Results for profiled FC for $B^0 \to K^\star \mu\mu$

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INFN Padova

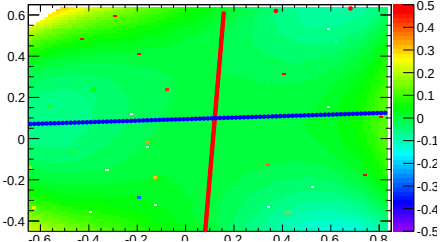
no meeting,
work, January 26, 2017

Are we using the correct Gen Point?

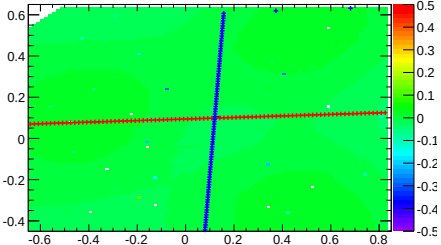
1. use the absolute minimum of the profiled DLL among the points for which we evaluated DLL for Data
   - × instable for some bin
2. consider the profiled DLL, fit with a parabola and use the vertex
   - ✓ more stable and robust definition of minimum and its value DLL(Data);
   - × still problem in sparse profile due to lack of points to fit;
3. fit a bivariate `pol2` to the 2d DLL distribution and get the min of the profiled parabolas
   - ✓ more robust than the previous one also for sparse profile.
   - ✓ smooth physical limit via high degree (9) pol fit to binned limit available;
   - × fit does not follow very well the original DLL distribution
4. fit a bivariate gauss to the 2d $\mathcal{L}$ distribution and get the max of the profile;
   - ✓ better fit
   - ✓ can reuse the previous toys with new DLL for Data, as computed with the new fit on the same gen point
   - × in some bins the maximum is different wrt (3)

