Supplemental material for LHCb-PAPER-2023-027

The ratio of Λ_b^0 to B^0 cross-sections $\sigma_{\Lambda_b^0}/\sigma_{B^0}$ as a function of p_{T} and normalized multiplicity $\mathrm{N}_{\mathrm{tracks}}^{\mathrm{VELO}}/\langle \mathrm{N}_{\mathrm{tracks}}^{\mathrm{VELO}} \rangle_{\mathrm{NB}}$ are given in Tables 1 and 2, respectively. Tables 3, 4, and 5 give the ratio versus the total VELO multiplicity for low-, intermediate-, and high-multiplicity ranges, respectively. Tables 6, 7, and 8 provide the ratio versus the backward multiplicity metric for low-, intermediate-, and high-multiplicity ranges, respectively.

Table 1: Ratio of cross-sections as a function of p_{T}, as shown in Fig. 2. The additional $^{+19\%}_{-16\%}$ global uncertainty due to the uncertainty in the branching fractions is not included.

p_{T} range [GeV/c]	$\sigma_{\Lambda_b^0}/\sigma_{B^0}$
0 – 2	0.45 ± 0.03
2 – 4	0.44 ± 0.02
4 – 6	0.46 ± 0.02
6 – 8	0.41 ± 0.02
8 – 10	0.39 ± 0.02
10 – 12	0.33 ± 0.01
12 – 14	0.29 ± 0.01
14 – 16	0.27 ± 0.01
16 – 18	0.23 ± 0.01
18 – 20	0.21 ± 0.01
20 – 22	0.21 ± 0.02
22 – 24	0.23 ± 0.02
24 – 26	0.19 ± 0.02
26 – 28	0.18 ± 0.03
28 – 30	0.16 ± 0.03

Table 2: Ratio of cross-sections as a function of multiplicity, as shown in Fig. 3. The additional $^{+19\%}_{-16\%}$ global uncertainty due to the uncertainty in the branching fractions is not included.

$\mathrm{N}_{\mathrm{tracks}}^{\mathrm{VELO}}/\langle \mathrm{N}_{\mathrm{tracks}}^{\mathrm{VELO}} \rangle_{\mathrm{NB}}$	$\sigma_{\Lambda_b^0}/\sigma_{B^0}$
0.13 – 0.40	0.25 ± 0.05
0.40 – 0.53	0.35 ± 0.03
0.53 – 0.66	0.36 ± 0.03
0.66 – 0.79	0.38 ± 0.02
0.79 – 1.06	0.42 ± 0.02
1.06 – 1.32	0.43 ± 0.02
1.32 – 1.59	0.46 ± 0.03
1.59 – 1.85	0.47 ± 0.03
1.85 – 2.12	0.48 ± 0.03
2.12 – 2.65	0.49 ± 0.03
2.65 – 3.31	0.49 ± 0.03
3.31 – 3.97	0.48 ± 0.03
3.97 – 5.29	0.44 ± 0.03
5.29 – 6.61	0.60 ± 0.08

Table 3: Ratio of cross-sections for low multiplicity data, as measured using VELO tracks, shown in blue in the left panel of Fig. 4. The additional $^{+19\%}_{-16\%}$ global uncertainty due to the uncertainty in the branching fractions is not included.

p_{T} range [GeV/c]	$\sigma_{\Lambda_b^0}/\sigma_{B^0}$
0 – 2	0.35 ± 0.05
2 – 4	0.41 ± 0.03
4 – 6	0.38 ± 0.02
6 – 8	0.35 ± 0.02
8 – 10	0.29 ± 0.02
10 – 12	0.23 ± 0.02
12 – 14	0.21 ± 0.02
14 – 16	0.18 ± 0.02
16 – 18	0.12 ± 0.02
18 – 20	0.18 ± 0.05

Table 4: Ratio of cross-sections for intermediate multiplicity data, as measured using VELO tracks, shown in black in the left panel of Fig. 4. The additional $^{+19\%}_{-16\%}$ global uncertainty due to the uncertainty in the branching fractions is not included.

