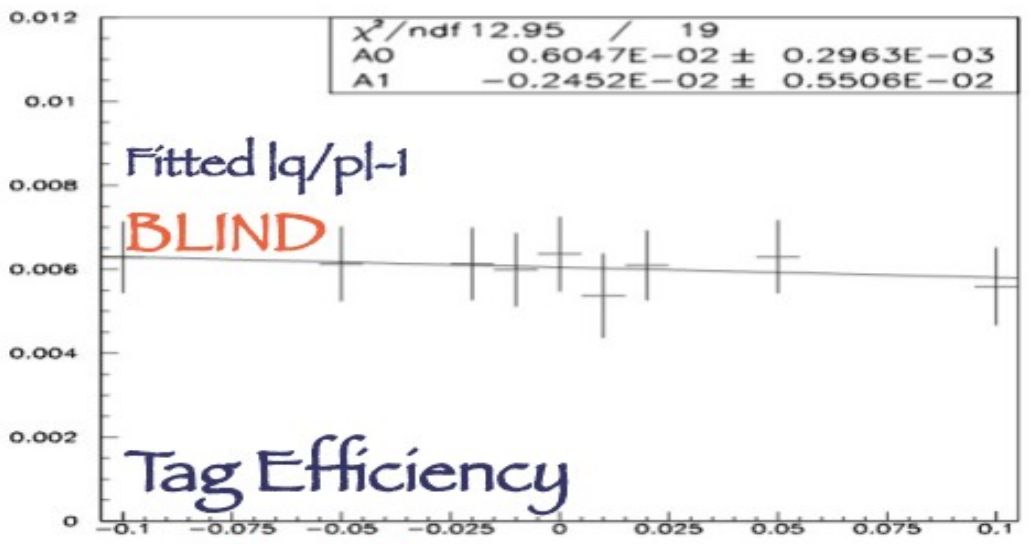
- Statistical error increased by ~7%
- More iterations needed to reach a smooth minimum
- Final number will be obtained by minuit itself, not using the scan



Real Data Results with free resolution

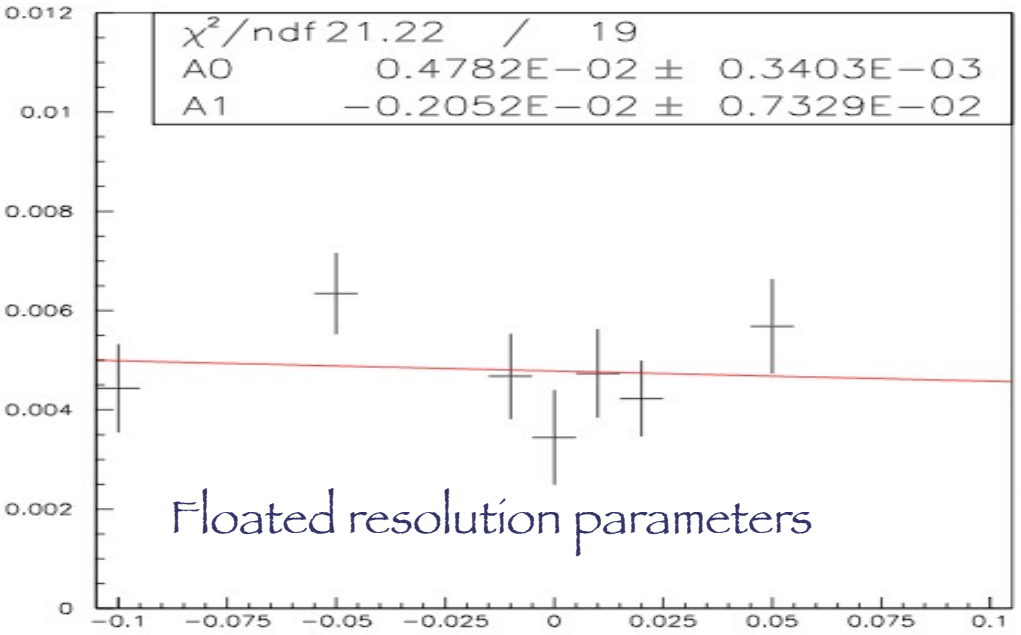
Detector Asymmetry Study: ~OK but more iterations needed...

