

Precise measurement of the f_s/f_d ratio of fragmentation fractions and of B_s^0 decay branching fractions

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Supplemental material for LHCb-PAPER-2020-046

Full results on the parameters for the default fit and the fit without external theory constraints are presented in Tables 1 and 2, respectively. The correlation matrices of the results for these fits also shown in Tables 3 and 4, respectively. This is important when considering the results at different energies, since they are correlated among each other.

The listed parameters are:

- a and b are the intercept and slope of the transverse-momentum-dependent functions at the three center-of-mass energies;
- r_{AF} and r_{E} are the scaling parameters with respect to the theoretical inputs;
- S_1 is the parameter propagating the correlated systematic uncertainty due to external parameters;
- S_2 , S_3 , and S_4 are the parameters propagating experimental systematic uncertainties.
- \mathcal{F}_R is the ratio of the $B_s^0 \rightarrow J/\psi\phi$ to $B^+ \rightarrow J/\psi K^+$ branching fractions, as detailed in the text.

Table 1: Output parameters of the default fit to the data.

$a(7 \text{ TeV})$	0.244 ± 0.008
$b(7 \text{ TeV})$	$(-10.3 \pm 2.7) \times 10^{-4}$
S_1	1.009 ± 0.026
S_2	1.030 ± 0.028
r_{AF}	1.082 ± 0.032
\mathcal{F}_R	0.505 ± 0.016
$a(8 \text{ TeV})$	0.240 ± 0.008
$b(8 \text{ TeV})$	$(-3.5 \pm 2.3) \times 10^{-4}$
$a(13 \text{ TeV})$	0.263 ± 0.008
$b(13 \text{ TeV})$	$(-17.6 \pm 2.1) \times 10^{-4}$
S_3	0.997 ± 0.008
S_4	0.977 ± 0.021
r_{E}	1.071 ± 0.030

Table 2: Output parameters of the fit to the data without external theory constraints.

$a(7 \text{ TeV})$	0.238 ± 0.008
$b(7 \text{ TeV})$	$(-10.3 \pm 2.7) \times 10^{-4}$
S_1	1.000 ± 0.026
S_2	1.00 ± 0.04
r_{AF}	1.16 ± 0.06
\mathcal{F}_R	0.517 ± 0.017
$a(8 \text{ TeV})$	0.234 ± 0.008
$b(8 \text{ TeV})$	$(-3.3 \pm 2.3) \times 10^{-4}$
$a(13 \text{ TeV})$	0.256 ± 0.009
$b(13 \text{ TeV})$	$(-16.9 \pm 2.0) \times 10^{-4}$
S_3	1.000 ± 0.009
S_4	0.998 ± 0.023
r_{E}	1.04 ± 0.04

Table 3: Output correlation matrix of the default fit versus p_{T} .

	$a(7 \text{ TeV})$	$b(7 \text{ TeV})$	S_1	S_2	r_{AF}	\mathcal{F}_R	$a(8 \text{ TeV})$	$b(8 \text{ TeV})$	$a(13 \text{ TeV})$	$b(13 \text{ TeV})$	S_3	S_4	r_{E}
$a(7 \text{ TeV})$	1.000	-0.360	-0.589	-0.185	-0.318	-0.955	0.925	-0.046	0.933	-0.314	-0.223	-0.645	-0.198
$b(7 \text{ TeV})$		1.000	0.067	-0.045	-0.003	0.131	-0.129	0.010	-0.130	0.048	0.034	0.097	0.109
S_1			1.000	-0.075	-0.128	0.615	-0.596	0.029	-0.601	0.170	0.022	0.064	-0.079
S_2				1.000	-0.542	0.193	-0.184	0.004	-0.186	0.068	0.083	0.239	0.841
r_{AF}					1.000	0.328	-0.320	0.019	-0.322	0.129	0.142	0.410	-0.569
\mathcal{F}_R						1.000	-0.967	0.044	-0.976	0.326	0.233	0.676	0.198
$a(8 \text{ TeV})$							1.000	-0.257	0.945	-0.318	-0.226	-0.654	-0.202
$b(8 \text{ TeV})$								1.000	-0.046	0.021	0.010	0.030	0.030
$a(13 \text{ TeV})$									1.000	-0.492	-0.228	-0.660	-0.202
$b(13 \text{ TeV})$										1.000	0.056	0.161	0.098
S_3											1.000	-0.059	0.087
S_4												1.000	0.251
r_{E}													1.000

Table 4: Output correlation matrix of the fit versus p_{T} without theory constraints.

	$a(7 \text{ TeV})$	$b(7 \text{ TeV})$	S_1	S_2	r_{AF}	\mathcal{F}_R	$a(8 \text{ TeV})$	$b(8 \text{ TeV})$	$a(13 \text{ TeV})$	$b(13 \text{ TeV})$	S_3	S_4	r_{E}
$a(7 \text{ TeV})$	1.000	-0.343	-0.525	0.001	-0.367	-0.958	0.931	-0.049	0.938	-0.333	-0.257	-0.672	-0.002
$b(7 \text{ TeV})$		1.000	0.069	0.000	-0.032	0.125	-0.123	0.011	-0.124	0.048	0.034	0.088	0.111
S_1			1.000	0.000	-0.166	0.548	-0.531	0.027	-0.536	0.150	0.003	0.007	0.000
S_2				1.000	-0.768	-0.001	0.001	-0.000	0.001	-0.000	-0.000	-0.001	0.920
r_{AF}					1.000	0.378	-0.367	0.019	-0.370	0.152	0.178	0.467	-0.787
\mathcal{F}_R						1.000	-0.970	0.048	-0.978	0.343	0.267	0.701	-0.004
$a(8 \text{ TeV})$							1.000	-0.252	0.949	-0.336	-0.260	-0.680	-0.005
$b(8 \text{ TeV})$								1.000	-0.049	0.023	0.013	0.034	0.018
$a(13 \text{ TeV})$									1.000	-0.502	-0.262	-0.686	-0.004
$b(13 \text{ TeV})$										1.000	0.073	0.191	0.018
S_3											1.000	0.004	-0.000
S_4												1.000	-0.001
r_{E}													1.000