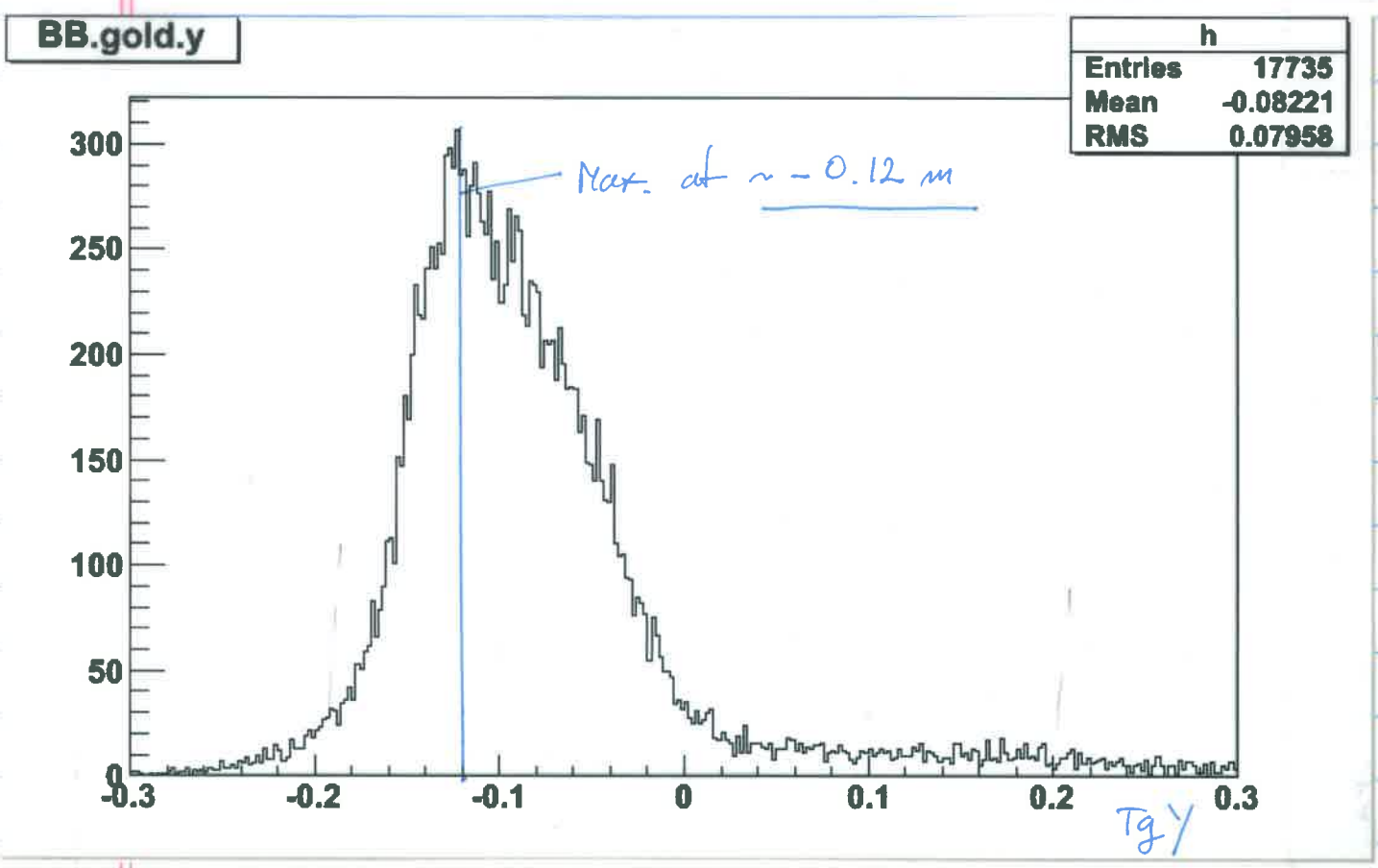
Problems with Tg Th

03/17/14

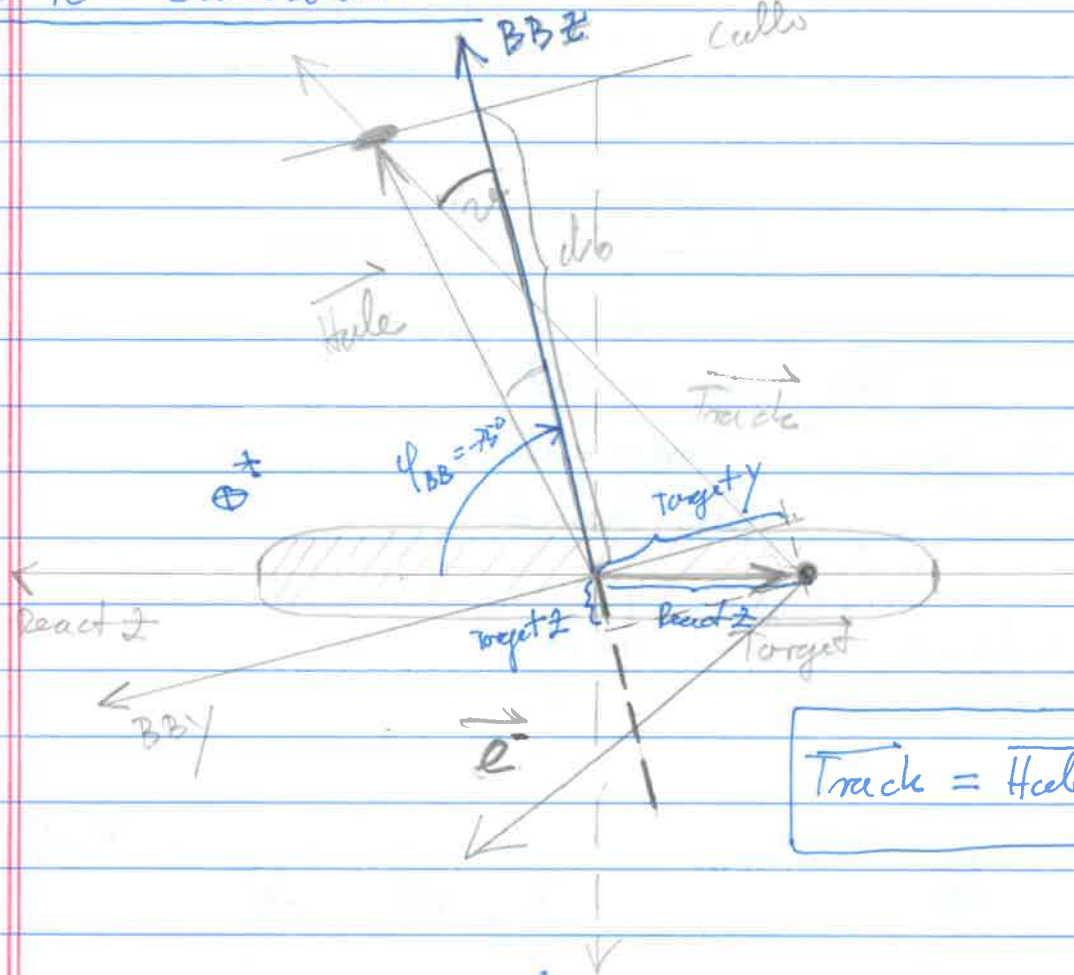
Problem: Distance to Coll: 1.26703 (old value)
~ 1.18 (New value)

Where does this difference came from?

Determination of this distance was done with ^{1}H elastics, which are all pushed to one side (considering only coincidence events) of the target.



Distance to Calibrator:



$$\vec{Track} = \vec{Hole} - \vec{Target}$$

$$Tg\,2\varphi = \frac{Track.x}{Track.z}$$ } This was written in BB coord. sys.

$$Tg\,2\varphi = \frac{Hole.x - \overbrace{Target.x}^{\approx 0}}{\underbrace{Hole.z}_{d_0} - Target.z} = \frac{Hole.x}{d_0 - Target.z}$$

$$Tg\,y = -React\,z \cdot \underbrace{\sin\varphi_{BB}}_{0} \Rightarrow React\,z = -\frac{Tg\,y}{\sin\varphi_{BB}}$$

$$Tg\,z = React\,z \cdot \underbrace{\cos\varphi_{BB}}_{0} = -Tg\,y \cdot \frac{1}{tg\,\varphi_{BB}}$$

The correct formula for $Tg2\varepsilon$ is:

$$Tg2\varepsilon = \frac{Hcale.\ x}{d_0 + Tg\gamma \frac{1}{tg\varphi_{BB}}}$$

↓

When I first did my calibration, I forgot to include/consider this term.

↓

What kind of correction is this:

$$Tg2\varepsilon = \frac{Hcale.\ x}{d_0 + Tg\gamma \frac{1}{tg\varphi_{BB}}} = \frac{Hcale.\ x}{\tilde{d}_0}$$

d_0 ↓ Correct Distance

$\tilde{d}_0$ ↓ First Distance.

