MisTag fraction systematic

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systematics for MisTag Fraction

Procedure

- I used Alessio's code for the fit, latest version;
- modify **MisTagFraction** by ± 1 *sigma* with respect the central value;
- The σ is the one obtained comparing mc results with fit on data on J/ψ control region: $\sigma = 0.008$
  - This σ is larger that the one obtained from MC statistics only $\sigma \sim 0.002$ for all the bins
  - Use the same $\sigma = 0.008$ for all the q^2 bins
- run standard fit using 100 random initial values
- free parameters: A_s^5, P_1, P_5' *nBkgComb*, *nSig*
- consider only successfull fits and take the one with lowest `fnc`;
- Try 10 different **MisTagFraction** values, randomly generated with gaussian distribution *mean(bin)*, $\sigma(bin)$
- Syst is the RMS of best result distribution for each values anf for each bin

Systematics due to MisTag

Bin	A_s^5	P_1	P_5'
0	0.000035	0.014	0.013
1	0.000014	0.022	0.015
2	0.0050	0.016	0.014
3	0.0025	0.0084	0.0058
5	0.0037	0.043	0.032
7	0.015	0.11	0.066
8	0.0050	0.025	0.016

WARNING:

- all 100 initial values done for all bins
- syst on actual A_s^5 got the conversion from Alessio.
  - RMS for fitting value in next slide and plots

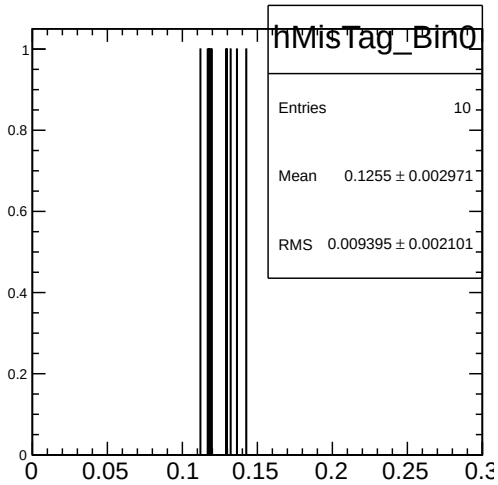
Comaparison: Toys (Gauss) vs $\pm\sigma$ method

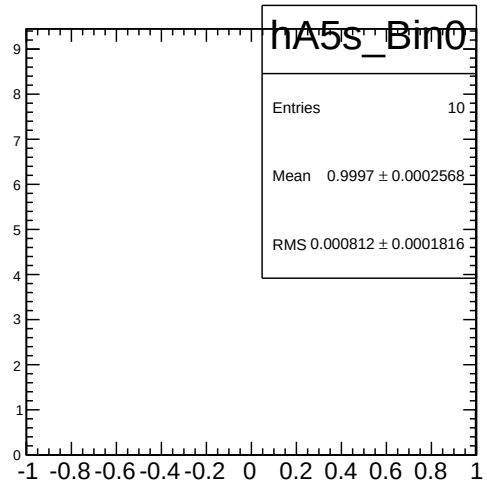
Bin	A_s^5		P_1		P_5'	
	Toys	$\pm 1\sigma$	*Toys*	$\pm 1\sigma$	*Toys*	$\pm 1\sigma$
0	0.0008	0.0	0.014	0.037	0.013	0.0002
1	0.00036	0.00002	0.022	0.025	0.015	0.012
2	0.041	0.0037	0.016	0.010	0.014	0.0030
3	0.021	0.015	0.0084	0.0066	0.0058	0.0076
5	0.46	0.50	0.043	0.0010	0.032	0.0067
7	0.16	0.00025	0.11	0.0029	0.066	0.0017
8	0.063	0.048	0.025	0.011	0.016	0.0003

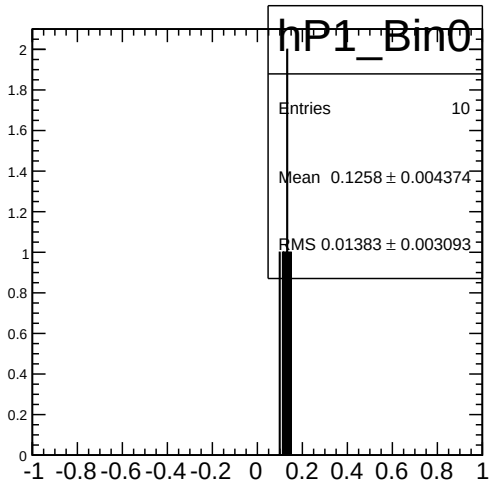
The effort was worthwhile, in some bins the difference is large: possibly those where pathological "same side" results were found with $\pm 1\sigma$ method.

