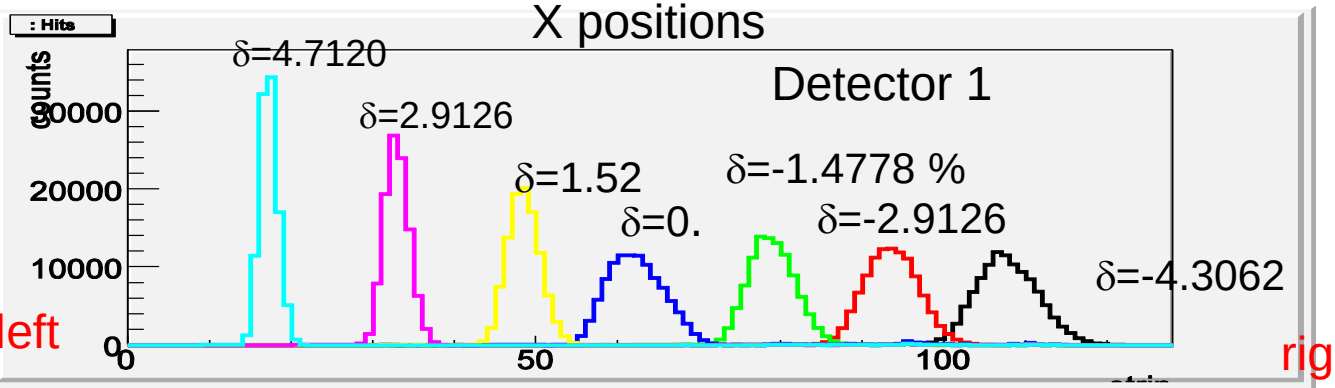
Measurements of pion beam line optic parameters
First proof of principle

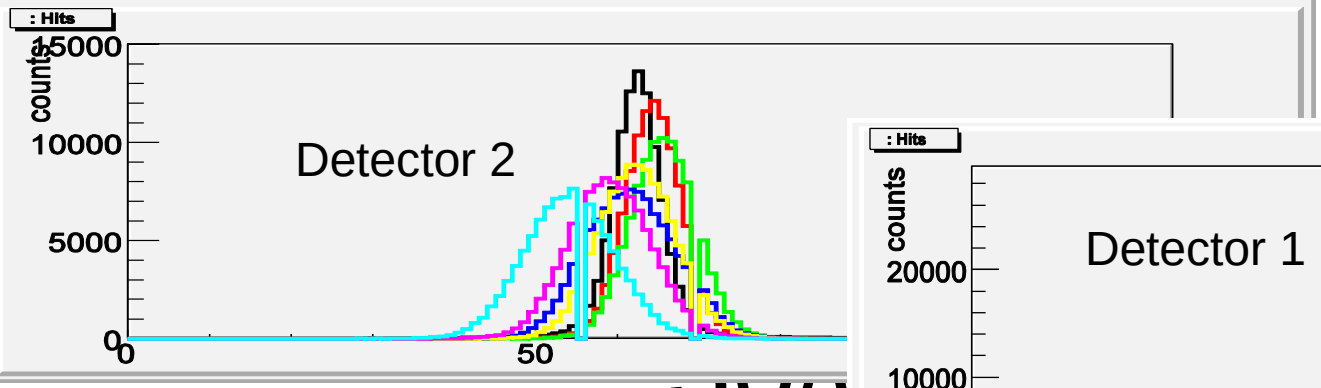
Analysis of measurements on 30/04/2014

Spectro \ inc. line	D = (P_spec-p_beam) /p_beam (in %)	d = D/(1+D) (wrt to central spectrometer B value , in %)	1 (ref) x0= 0.0 q0= 0.0 y0= 0.0 j0= 0.0	2 x0= 0.0 q0= 0.0 y0= -0.070 j0= 8.112	3 x0= 0.0 q0= 0.0 y0= -0.070 j0= -6.095	4 x0= 0.0 q0= 0.0 y0= 0.07 j0= 6.095
A (T=2.014033)	4,5	-4,3062				
B (T=1.975964)	3	-2,9126				
C (T=1.937952)	1,5	-1,4778				
D (T=1.90000 = ref)	0	0,0000				
E (T=1.862110)	-1,5	1,5228				
F (T=1.824285)	-3	3,0928				
G (T=1.786527)	-4,5	4,7120				
			T16, T166, T36, T366	T136, T146, T336, T346		T136, T146, T336, T346