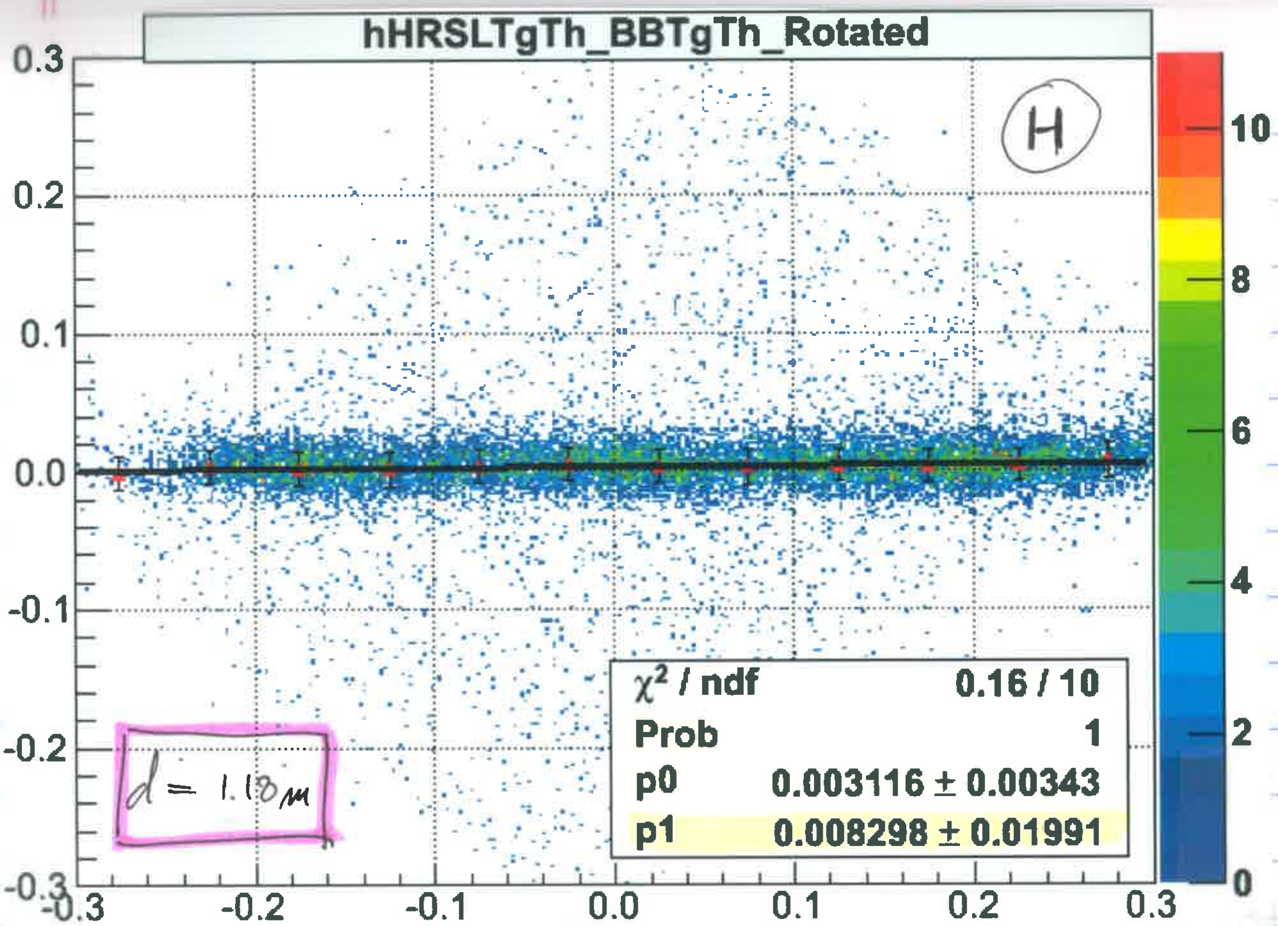
$$\tilde{d}_0 = d_0 + Tg\gamma \frac{1}{tg\varphi_{BB}} =$$