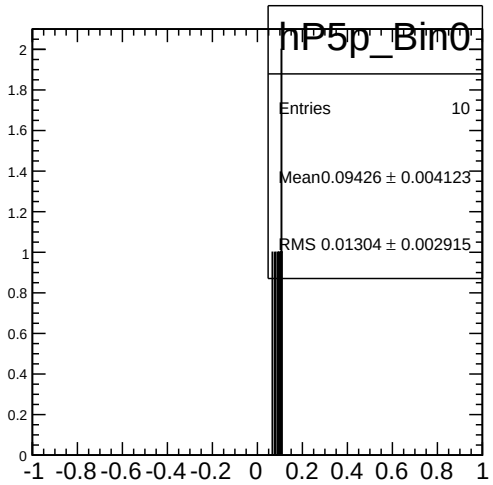
NB for A_s^5 comparing RMS for fitting parameter, not actual A_s^5

Bin 0

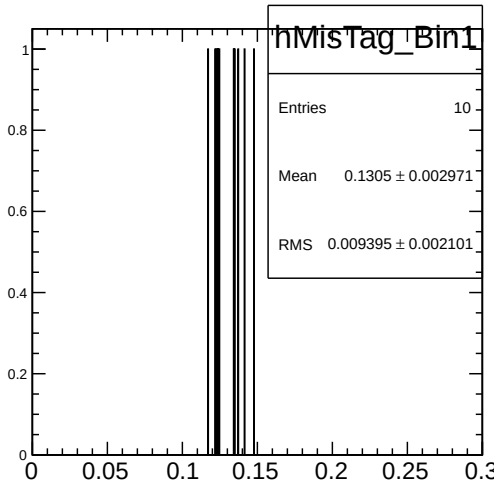

hMisTag_Bin0
Entries 10
Mean 0.1255 ± 0.002971
RMS 0.009395 ± 0.002101

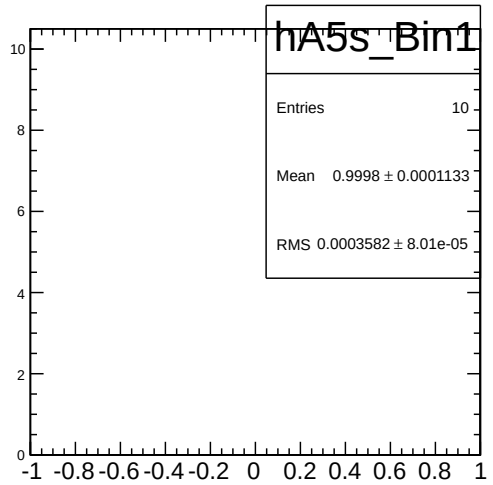

hA5s_Bin0
Entries 10
Mean 0.9997 ± 0.0002568
RMS 0.000812 ± 0.0001816

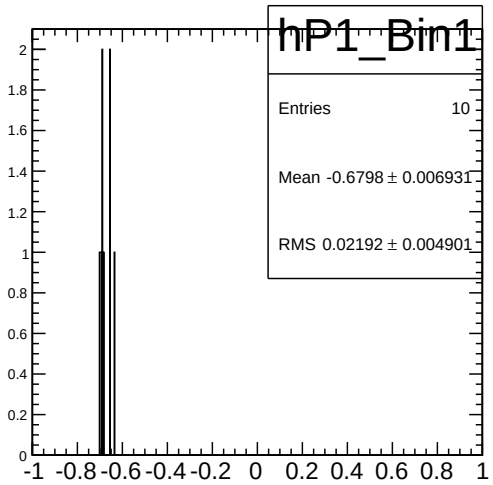

hP1_Bin0
Entries 10
Mean 0.1258 ± 0.004374
RMS 0.01383 ± 0.003093

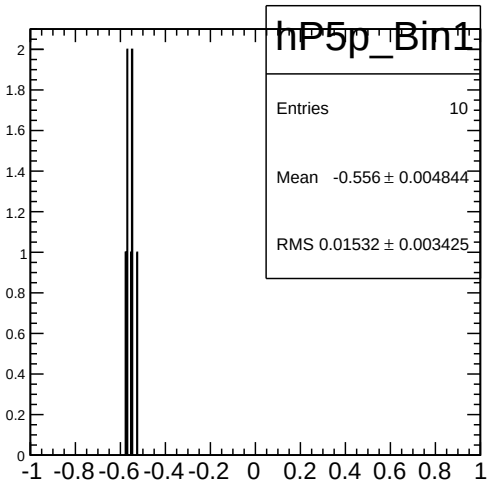

hP5p_Bin0
Entries 10