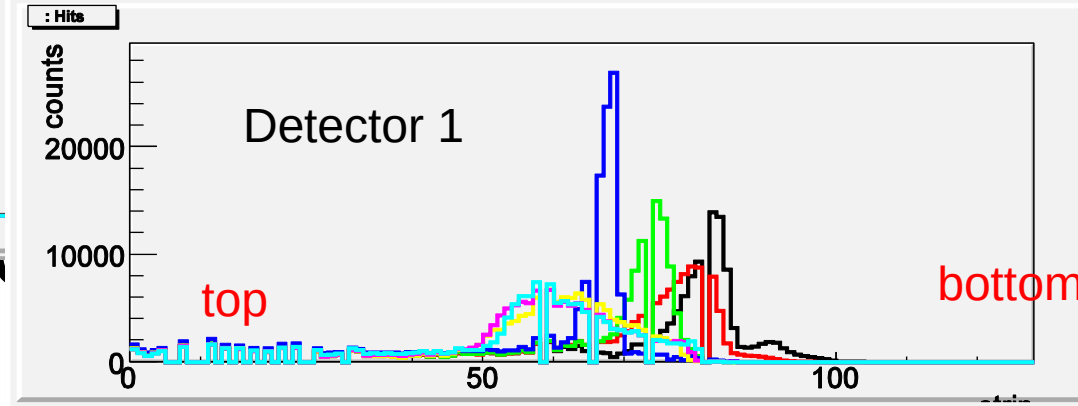
+……

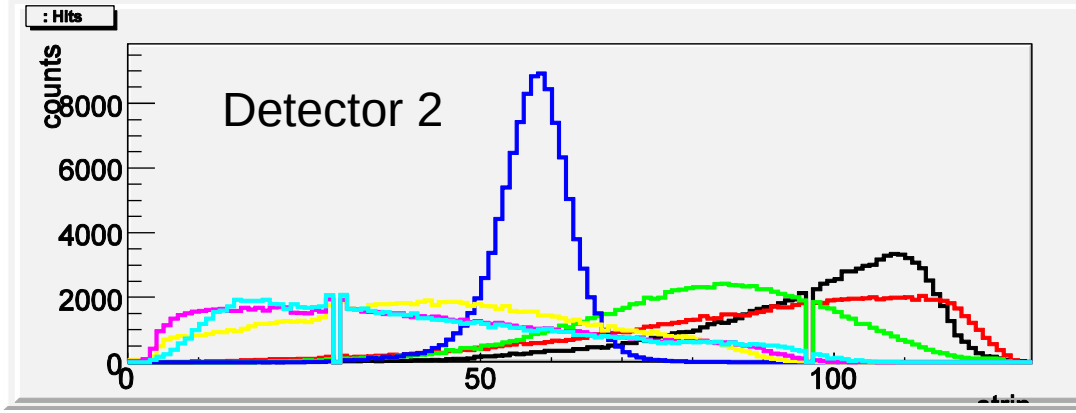
35 measurements in total





Y positions



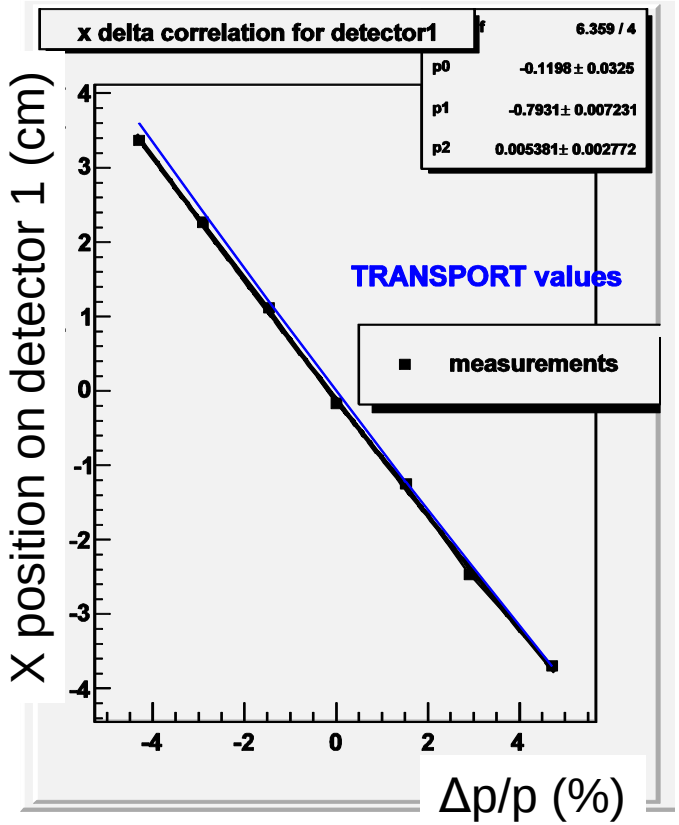


No time cut yet (analysis in progress)

Dispersion at detector 1 plane