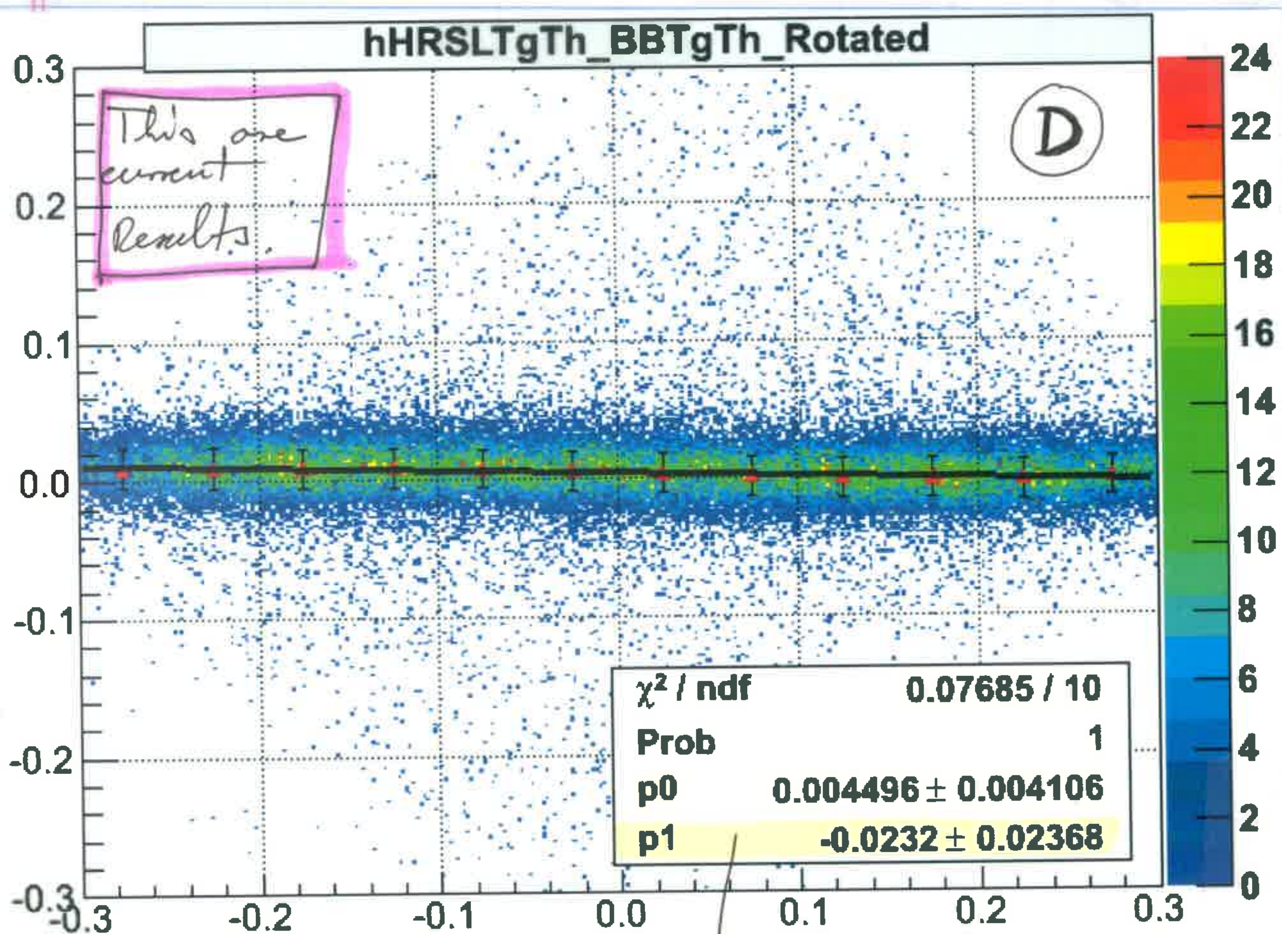
$$= d_0 \cdot \underbrace{\left(1 + \frac{Tg\gamma}{d_0} \cdot \frac{1}{tg\varphi_{BB}}\right)}_{1 - \frac{0.12}{1.18} \frac{1}{tg(-75^\circ)}}$$

$$1.18 \quad 1.027 = 1.2118 \text{ m}$$

Tole je popravek v prvo smer, vendar ne celo prav velik. Nekaj ši manjka!

→ This is correction in right direction, but is still too small.





Analysis was done on run #3491!

Now I will change the distance to the target in my SVD algorithm, and observe, how the slope changes for both D, which are centered around $y_T = 0$ and H, which are pushed to one side of the target. $y_T = -0.15\,m$, thus having additional offset.

do distance	D − 45° slope (k')	H − 45° slope (k')	Mean Slope k'	Δ (H−D) Slope
1.18 m	−0.0232	+0.006743		+0.0299
	↑	↕ Between these two is zero!		
1.267 m	−0.05725	−0.02588		+0.03137
	↓ Between these two is zero			
1.10 m	+0.01008	+0.03897		+0.02889
1.0 m	+0.05513	+0.08304		+0.02791
0.9 m	+0.1052	+0.1315		+0.0263
1.3 m	−0.06945	−0.03899		+0.03046
1.4 m	−0.1042	−0.07134		+0.03286

Where does this constant difference come from?

Why do we see a constant difference in a slope!

I will make narrower cuts on TgY and check how results change! They should not change at all.