Mean 0.09426 ± 0.004123
RMS 0.01304 ± 0.002915

Bin 1

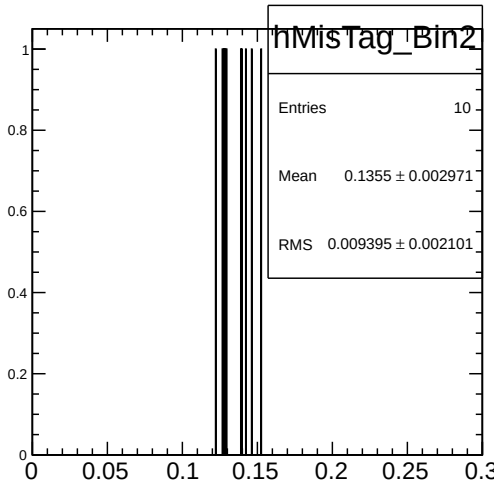

hMisTag_Bin1
Entries 10
Mean 0.1305 ± 0.002971
RMS 0.009395 ± 0.002101

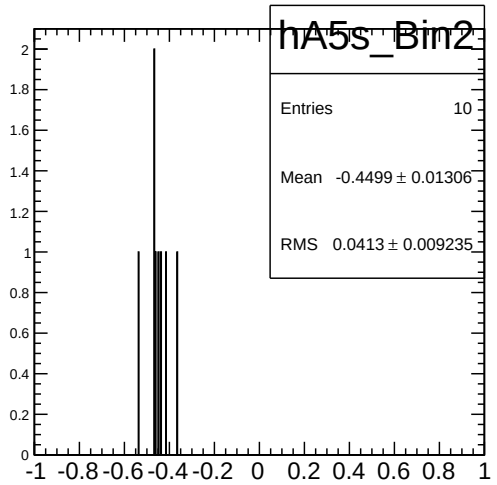

hA5s_Bin1
Entries 10
Mean 0.9998 ± 0.0001133
RMS 0.0003582 ± 8.01e-05

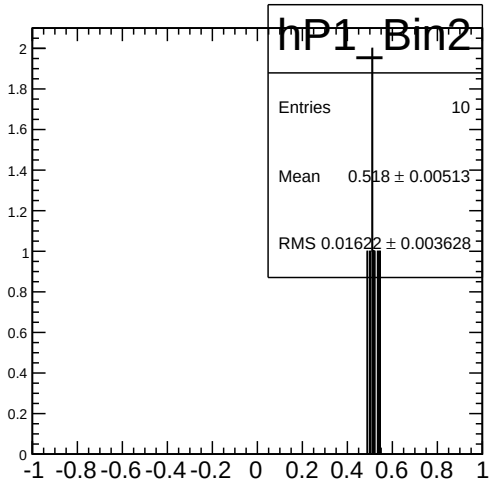

hP1_Bin1
Entries 10
Mean -0.6798 ± 0.006931
RMS 0.02192 ± 0.004901

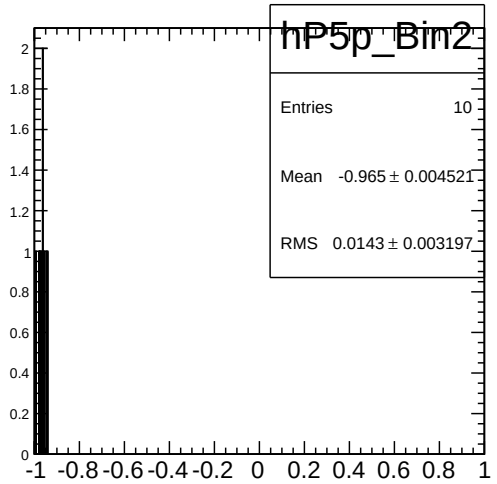

hP5p_Bin1
Entries 10
Mean -0.556 ± 0.004844
RMS 0.01532 ± 0.003425

Bin 2

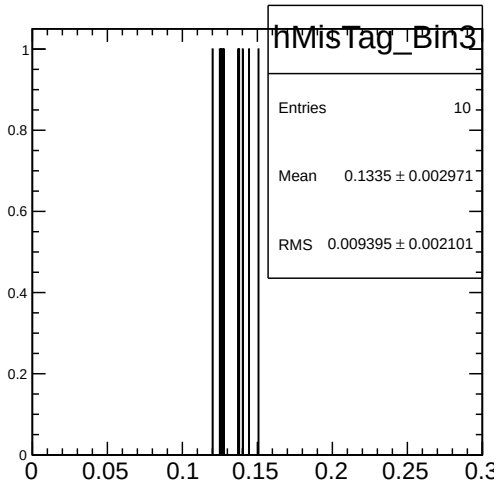