Bin 0

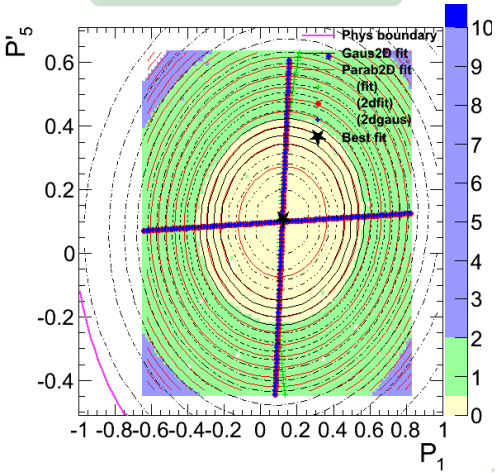
Bivariate po12



Bivariate Gauss

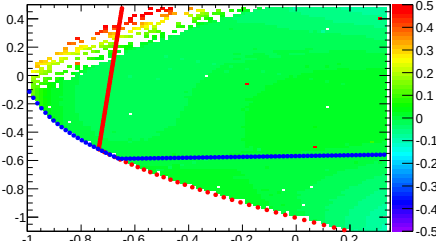


Profiled min comparison

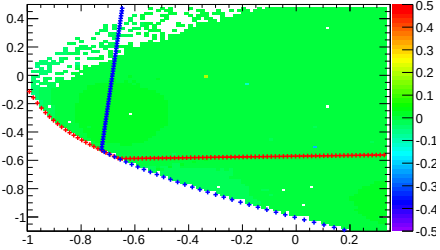


Bin 1

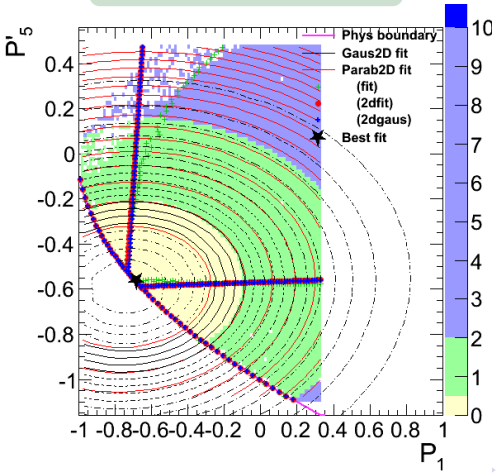
Bivariate po12



Bivariate Gauss

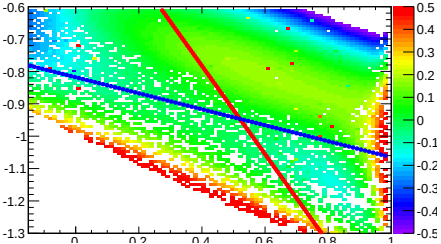


Profiled min comparison

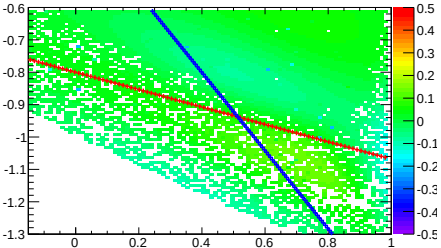


Bin 2

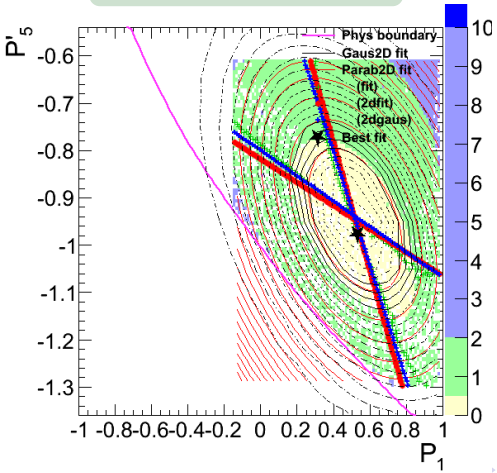
Bivariate po12



Bivariate Gauss

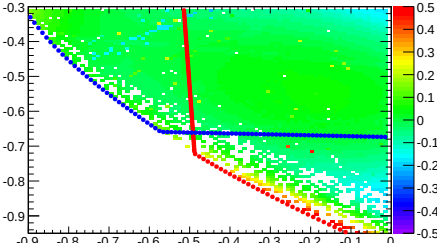


Profiled min comparison

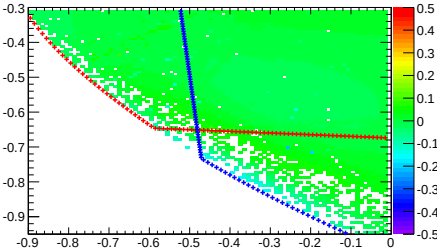