$d_0 = 1.1\,m$

TgY	k'(D)	k'(H)	
(−0.1 ± 0.02)	+0.03056	+0.03682	Thankfully they are changing together in the same direction
(0.05 ± 0.02)	+0.02064	+0.02422	
(0.0 ± 0.02)	+0.00975	/	(No good events available to calibrate with)
(0.05 ± 0.02)	1.85×10^{-5}	/	
(−0.1 ± 0.02)	−0.008182	/	
(0.15 ± 0.02)	/	No events here	This should not change like Tws

Remarks: When doing TgTh calibrations, I had a offset in my code for TgY. This offset ~~could~~ could thus lead to between, because it introduces a term in TgTh, that is changing with angle!

$$Tg\,2\varrho = \frac{Hole.x}{do - Target.z}$$

$$Tg\,z = (React\,z + \underbrace{offst.z}) \cdot \cos\varphi_{BB}$$

This is my correction.

$$Tg\,2\varrho = \frac{Hole\,x}{do} \cdot \left(1 - \frac{Tg\gamma}{do} \cdot \frac{1}{tg\,2\varrho_{BB}} \pm \underbrace{\frac{offst.z \cdot \cos\varphi_{BB}}{do}}\right)$$

↓

This is not constant!

My offset was set to 0.0288 m in the z_{UP} direction! I will remove this offset and check what is going on!

What is the change ...

$Tg\gamma$	$k'(D)$	$k'(H)$
(0.0 ± 0.02)	$+0.013$	
(-0.1 ± 0.02)	$+0.0336$	
$(+0.1 \pm 0.02)$	-0.004915	

Obviously this correction means only constant correction, since all the results still not for 'tapper. the same value.

$$k' = \frac{k-1}{1+k} \Rightarrow k = \frac{1+k'}{1-k'} \cong (1+k')\cdot(1+k')$$

$1+2k'$

$$k = \frac{1+0.03}{1-0.03} = 1.03$$

3% correction

$$k(k' = 0.013) = 1.026$$

Let's use deuterons and trg to fix the distance, using only central events!

$tg\gamma = 0 \pm 0.02$

d_0	k'	n
1.1 m	0.013 m	?
	0	
1.15 m	-0.008539	0.00392
1.13 m	$+6.461 \cdot 10^{-5}$	0.00392