hMisTag_Bin2
Entries 10
Mean 0.1355 ± 0.002971
RMS 0.009395 ± 0.002101

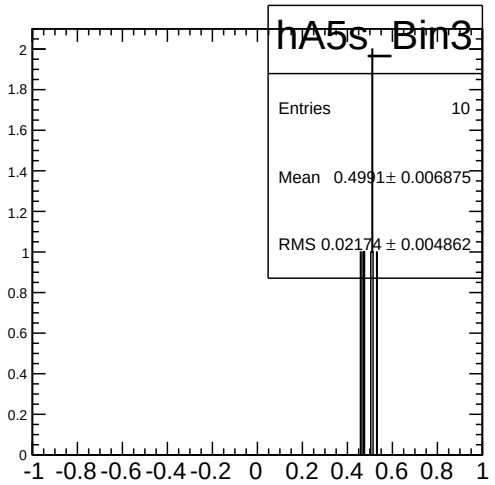

hA5s_Bin2
Entries 10
Mean -0.4499 ± 0.01306
RMS 0.0413 ± 0.009235

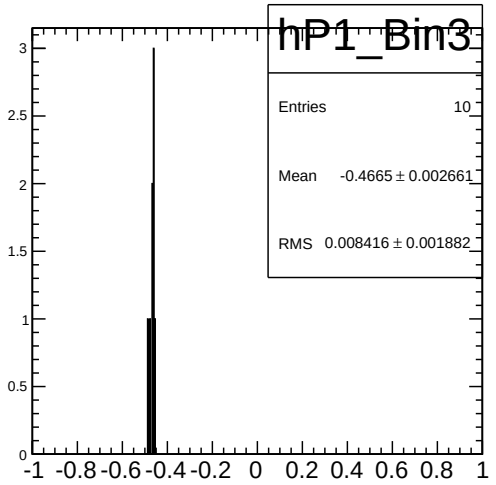

hP1_Bin2
Entries 10
Mean 0.518 ± 0.00513
RMS 0.01622 ± 0.003628

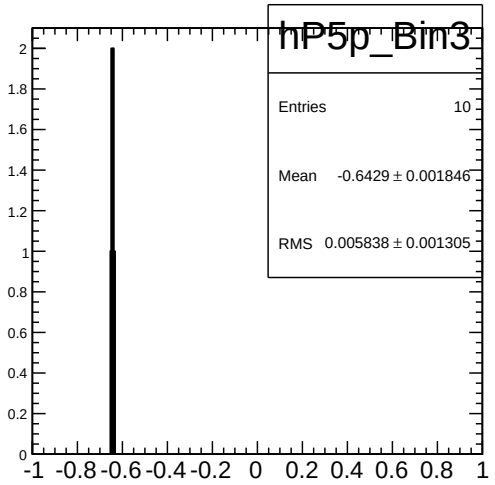

hP5p_Bin2
Entries 10
Mean -0.965 ± 0.004521
RMS 0.0143 ± 0.003197

Bin 3

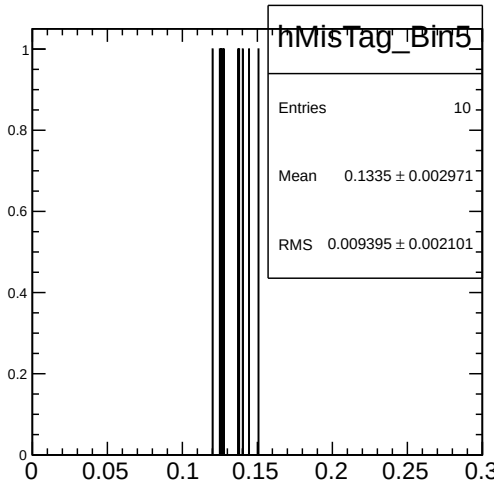

hMisTag_Bin3
Entries 10
Mean 0.1335 ± 0.002971
RMS 0.009395 ± 0.002101