Bin 3

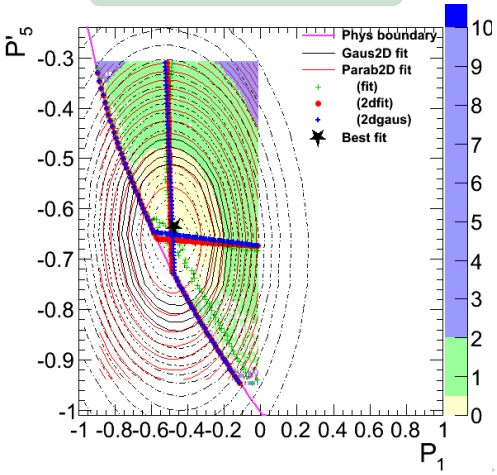
Bivariate po12



Bivariate Gauss

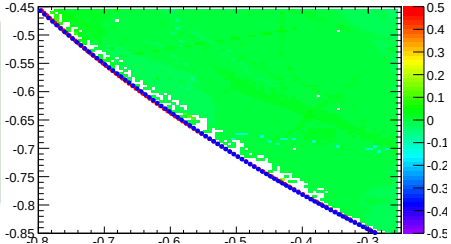


Profiled min comparison

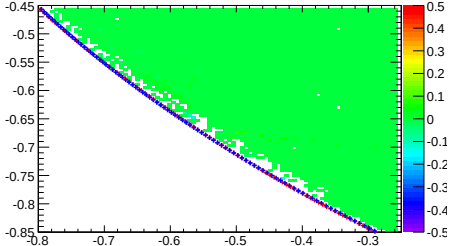


Bin 5

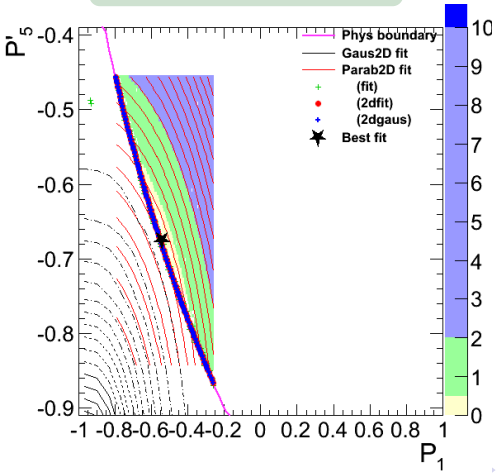
Bivariate po12



Bivariate Gauss

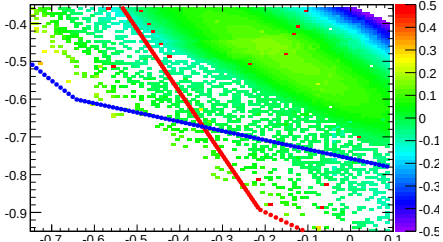


Profiled min comparison

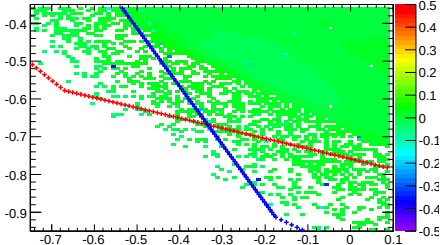


Bin 7

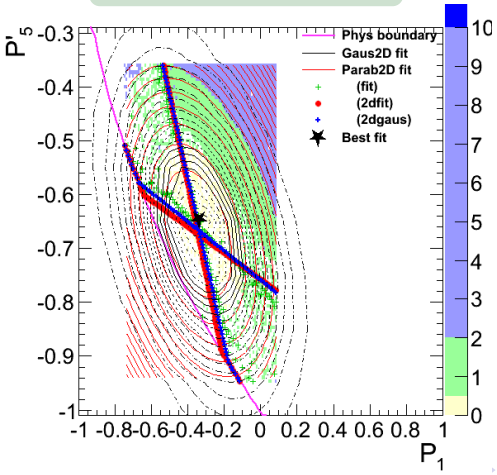
Bivariate po12



Bivariate Gauss

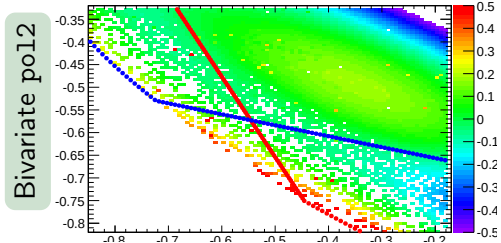


Profiled min comparison