$y = kx + n$

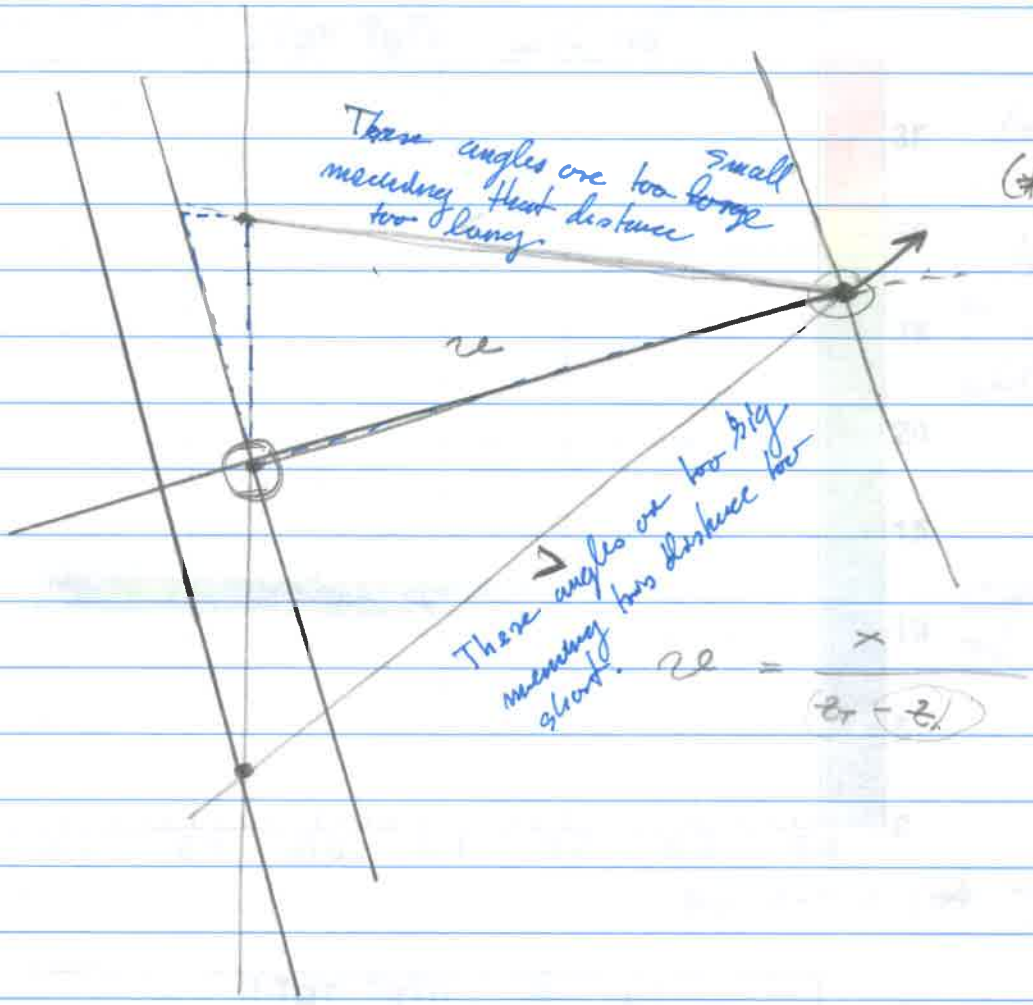
$k = -0.43078$

$n = 0.013 + 0.043078 \cdot 1.1$

$n = 0.4868$

$y = 0 \Rightarrow x = 1.13$ m

03/18/11



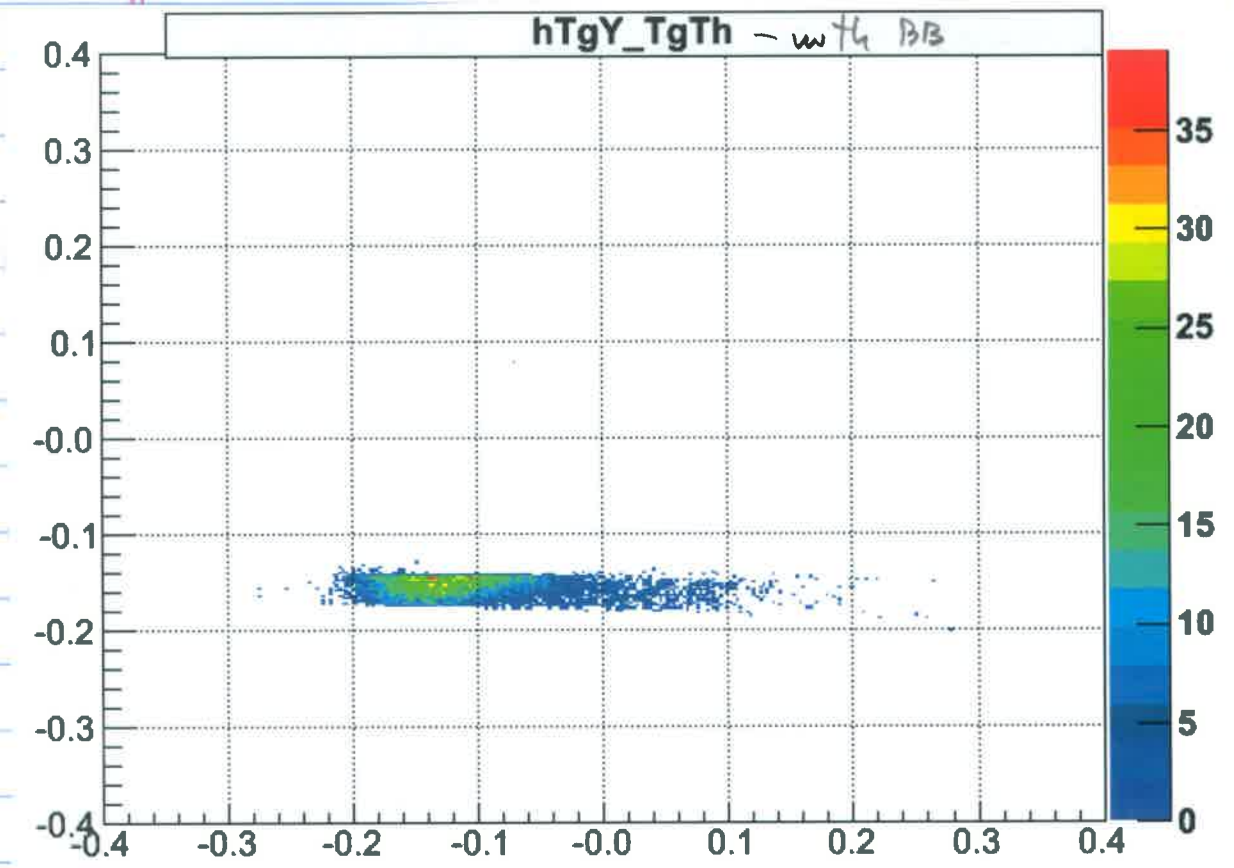
$z_e = \frac{x}{z_2 - z_1}$

V analysis — I will include ExTarCor_L class. It considers corrections for ρ and z_e. This was not yet included in my analysis. Lets check, how this affects my results. I have changed the analysis names from 9 → 10

