

Supplementary material for LHCb-PAPER-2022-009

Concerning the difference between the fourth data point ($19 < p_T^Z < 34$ GeV) and the corresponding theoretical prediction in the differential fiducial cross-section measurement as a function of p_T^Z , a detailed study has been performed. This study excludes possible bugs from data quality, efficiency estimation, beam crossing angle, geometry acceptance, track reconstruction quality, and possible contributions from missing backgrounds such as standard model ZZ . Therefore, it is concluded as a statistical fluctuation. Detailed information of the forty events in the fourth data point is shown in Table 1. The p-value and the corresponding local significance of differences between the measurements and the POWHEGBOX predictions are shown in Fig. 1. The p-value of the fourth data point corresponds to about a $3\text{-}\sigma$ significance.

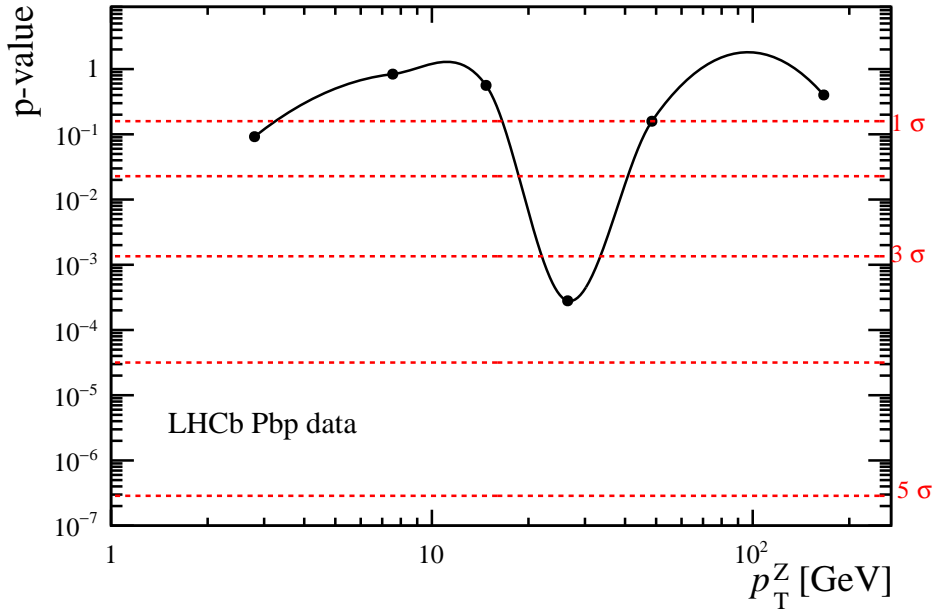


Figure 1: The p-value and local significance (red dotted lines) of the measurements with respect to the POWHEGBOX predictions as a function of p_T^Z for the backward collision.

Table 1: Detailed information of the forty events in fourth data point of Fig. 1.

Row	runNum	eventNum	totCand	nCand	$m_{\mu^+\mu^-}$ [GeV]	p_T^Z [GeV]	y_Z
0	187042	336775248	3	1	97.9	23.0	2.5
1	187058	1003869585	2	0	91.8	29.4	3.0
2	187113	1300377272	1	0	65.0	25.7	2.6
3	187392	764408682	3	2	88.5	20.1	2.6
4	187064	61189625	1	0	93.0	30.5	3.2
5	187058	943324610	1	0	78.1	19.7	2.6
6	187040	1319617953	2	1	94.1	29.6	3.1
7	187084	657247672	1	0	90.3	33.5	2.9
8	187375	426626028	1	0	91.7	26.1	2.8
9	187058	1077063800	1	0	92.7	31.2	2.8
10	187377	730661584	2	1	92.7	24.0	2.2
11	187074	233951165	3	1	87.6	27.1	3.0
12	187182	1388565732	2	1	90.5	26.1	2.4
13	187110	602969520	4	1	90.3	23.6	2.0
14	187247	854332469	3	1	92.8	25.3	2.9
15	187203	445080031	1	0	89.7	31.7	2.7
16	187018	1513583094	1	0	79.1	26.7	3.0
17	187106	290909673	2	0	77.7	22.5	2.4
18	187021	88835280	2	0	90.5	24.1	2.5
19	187244	1030951141	1	0	90.0	22.1	3.0
20	187045	337153303	1	0	70.2	20.3	2.6
21	187015	983797759	1	0	87.3	21.3	2.6
22	187266	396404324	1	0	87.8	22.3	2.3
23	187182	951084122	1	0	89.9	23.8	2.5
24	187058	1021263905	1	0	90.9	23.2	2.7
25	187086	422838925	2	1	107.4	27.4	2.7
26	187078	253793531	2	0	98.1	26.5	2.3
27	187018	1167670643	1	0	90.9	22.8	2.3
28	187082	1227385850	1	0	86.2	24.7	2.7
29	187266	34303770	3	1	94.5	26.8	2.7
30	187061	431432067	2	1	86.1	26.4	2.7
31	187074	897443085	2	1	91.6	21.2	2.4
32	187355	375768881	3	2	91.1	20.6	2.3
33	187182	128884550	1	0	91.0	20.6	2.6
34	187062	247698042	4	1	86.0	28.6	2.8
35	187394	240977315	2	0	89.0	22.8	3.2
36	187394	669353862	1	0	91.2	30.2	2.9
37	187204	102471537	3	2	94.3	33.4	2.2
38	187199	1125710837	2	1	93.9	32.1	2.5
39	187184	1062227171	2	1	90.8	22.4	2.5