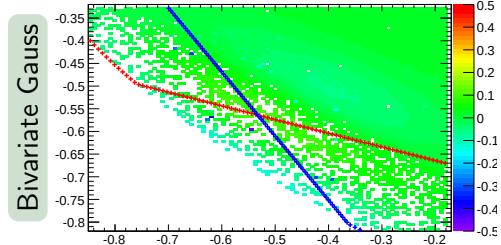


Bin 8

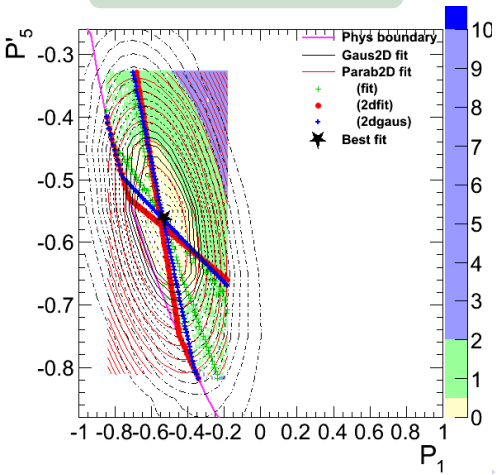
Bivariate pol2



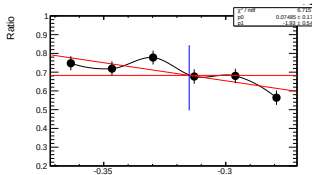
Bivariate Gauss



Profiled min comparison

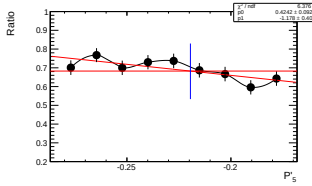


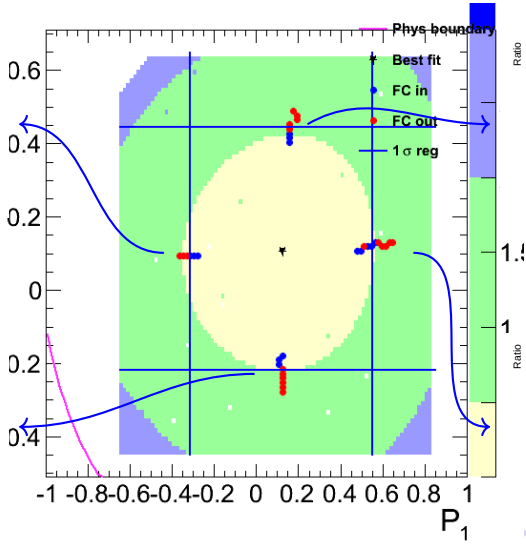
Bin 0

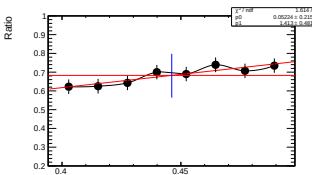


Done

Done







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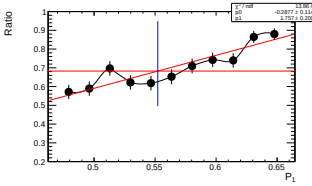
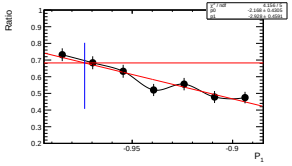


Bin 1



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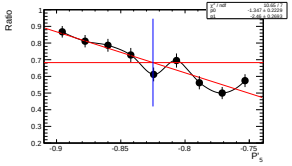