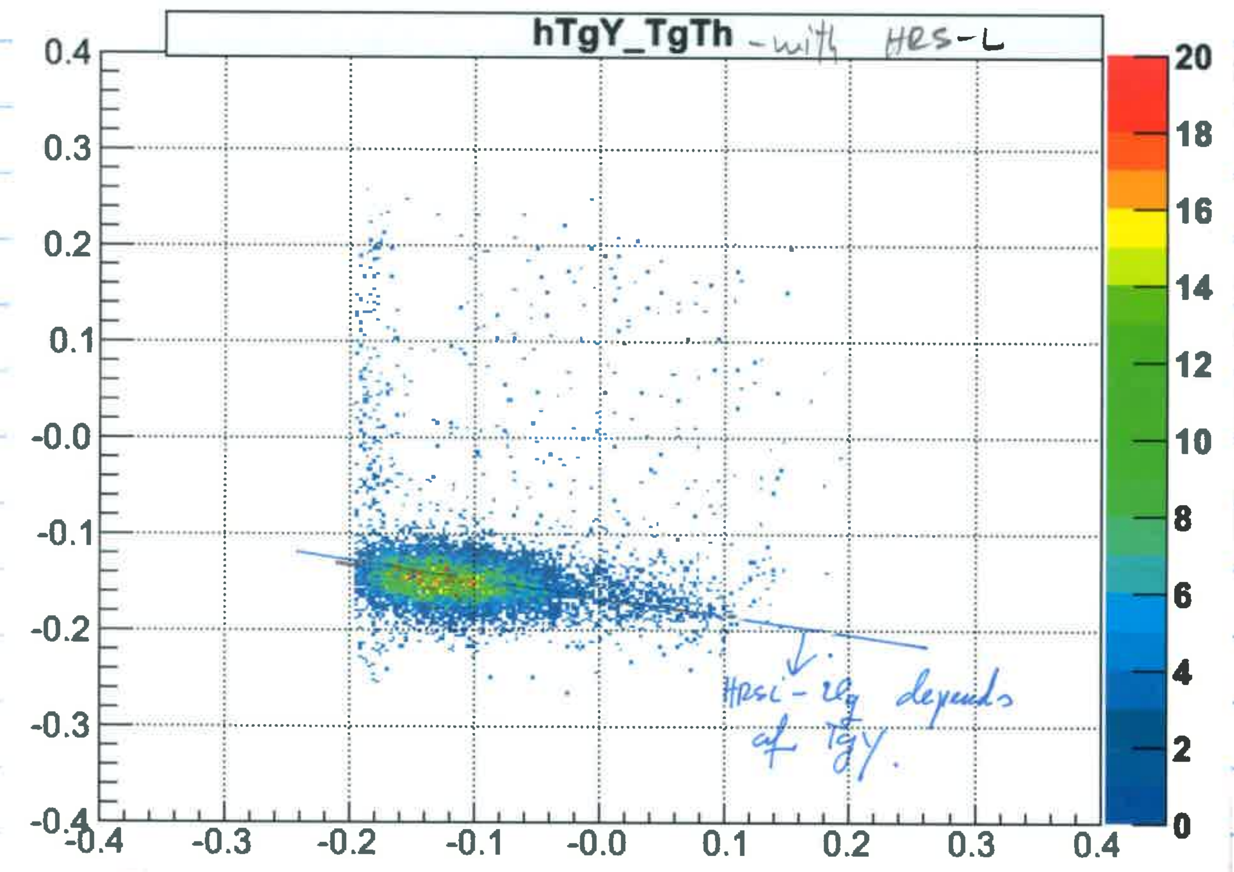
Analysed bam name: 3374 in 3157.

03/20/11

Remark: My Analysis can form is still not working. It compiles correctly but always times out when analysis runs.



React PT_z (at TgY)



focus

responds

React PT_z.

To solve this problem, I reanalyzed my data with different variables. This time I used ExTogtCor_# variables, that consider Extended target Corrections. With this variables, I get better results. At the edges of Tgy acceptance is RC HRCL bigger, when using ExTgTCorr variables, than, when using just PrwKine1 ... !