Measurements on detector 1 for different values of δ: 26/04/2014

Fitted by $X^{det1} = T_{16}^{det1}\,\delta + T_{166}^{det1}\,\delta^2 + C$

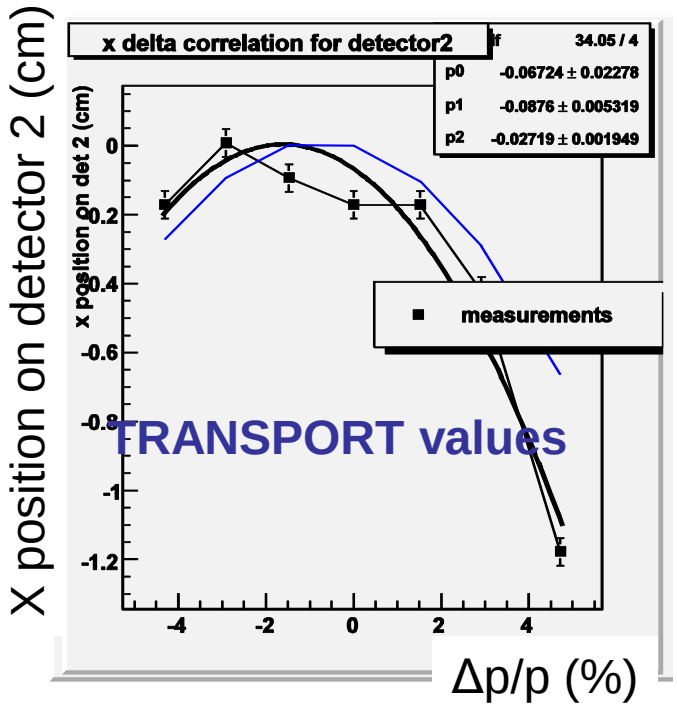


	measurements	TRANSPORT
T^{det1}_{16}	-0.793 ± 0.07	-0.81235
T^{det1}_{166}	0.005 ± 0.003	0.005611