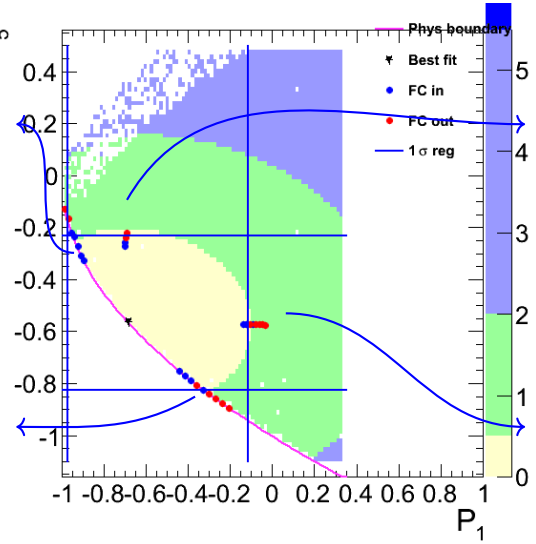

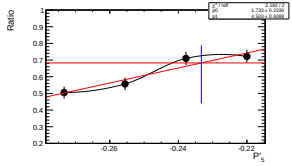

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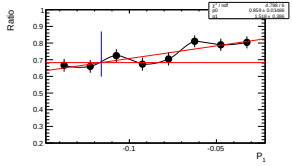
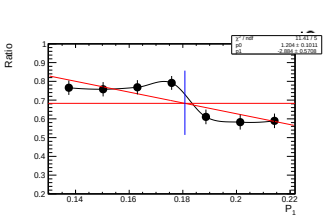
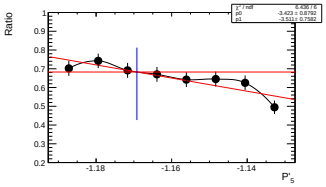
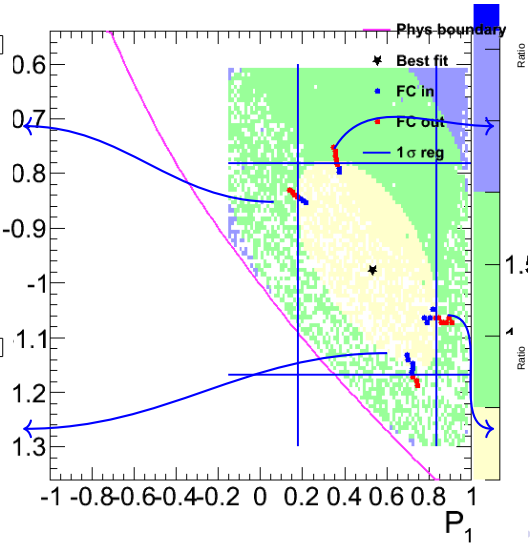
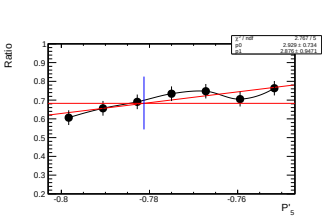


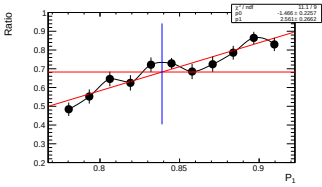
Bin 2











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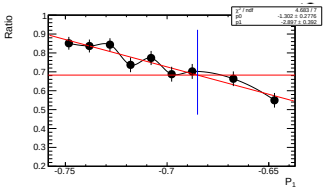
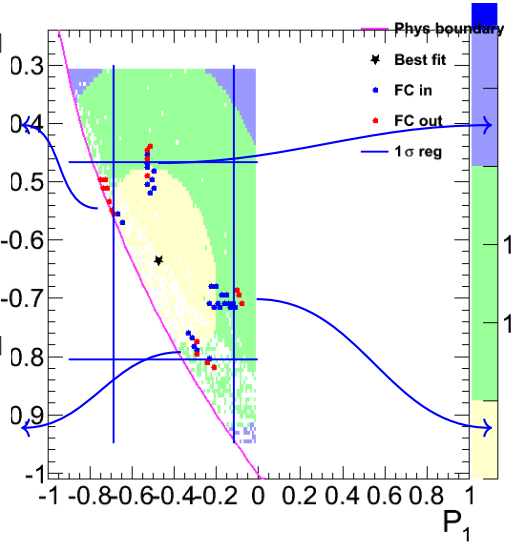
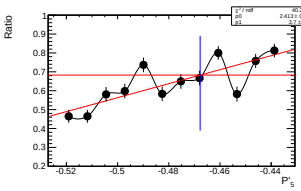
Done

Bin 3







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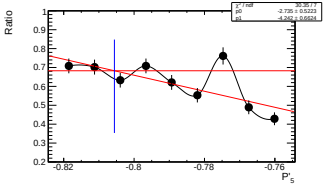
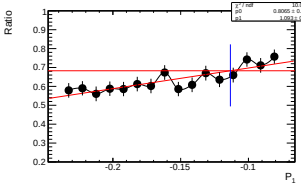
Done