Tgy	k' (D)	k' (H)	d = 1.13m
(-0.1 ± 0.02)	-0.004839	-0.0003682	
(-0.05 ± 0.02)	-0.003254	+0.004638	
(0.0 ± 0.02)	-0.00060912	+0.005516	(Bad statistics)
(+0.05 ± 0.02)	+0.002313	/	Now we do not have syntactic affect any more!
(+0.1 ± 0.02)	+0.009394! (Bad stat!)	/	
(+0.05 ± 0.02)	/ No stat.	/	
(-0.15 ± 0.02)	-0.004709	+0.001846	

$k'_{Max} = \pm 0.005 \Rightarrow$ To primerna napaka: $\Delta k' \approx 2k' \leq 0.01 = 1\%$

Now let's try to find correct distance

distance do	k'(D)	k'(H)	
1.13m	-0.00042 ± 0.027	0.0010 ± 0.02.	Best
	↓	↓	
1.1m	0.0092 ± 0.032	0.0141 ± 0.022	
1.0m	0.05748 ± 0.03	0.05892 ± 0.021	
1.18m	-0.021 ± 0.026	-0.01964 ± 0.022	
1.27m	-0.05626 ± 0.026	-0.0545 ± 0.021	
1.12m	+0.003858 ± 0.0272	+0.005366 ± 0.022	(Worse than 1.13m)
1.14m	-0.004499 ± 0.026	-0.003164 ± 0.02192	(Worse than 1.13m)

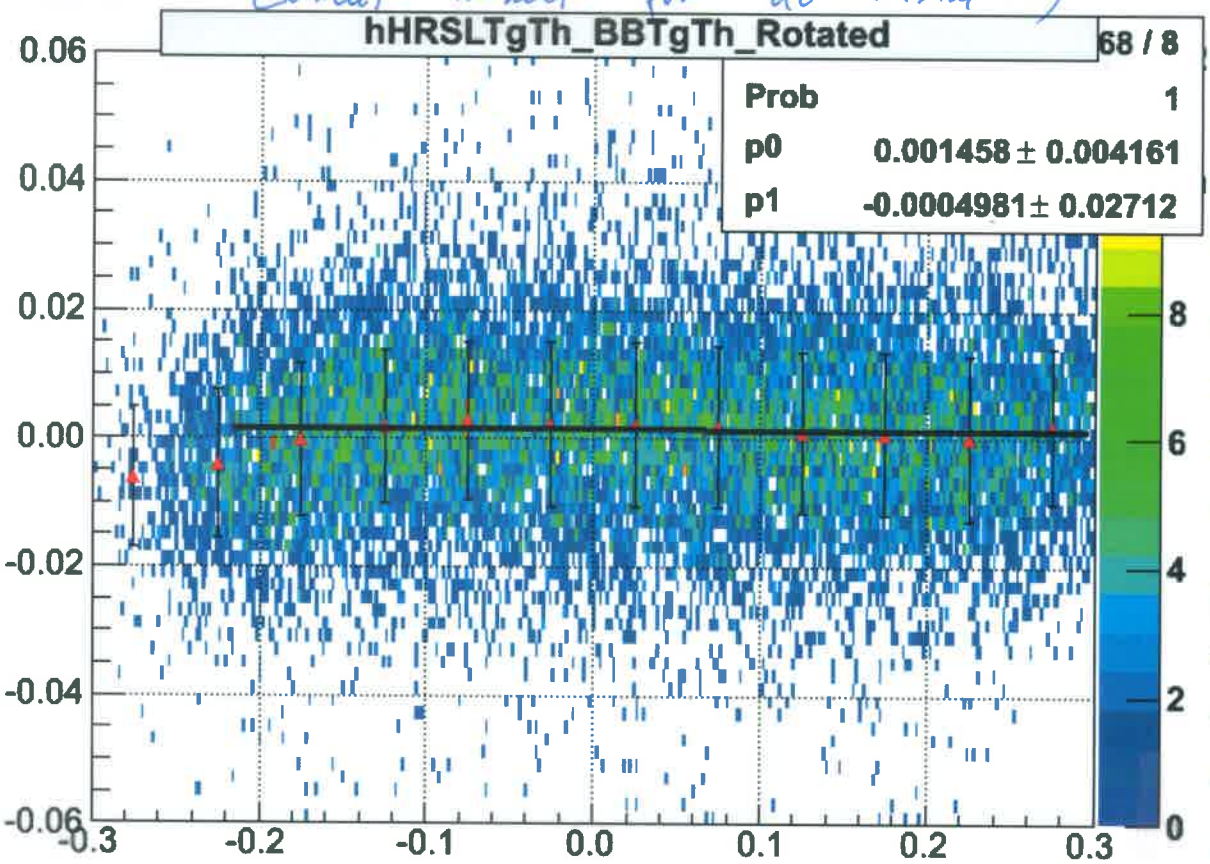
These three are results constant!!!

Comparison of new and old results: (without any cuts!)

	k' (D)	k'(H)	difference	
New	-0.00048	0.001	Δ = 0.0015	$\frac{\Delta_{new}}{\Delta_{old}} = 5 \cdot 10^{-2}$
Old	-0.06945	-0.03849	Δ = 0.0305	

03/21/17

Current result for $d_0 = 1.13$ m (D)



Current result for $d_0 = 1.13$ m (H)