p_{T} range [GeV/c]	$\sigma_{\Lambda_b^0}/\sigma_{B^0}$
0 – 2	0.51 ± 0.04
2 – 4	0.45 ± 0.02
4 – 6	0.46 ± 0.02
6 – 8	0.42 ± 0.02
8 – 10	0.38 ± 0.02
10 – 12	0.33 ± 0.02
12 – 14	0.28 ± 0.02
14 – 16	0.25 ± 0.02
16 – 18	0.23 ± 0.02
18 – 20	0.17 ± 0.02
20 – 22	0.20 ± 0.02
22 – 24	0.19 ± 0.02

Table 5: Ratio of cross-sections for high multiplicity data, as measured using VELO tracks, shown in red in the left panel of Fig. 4. The additional $^{+19\%}_{-16\%}$ global uncertainty due to the uncertainty in the branching fractions is not included.

p_{T} range [GeV/c]	$\sigma_{\Lambda_b^0}/\sigma_{B^0}$
0 – 2	0.49 ± 0.05
2 – 4	0.45 ± 0.02
4 – 6	0.51 ± 0.02
6 – 8	0.45 ± 0.02
8 – 10	0.44 ± 0.02
10 – 12	0.35 ± 0.02
12 – 14	0.32 ± 0.02
14 – 16	0.30 ± 0.02
16 – 18	0.25 ± 0.02
18 – 20	0.25 ± 0.02
20 – 22	0.24 ± 0.02
22 – 24	0.22 ± 0.02

Table 6: Ratio of cross-sections for low multiplicity data, as measured using backward tracks, shown in blue in the right panel of Fig. 4. The additional $^{+19\%}_{-16\%}$ global uncertainty due to the uncertainty in the branching fractions is not included.

p_{T} range [GeV/c]	$\sigma_{\Lambda_b^0}/\sigma_{B^0}$
0 – 2	0.39 ± 0.04
2 – 4	0.42 ± 0.02
4 – 6	0.42 ± 0.02
6 – 8	0.39 ± 0.02
8 – 10	0.37 ± 0.01
10 – 12	0.29 ± 0.02
12 – 14	0.31 ± 0.02
14 – 16	0.23 ± 0.02
16 – 18	0.19 ± 0.02
18 – 20	0.19 ± 0.02
20 – 22	0.21 ± 0.03
22 – 24	0.24 ± 0.03

Table 7: Ratio of cross-sections for intermediate multiplicity data, as measured using backward tracks, shown in black in the right panel of Fig. 4. The additional $^{+19\%}_{-16\%}$ global uncertainty due to the uncertainty in the branching fractions is not included.

p_{T} range [GeV/c]	$\sigma_{\Lambda_b^0}/\sigma_{B^0}$
0 – 2	0.41 ± 0.05
2 – 4	0.49 ± 0.03
4 – 6	0.50 ± 0.02
6 – 8	0.44 ± 0.02
8 – 10	0.43 ± 0.02
10 – 12	0.33 ± 0.02
12 – 14	0.29 ± 0.02
14 – 16	0.27 ± 0.02
16 – 18	0.26 ± 0.02
18 – 20	0.23 ± 0.02
20 – 22	0.21 ± 0.02
22 – 24	0.18 ± 0.02

Table 8: Ratio of cross-sections for high multiplicity data, as measured using back tracks, shown in red in the right panel of Fig. 4. The additional $^{+19\%}_{-16\%}$ global uncertainty due to the uncertainty in the branching fractions is not included.

p_{T} range [GeV/c]	$\sigma_{\Lambda_b^0}/\sigma_{B^0}$
0 – 2	0.55 ± 0.07
2 – 4	0.45 ± 0.03
4 – 6	0.51 ± 0.02
6 – 8	0.45 ± 0.02
8 – 10	0.43 ± 0.02
10 – 12	0.38 ± 0.02
12 – 14	0.32 ± 0.02
14 – 16	0.31 ± 0.02
16 – 18	0.24 ± 0.02
18 – 20	0.22 ± 0.02
20 – 22	0.22 ± 0.02
22 – 24	0.22 ± 0.02