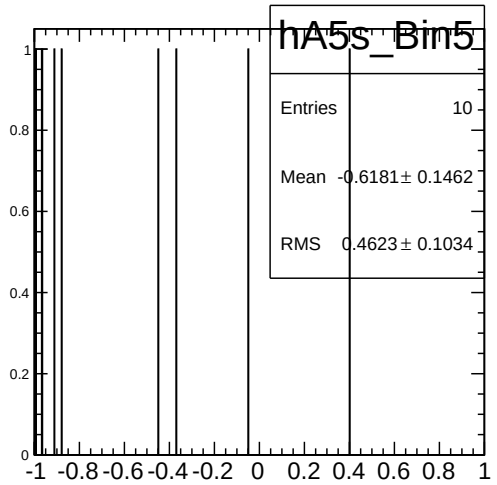

hA5s_Bin3
Entries 10
Mean 0.4991 ± 0.006875
RMS 0.02174 ± 0.004862

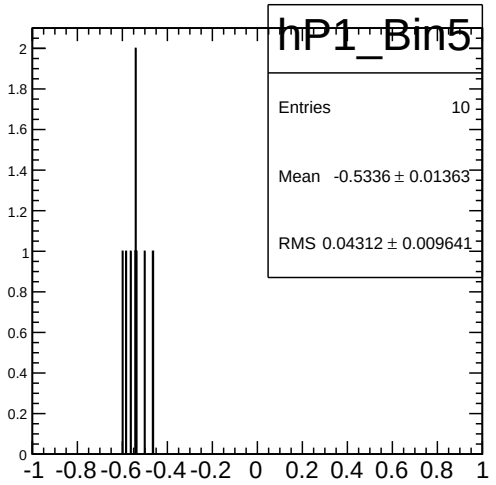

hP1_Bin3
Entries 10
Mean -0.4665 ± 0.002661
RMS 0.008416 ± 0.001882

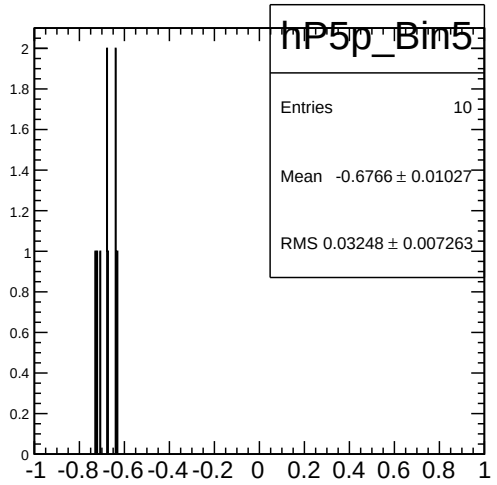

hP5p_Bin3
Entries 10
Mean -0.6429 ± 0.001846
RMS 0.005838 ± 0.001305

Bin 5

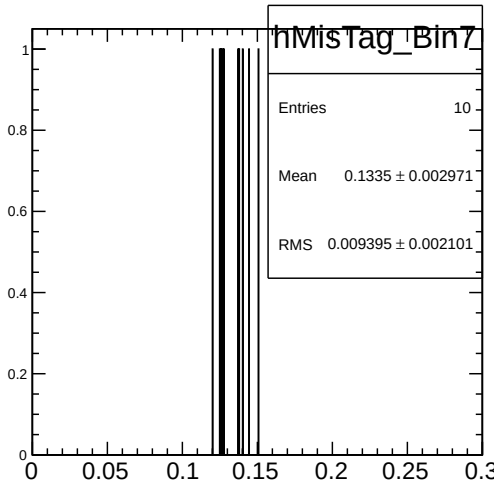

hMisTag_Bin5
Entries 10
Mean 0.1335 ± 0.002971
RMS 0.009395 ± 0.002101

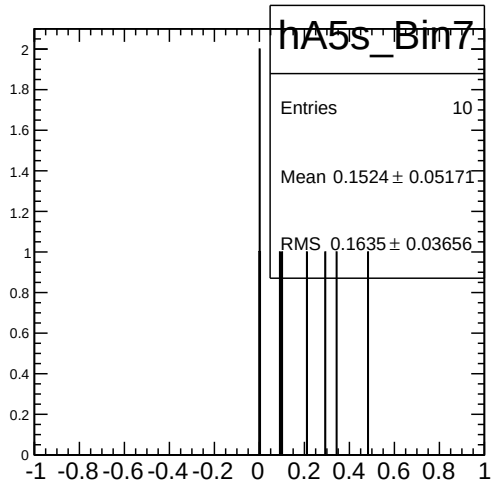

hA5s_Bin5
Entries 10