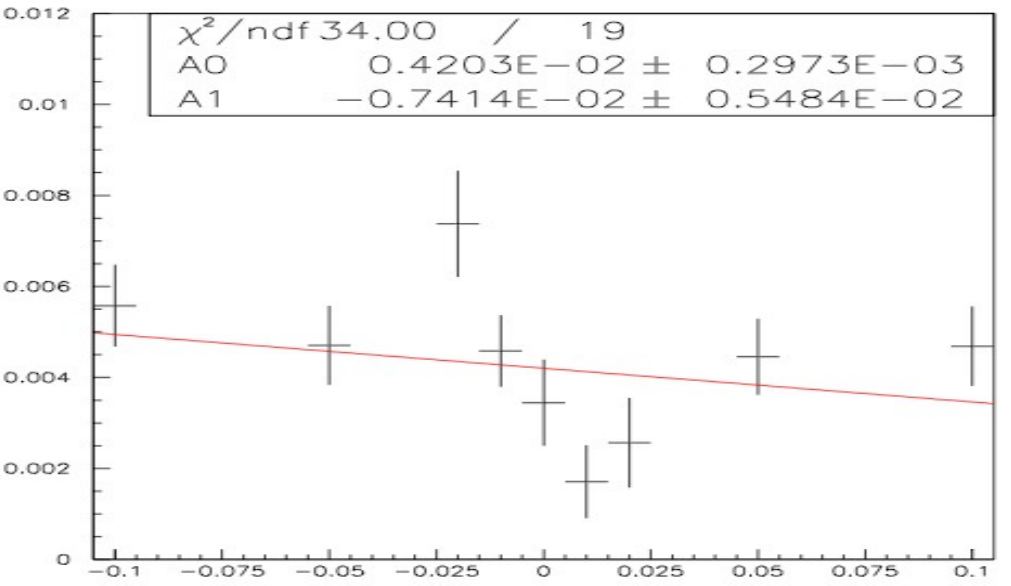




$\varepsilon(l^+\pi^-)-\varepsilon(l^-\pi^+)$

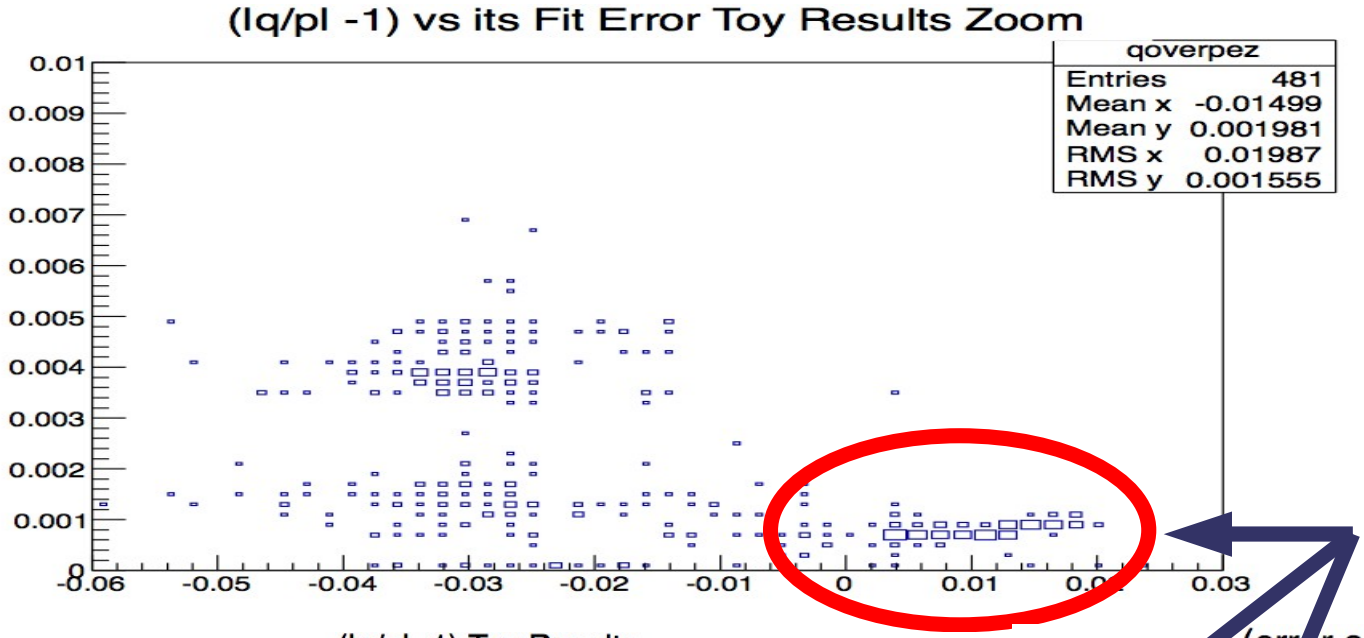
$\varepsilon(K^+)-\varepsilon(K^-)$





Toy MC Study

Enrico Feltresi



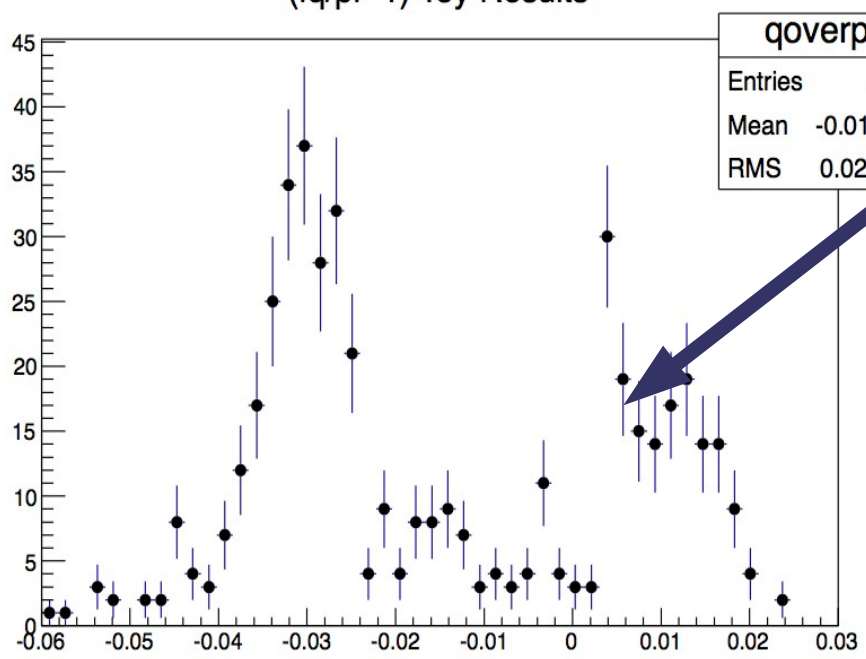
Starting Point:

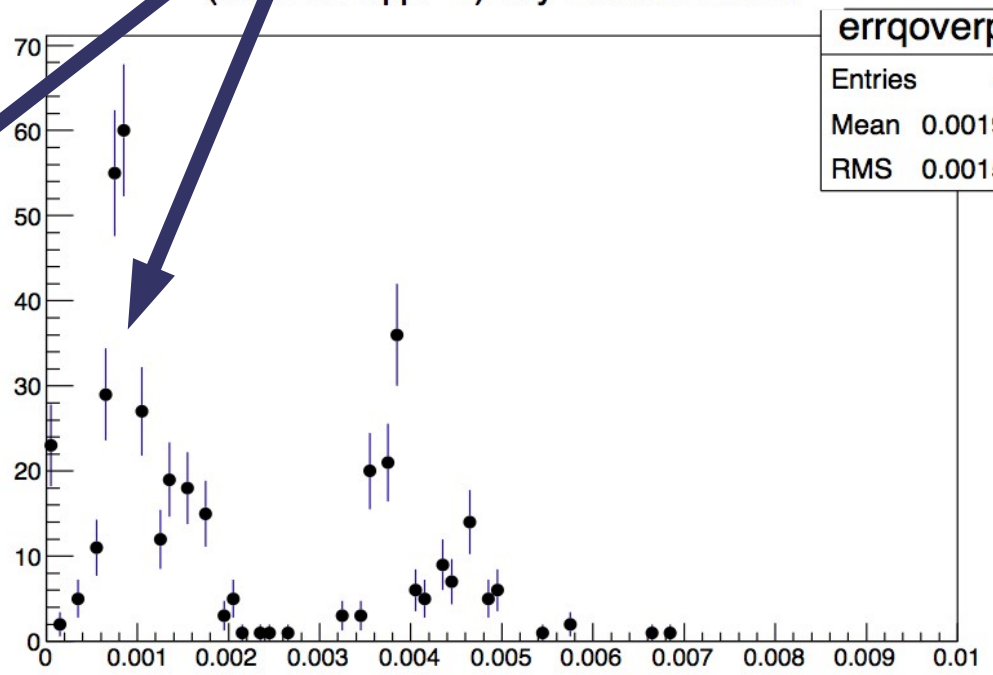
Iq/pI-1 ~0.006

ΔIq/pI ~ 1 10^{-3}

Huge Spread !!

"Reasonable" region





Toy MC Study

Spread too big to be a serious problem...
What is happening?

- Bug in the Toy MC algorithm?

- On the "Standard" MC and Real Data samples the fit needs some likelihood scan iteration before reaching convergence and a proper likelihood behaviour:
  - ➔ Does every generated experiment need the same procedure?

- A Combination of the previous two?
  - ➔ Code to be debugged...