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Erratum: Study of Υ production in pPb collisions at $\sqrt{s_{\mathrm{NN}}} = 8.16$ TeV

The LHCb collaboration

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In figure 11 of the original paper [1] the LHCb data points for $\mathfrak{R}^{\Upsilon(2S)/\Upsilon(1S)}_{\mathrm{Pb}p/pp}$ and $\mathfrak{R}^{\Upsilon(3S)/\Upsilon(1S)}_{p\mathrm{Pb}/pp}$ ratios were erroneously swapped. The values given in the text are correct. The corrected figure 11 is shown below. We also provide more digits in table 3 to ease calculations.

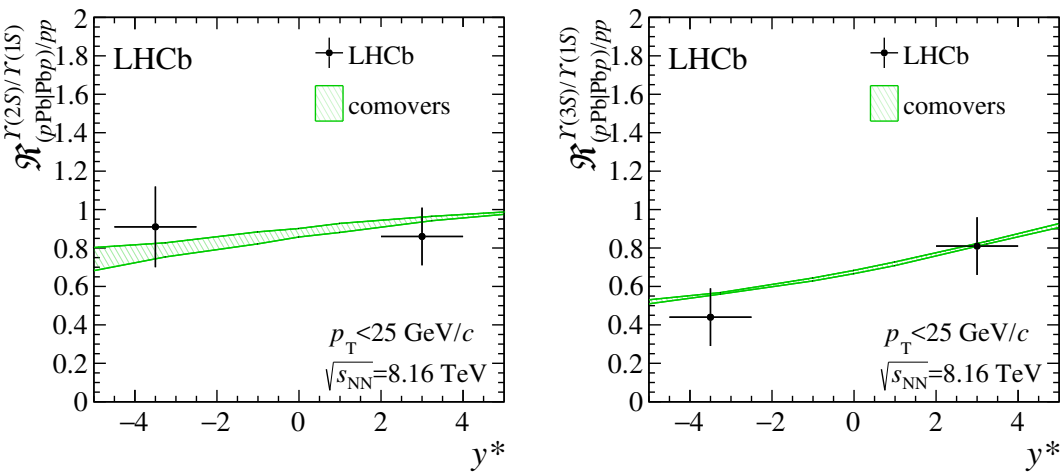

Figure 11. Double ratios for (left) $\Upsilon(2S)$ and (right) $\Upsilon(3S)$. The bands correspond to the theoretical prediction for the comovers model as reported in the text.

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Sample		$R(\Upsilon(2S))$	$R(\Upsilon(3S))$
pp	$2.0 < y^* < 4.0$	0.328 ± 0.004	0.137 ± 0.002
pp	$-4.5 < y^* < -2.5$	0.325 ± 0.004	0.137 ± 0.002
pPb	$2.0 < y^* < 4.0$	0.282 ± 0.049	0.111 ± 0.021
Pbp	$-4.5 < y^* < -2.5$	0.296 ± 0.070	0.060 ± 0.016

Table 3. Ratio $R(nS)$ in pp, pPb, and Pbp samples. The uncertainties are combinations of statistical and systematical components.

References

[1] LHCb collaboration, *Study of Υ production in pPb collisions at $\sqrt{s_{NN}} = 8.16$ TeV*, *JHEP* **11** (2018) 194 [arXiv:1810.07655] [INSPIRE]