Mean -0.6181 ± 0.1462
RMS 0.4623 ± 0.1034

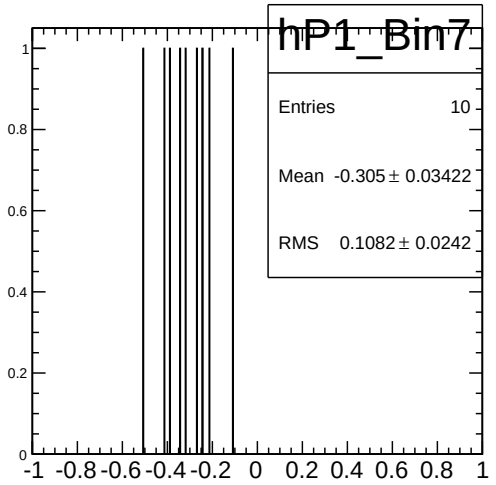

hP1_Bin5
Entries 10
Mean -0.5336 ± 0.01363
RMS 0.04312 ± 0.009641

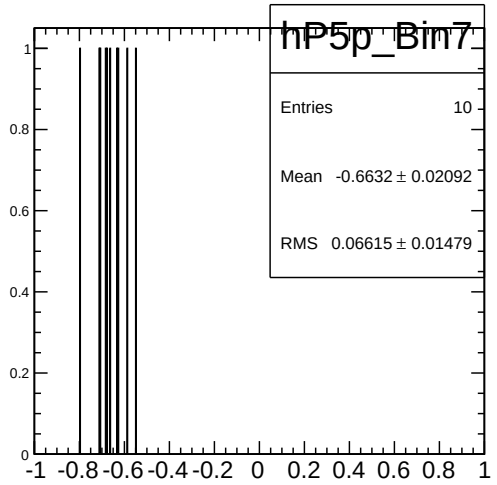

hP5p_Bin5
Entries 10
Mean -0.6766 ± 0.01027
RMS 0.03248 ± 0.007263

Bin 7

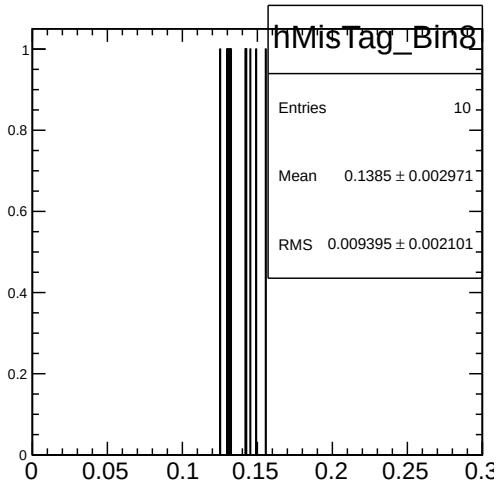

hMisTag_Bin7
Entries 10
Mean 0.1335 ± 0.002971
RMS 0.009395 ± 0.002101

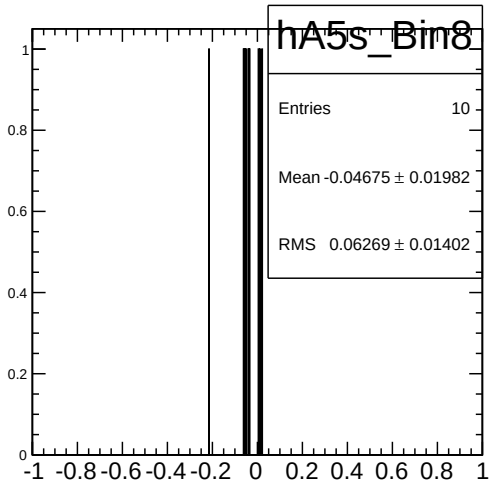

hA5s_Bin7
Entries 10
Mean 0.1524 ± 0.05171
RMS 0.1635 ± 0.03656

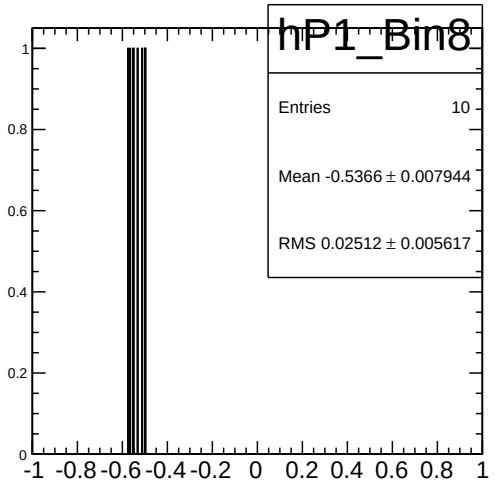