Dispersion at detector 2 plane

Measurements on detector 2 for different values of δ

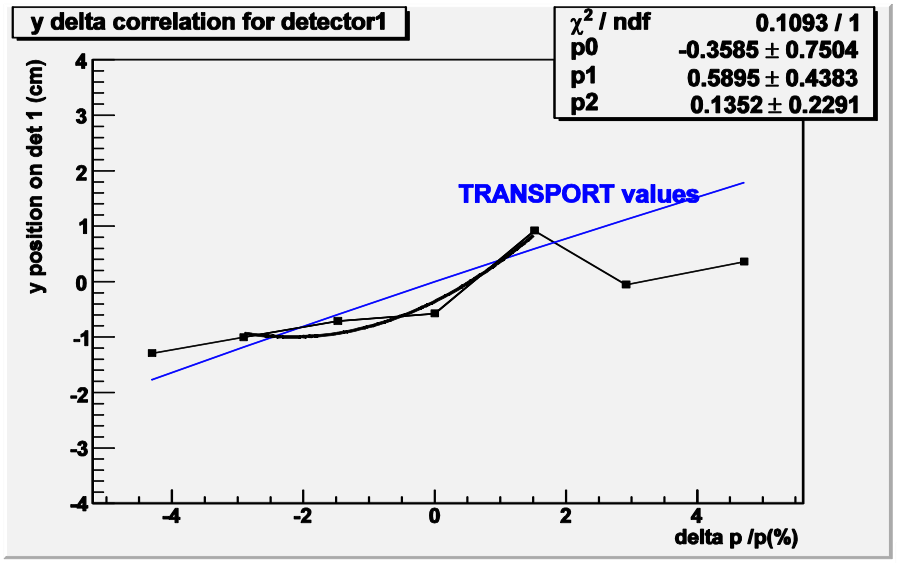
Fitted by $X^{det2} = T_{16}^{det2}\,\delta + T_{166}^{det2}\,\delta^2 + C$



	measurements	TRANSPORT
T^{det2}_{16}	-0.0876 ± 0.005	-0.03413
T^{det2}_{166}	-0.027 ± 0.002	-0.02265