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B. Pietrzyk[5], G. Pietrzyk[44], M. Pikies[30], M. Pili[58], D. Pinci[27], J. Pinzino[43], F. Pisani[43], A. Piucci[13], V. Placinta[33], S. Playfer[53], J. Plews[48], M. Plo Casasus[42], F. Polci[9], M. Poli Lener[19], A. Poluektov[51], N. Polukhina[73,c], I. Polyakov[62], E. Polycarpo[2], G.J. Pomery[49], S. Ponce[43], A. Popov[40], D. Popov[48,12], S. Poslavskii[40], C. Potterat[2], E. Price[49], J. Prisciandaro[42], C. Prouve[49], V. Pugatch[47], A. Puig Navarro[45], H. Pullen[58], G. Punzi[25,p], W. Qian[65], J. Qin[65], R. Quagliani[9], B. Quintana[6], B. Rachwal[31], J.H. Rademacker[49], M. Rama[25], M. Ramos Pernas[42], M.S. Rangel[2], F. Ratnikov[38,x], G. Raven[29], M. Ravonel Salzgeber[43], M. Reboud[5], F. Redi[44], S. Reichert[11], A.C. dos Reis[1], F. Reiss[9], C. Remon Alepuz[75], Z. Ren[3], V. Renaudin[8], S. Ricciardi[52], S. Richards[49], K. Rinnert[55], P. Robbe[8], A. Robert[9], A.B. Rodrigues[44], E. Rodrigues[60], J.A. Rodriguez Lopez[69], M. Roehrken[43], S. Roiser[43], A. Rollings[58], V. Romanovskiy[40], A. Romero Vidal[42], M. Rotondo[19], M.S. Rudolph[62], T. Ruf[43], J. Ruiz Vidal[75], J.J. Saborido Silva[42], N. Sagidova[34], B. Saitta[23,f], V. Salustino Guimaraes[64], C. Sanchez Gras[28], C. Sanchez Mayordomo[75], B. Sanmartin Sedes[42], R. Santacesaria[27], C. Santamarina Rios[42], M. Santimaria[19,43], E. Santovetti[26,j], G. Sarpis[57], A. Sarti[19,k], C. Satriano[27,s], A. Satta[26], M. Saur[65], D. Savrina[35,36], S. Schael[10], M. Schellenberg[11], M. Schiller[54], H. Schindler[43], M. Schmelling[12], T. Schmelzer[11], B. Schmidt[43], O. Schneider[44], A. Schopper[43], H.F. Schreiner[60], M. Schubiger[44], M.H. Schune[8], R. Schwemmer[43], B. Sciascia[19], A. Sciubba[27,k], A. Semennikov[35], E.S. Sepulveda[9], A. Sergi[48,43], N. Serra[45], J. Serrano[7], L. Sestini[24], A. Seuthe[11], P. Seyfert[43], M. Shapkin[40], Y. Shcheglov[34,†], T. Shears[55], L. Shekhtman[39,w], V. Shevchenko[72], E. Shmanin[73], B.G. Siddi[17], R. Silva Coutinho[45], L. Silva de Oliveira[2], G. Simi[24,o], S. Simone[15,d], I. Skiba[17], N. Skidmore[13], T. Skwarnicki[62], M.W. Slater[48], J.G. Smeaton[50], E. Smith[10], I.T. Smith[53], M. Smith[56], M. Soares[16], l. Soares Lavra[1], M.D. Sokoloff[60], F.J.P. Soler[54], B. Souza De Paula[2], B. Spaan[11], E. Spadaro Norella[22,q], P. Spradlin[54], F. Stagni[43], M. Stahl[13], S. Stahl[43], P. Stefko[44], S. Stefkova[56], O. Steinkamp[45], S. Stemmle[13], O. Stenyakin[40], M. Stepanova[34], H. Stevens[11], A. Stocchi[8], S. Stone[62], B. Storaci[45], S. Stracka[25], M.E. Stramaglia[44], M. Straticiuc[33], U. Straumann[45], S. Strokov[74], J. Sun[3], L. Sun[67], K. Swientek[31], A. Szabelski[32], T. Szumlak[31], M. Szymanski[65], S. T'Jampens[5], Z. Tang[3], A. Tayduganov[7], T. Tekampe[11], G. Tellarini[17], F. Teubert[43], E. Thomas[43], J. van Tilburg[28], M.J. Tilley[56], V. Tisserand[6], M. Tobin[31], S. Tolk[43], L. Tomassetti[17,g], D. Tonelli[25], D.Y. Tou[9], R. Tourinho Jadallah Aoude[1], E. Tournefier[5], M. Traill[54], M.T. Tran[44], A. Trisovic[50], A. Tsaregorodtsev[7], G. Tuci[25,p], A. Tully[50], N. Tuning[28,43], A. Ukleja[32], A. Usachov[8], A. Ustyuzhanin[38], U. Uwer[13], A. Vagner[74], V. Vagnoni[16], A. Valassi[43], S. Valat[43], G. Valenti[16], R. Vazquez Gomez[43], P. Vazquez Regueiro[42], S. Vecchi[17], M. van Veghel[28], J.J. Velthuis[49], M. Veltri[18,r], G. Veneziano[58], A. Venkateswaran[62], M. Vernet[6], M. Veronesi[28], N.V. Veronika[14], M. Vesterinen[58], J.V. Viana Barbosa[43], D. Vieira[65], M. Vieites Diaz[42], H. Viemann[70], X. Vilasis-Cardona[41,m], A. Vitkovskiy[28], M. Vitti[50], V. Volkov[36], A. Vollhardt[45], D. Vom Bruch[9], B. Voneki[43], A. Vorobyev[34], V. Vorobyev[39,w], J.A. de Vries[28], C. Vázquez Sierra[28], R. Waldi[70], J. Walsh[25], J. Wang[4], M. Wang[3], Y. Wang[68], Z. Wang[45], D.R. Ward[50], H.M. Wark[55], N.K. Watson[48], D. Websdale[56], A. Weiden[45], C. Weisser[59], M. Whitehead[10], J. Wicht[51], G. Wilkinson[58], M. Wilkinson[62], I. Williams[50], M.R.J. Williams[57], M. Williams[59], T. Williams[48], F.F. Wilson[52], M. Winn[8], W. Wislicki[32], M. Witek[30], G. Wormser[8], S.A. Wotton[50], K. Wyllie[43], D. Xiao[68], Y. Xie[68], A. Xu[3], M. Xu[68], Q. Xu[65], Z. Xu[3], Z. Xu[5], Z. Yang[3], Z. Yang[61], Y. Yao[62], L.E. Yeomans[55], H. Yin[68], J. Yu[68,aa], X. Yuan[62], O. Yushchenko[40], K.A. Zarebski[48], M. Zavertyaev[12,c], D. Zhang[68], L. Zhang[3], W.C. Zhang[3,z], Y. Zhang[8], A. Zhelezov[13], Y. Zheng[65], X. Zhu[3], V. Zhukov[10,36], J.B. Zonneveld[53], S. Zucchelli[16]

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