Done

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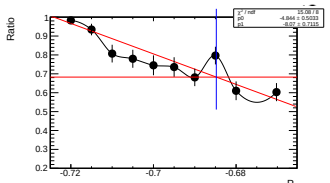
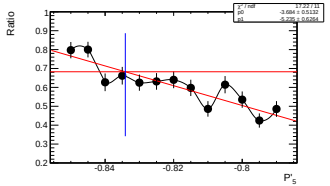
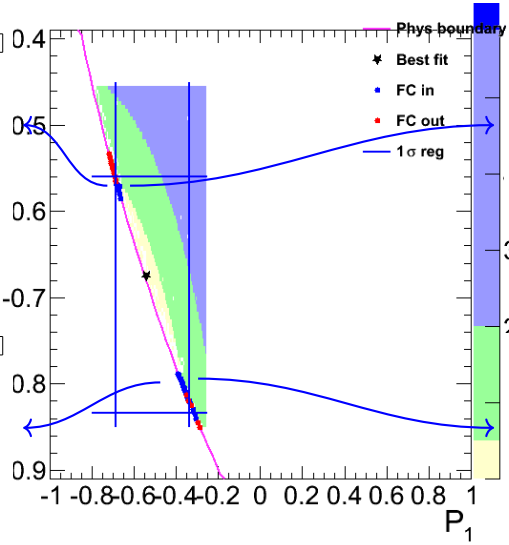
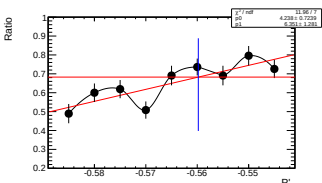
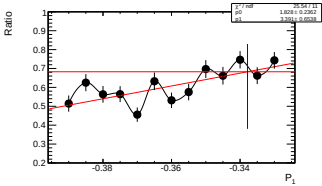
Bin 5











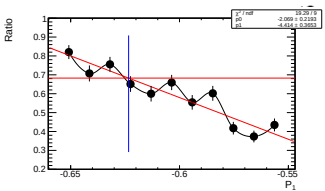
Done

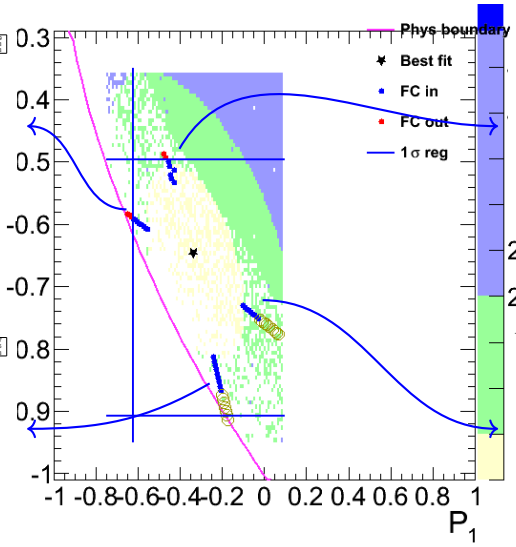
Done

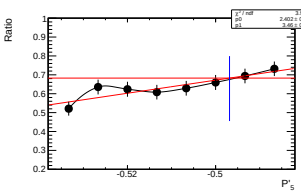
Done

Done

Bin 7







Done

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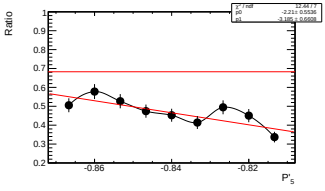