hP1_Bin7
Entries 10
Mean -0.305 ± 0.03422
RMS 0.1082 ± 0.0242

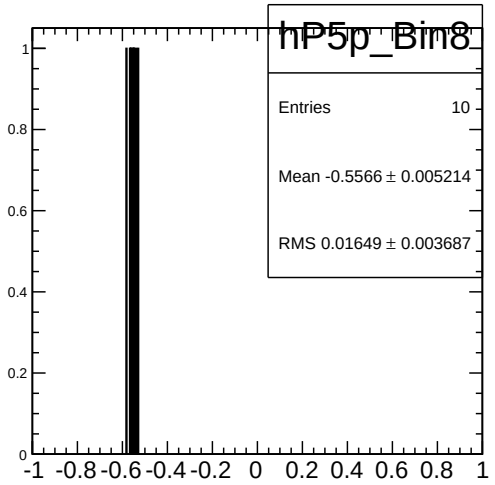

hP5p_Bin7
Entries 10
Mean -0.6632 ± 0.02092
RMS 0.06615 ± 0.01479

Bin 8


hMisTag_Bin8
Entries 10
Mean 0.1385 ± 0.002971
RMS 0.009395 ± 0.002101


hA5s_Bin8
Entries 10
Mean -0.04675 ± 0.01982
RMS 0.06269 ± 0.01402


hP1_Bin8
Entries 10
Mean -0.5366 ± 0.007944
RMS 0.02512 ± 0.005617


hP5p_Bin8
Entries 10
Mean -0.5566 ± 0.005214
RMS 0.01649 ± 0.003687

Additional stuff

Additional or backup slides

Bibliography I