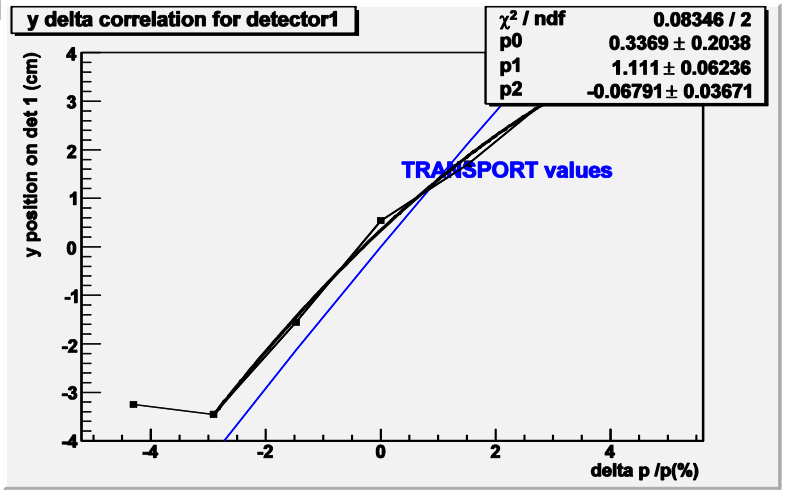
Dominant effect of second order term

(Y,δ) correlation detector 1



T36>0
T366 small
Fit using only 4 points

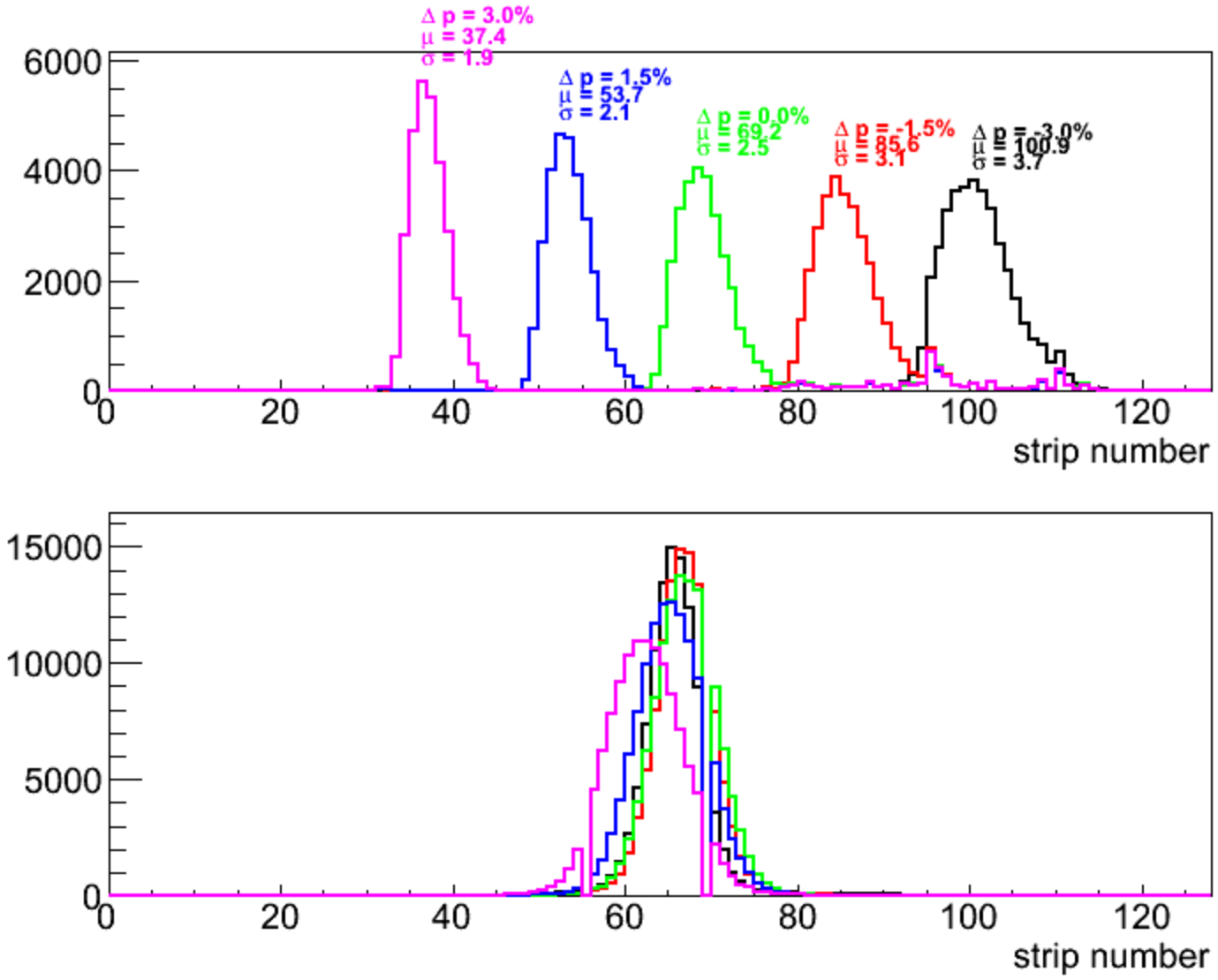
(Y,δ) correlation detector 2



Fit using only 4 points

Main trend is reproduced

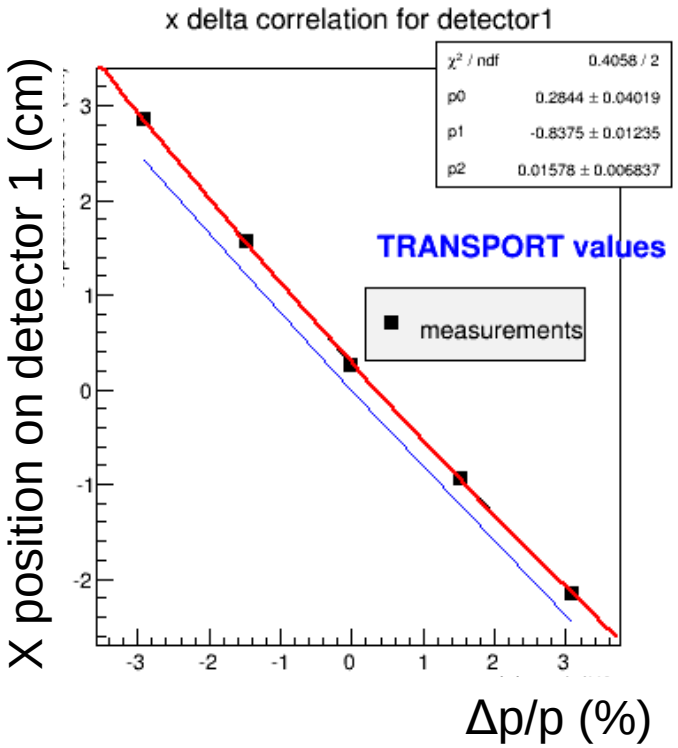
Analysis of measurements on 26/04/2014


Δ p = 3.0%
μ = 37.4
σ = 1.9
Δ p = 1.5%
μ = 53.7
σ = 2.1
Δ p = 0.0%
μ = 69.2
σ = 2.5
Δ p = -1.5%
μ = 85.6
σ = 3.1
Δ p = -3.0%
μ = 100.9
σ = 3.7
6000
4000
2000
0
0
20
40
60
80
100
120
strip number
15000
10000
5000
0
0
20
40
60
80
100
120
strip number

Dispersion at detector 1 plane

Measurements on detector 1 for different values of δ: 26/04/2014

Fitted by $X^{det1} = T_{16}^{det1}\,\delta + T_{166}^{det1}\,\delta^2 + C$