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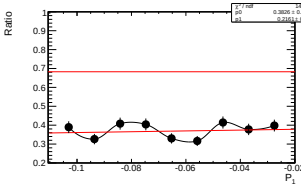
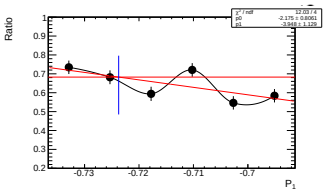
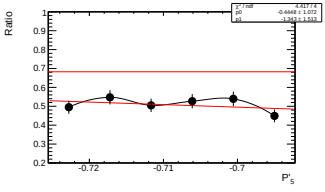
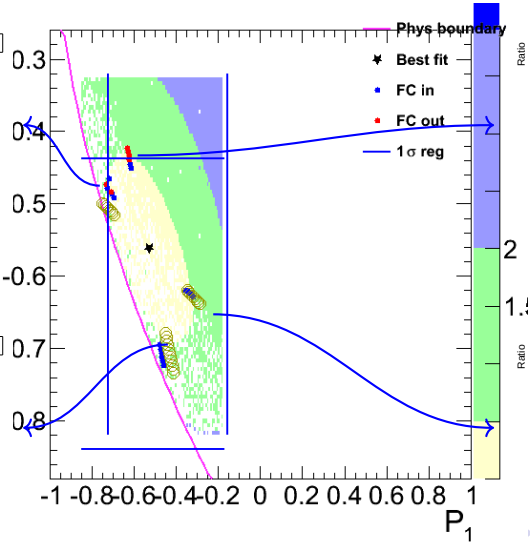
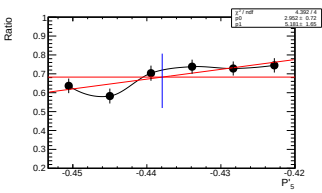


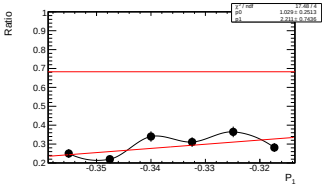
Bin 8











Done

No

Done

No

Summary of results

Results and confidence level (68%)

Bin	P_1		P_5'	
0	0.13	$^{+0.43}_{-0.44}$	0.11	$^{+0.34}_{-0.33}$
1	−0.68	$^{+0.57}_{-0.29}$	−0.56	$^{+0.33}_{-0.26}$
2	0.53	$^{+0.30}_{-0.35}$	−0.98	$^{+0.20}_{-0.19}$
3	−0.48	$^{+0.36}_{-0.21}$	−0.64	$^{+0.17}_{-0.17}$
5	−0.54	$^{+0.20}_{-0.14}$	−0.67	$^{+0.11}_{-0.16}$
7	−0.34	$^{+1.7}_{-0.28}$	−0.65	$^{+0.15}_{-0.26}$
8	−0.53	$^{+0.37}_{-0.19}$	−0.56	$^{+0.12}_{-0.28}$

The values in red are still preliminary, the ones in blue to be checked.

Submitted new toys for:

- Bin 3: $+\sigma(P_1)$
- Bin 5: $+\sigma(P_1)$, $+\sigma(P_5')$
- Bin 7: $\pm\sigma(P_1)$, $-\sigma(P_5')$
  - using the new Gen Point as defined by the bivariate gauss fit
- Bin 8: $\pm\sigma(P_1)$, $-\sigma(P_5')$
  - using the new Gen Point as defined by the bivariate gauss fit

Numbers

- Number of points in the P_1, P_5' space investigated: 583
- Number of toys generated: 58 300
- Numer of UML fit performed in total: 1 370 000
- Number of jobs submitted: $\sim$ 70 000
- Maximum number of jobs running at once: 750
- Average wall clock time for a job: $\sim 1.6\ h$
- Total wall clock time by all jobs: $\sim 4 \cdot 10^8\ s = 11\,000\ h = 4\,600\ d = 1.25\ y$
- Actual time spent so far $\sim$ 1 mounth, not counting the two mounths spent by Alessio with his coverage study to try and demonstrate that this effort was not needed.
- and counting ...

Additional stuff

Additional or backup slides

Bibliography I