

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 to the central value;
- run standard fit using 100 random initial values
- free parameters:
 - ▶ A_s^5
 - ▶ P_1
 - ▶ P_5'
 - ▶ $nBkgComb$
 - ▶ $nSig$
- consider only successful fits and take the one with lowest `fnc`;
- compare the results with the same fit done with **MisTagFraction** central value;
- Differences are systematic uncertainties for MisTagFraction

Bin	$\Delta(+1\sigma, central)$	$\Delta(central, -1\sigma)$	$\Delta(-1\sigma, +1\sigma)$	$\Delta(-1\sigma, +1\sigma)/2$
0	0.0000	0.0000	0.0000	0.0000
1	0.0000	0.0000	0.0000	0.0000
2	0.0029	-0.0930	-0.0901	-0.0450
3	0.0389	0.0584	0.0973	0.0487
5	0.9784	-0.2259	0.7526	0.3763
7	0.0261	-0.3012	-0.2751	-0.1375
8	0.0132	-0.1137	-0.1006	-0.0503

Bin	-1σ		central		$+1\sigma$	
	#conv	Δ	#conv	Δ	#conv	Δ
0	59	1.0	59	0.999999	64	0.999996
1	35	0.999	36	0.999983	42	1.0
2	10	-0.473809	10	-0.476709	14	-0.383748
3	22	0.528745	7	0.489838	16	0.431415
5	11	0.079109	6	-0.899327	8	-0.673469
7	7	0.0260808	7	7.82636e-06	5	0.301175
8	13	-0.00761066	16	-0.0207761	14	0.0929458

Bin	$\Delta(+1\sigma, central)$	$\Delta(central, -1\sigma)$	$\Delta(-1\sigma, +1\sigma)$	$\Delta(-1\sigma, +1\sigma)/2$
0	-0.0035	0.0020	-0.0015	-0.0007
1	-0.0216	0.0071	-0.0145	-0.0072
2	0.0444	0.0272	0.0716	0.0358
3	-0.0244	-0.0225	-0.0469	-0.0234
5	0.0159	0.0075	0.0234	0.0117
7	-0.0062	-0.0328	-0.0389	-0.0195
8	-0.0013	0.0174	0.0161	0.0080

Bin	-1σ		central		$+1\sigma$	
	#conv	Δ	#conv	Δ	#conv	Δ
0	59	0.115429	59	0.118899	64	0.116894
1	35	-0.705728	36	-0.684167	42	-0.691257
2	10	0.584155	10	0.539708	14	0.512537
3	22	-0.490823	7	-0.466445	16	-0.443932
5	11	-0.50574	6	-0.521658	8	-0.529189
7	7	-0.313986	7	-0.307832	5	-0.27504
8	13	-0.548005	16	-0.546696	14	-0.564067

Bin	$\Delta(+1\sigma, central)$	$\Delta(central, -1\sigma)$	$\Delta(-1\sigma, +1\sigma)$	$\Delta(-1\sigma, +1\sigma)/2$
0	0.0007	-0.0001	0.0006	0.0003
1	0.0102	-0.0032	0.0070	0.0035
2	-0.0235	0.0088	-0.0147	-0.0073
3	0.0018	0.0079	0.0098	0.0049
5	0.0034	-0.0092	-0.0058	-0.0029
7	0.0078	-0.0284	-0.0206	-0.0103
8	0.0002	0.0034	0.0036	0.0018

Bin	-1σ		central		$+1\sigma$	
	#conv	Δ	#conv	Δ	#conv	Δ
0	59	0.107801	59	0.107059	64	0.107194
1	35	-0.544902	36	-0.555073	42	-0.55186
2	10	-0.985915	10	-0.962398	14	-0.971233
3	22	-0.6339	7	-0.635709	16	-0.643658
5	11	-0.687174	6	-0.690563	8	-0.681329
7	7	-0.681315	7	-0.689083	5	-0.660694
8	13	-0.553286	16	-0.553437	14	-0.556886

Summary

Taking as systematic uncertainty **half** the difference of the fit results between MisTag $+1\sigma$ and MisTag -1σ , the grand summary would be the following.

Bin	A_s^5	P_1	P'_5
0	0.0000	0.0007	0.0003
1	0.0000	0.0072	0.0035
2	0.0450	0.0358	0.0073
3	0.0487	0.0234	0.0049
5	0.3763	0.0117	0.0029
7	0.1375	0.0195	0.0103
8	0.0503	0.0080	0.0018

uncertainty on A_s^5 is large for some bins, especially bin 5 (and 7)

Additional or backup slides



Bibliography I