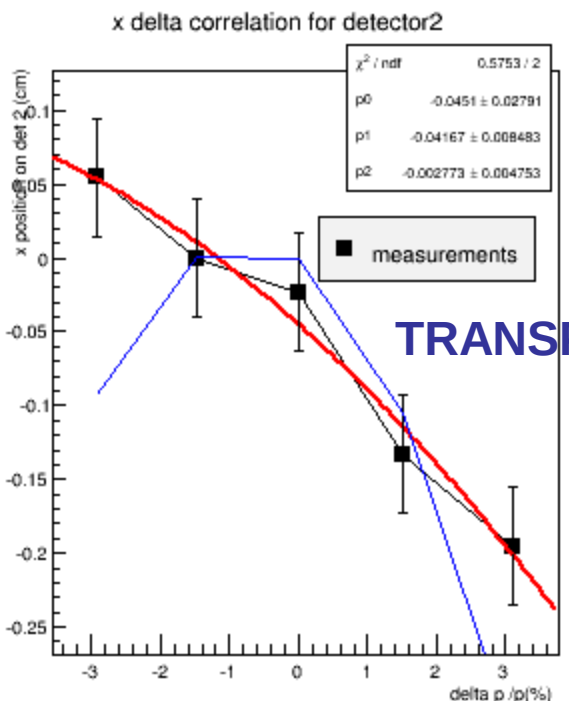


	measurements	TRANSPORT
T^{det1}_{16}	-0.84 ± 0.01	-0.81235
T^{det1}_{166}	0.016 ± 0.006	0.005611

Dispersion at detector 2 plane

Measurements on detector 2 for different values of δ

Fitted by $X^{det2} = T_{16}^{det2}\,\delta + T_{166}^{det2}\,\delta^2 + C$



X position on detector 2 (cm)

Δp/p (%)

	measurements	TRANSPORT
T^{det2}_{16}	-0.042 ± 0.008	-0.03413
T^{det2}_{166}	-0.003 ± 0.005	-0.02265

TRANSPORT values

First conclusion:
check of the dispersion terms given by TRANSPORT
First order terms are fine
2nd order terms too large

Analysis of the width of beam spots on detector 1

Measurements on detector 1 for different values of δ: 26/04/2014

Contributions to the width in x:

Beam horizontal size $(T_{11} + T_{116}\,\delta)\,\sigma_{X0}$

Beam horizontal angular aperture $(T_{12} + T_{126}\,\delta)\,\sigma_{\theta 0}$

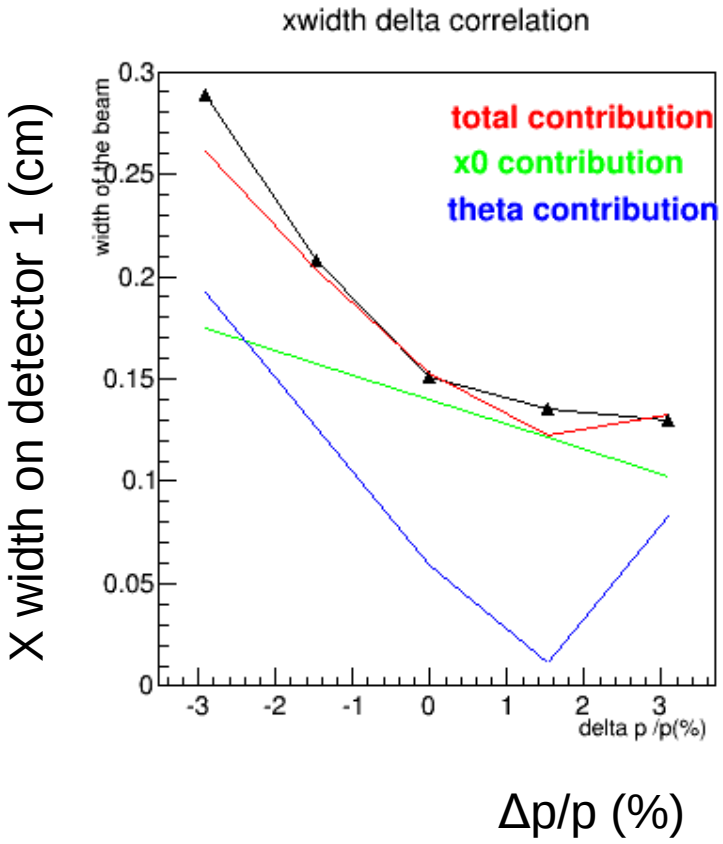
Beam momentum spread (210^{-4}): negligible effect

Reasonable description of width on detector 1with

$\sigma_{X0} = 0.08$ cm

$\sigma_{\theta 0} = 1.5$ mrd

To be checked once $T_{11}, T_{116}, T_{12}, T_{126}$ will be measured



Δp/p (%)

Analysis of the width of beam spots on detector 1 and 2

Measurements on detector 1 for different values of δ: 26/04/2014

Contributions to the width in x:

Beam horizontal size $(T_{11} + T_{116}\,\delta)\,\sigma_{X0}$

Beam horizontal angular aperture $(T_{12} + T_{126}\,\delta)\,\sigma_{\theta 0}$

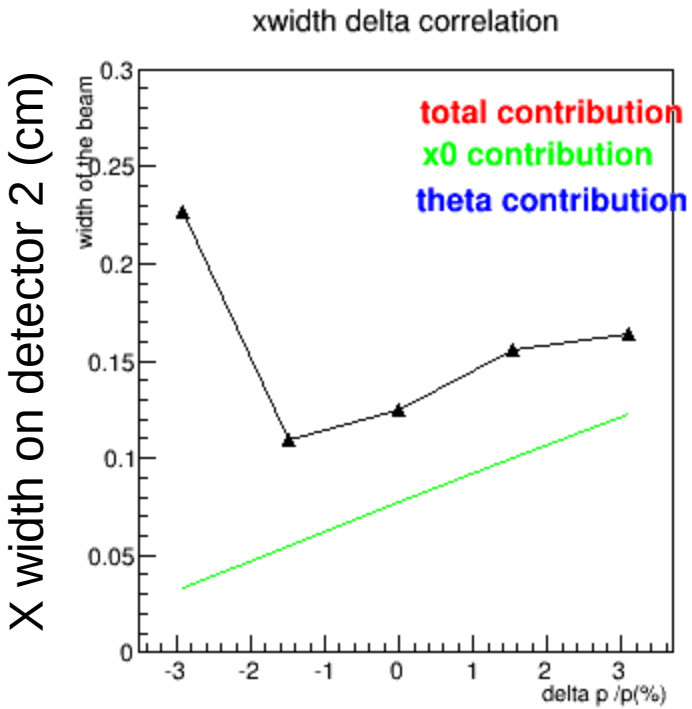
Beam momentum spread (210^{-4}): negligible effect

With the values used for detector 2

Too large contribution of angular aperture (0.6 cm)

apparent inconsistency to be understood

once $T_{11}, T_{116}, T_{12}, T_{126}$ will be measured



Δp/p (%)

To do

Extract position and width using strip distribution with time cut (Lukas)
Understand width on detector 1 and 2
Analysis of all coefficients, new coefficients to be used for data analysis