

Erratum: Doubly charmed baryon decays $\Xi_{cc}^{++} \rightarrow \Xi_c^{(\prime)+} \pi^+$ in the quark model [Phys. Rev. D **107**, 034009 (2023)]

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We report several numerical errors in the original paper. They are caused by a programming mistake—all corrected results are consistent with the theoretical framework of the original paper, and the main conclusions remain unchanged. The corresponding statements in regard to the numerical results are accordingly modified.

- (1) Figure 2 on page 4 should be replaced by the new figure depicted below
- (2) Table II on page 4 should be replaced with the new table shown on the next page
- (3) Table III should be replaced with the new table shown on the next page
- (4) The third paragraph of Sec. III should read as follows:

We plot in Fig. 2 the allowed regions for the harmonic oscillator parameters $\alpha_{\rho 1}$ and $\alpha_{\rho 2}$ constrained by the ratio of branching fractions R [see Eq. (1.1)] and the absolute branching fraction of $\Xi_{cc}^{++} \rightarrow \Xi_c^+ \pi^+$ inferred from Eq. (1.5). It is clear that the allowed range of 0.395–0.440 GeV for $\alpha_{\rho 1}$ is compatible with the value of 0.47 GeV inferred from the charmonium system. However, the preferred range of $\alpha_{\rho 2}$, (0.145–0.195) GeV, is somewhat smaller than the naive expectation of 0.25 GeV. Accordingly, in Table II we choose three sets of harmonic oscillator parameters denoted by cases 1, 2, and 3, with $(\alpha_{\rho 1}, \alpha_{\rho 2})$ being in the vicinity of 0.42 and 0.17 GeV, respectively.

- (5) On the left side of page 6, Eq. (3.1) and R should read as follows:

Taking case 2 as an example, we have the results

$$\mathcal{B}(\Xi_{cc}^{++} \rightarrow \Xi_c^+ \pi^+) = 1.24\%, \quad \alpha(\Xi_c^+ \pi^+) = -0.65, \quad \mathcal{B}(\Xi_{cc}^{++} \rightarrow \Xi_c'^+ \pi^+) = 1.69\%, \quad \alpha(\Xi_c'^+ \pi^+) = -0.80, \quad (1)$$

and hence $R = 1.36$.

- (6) On the right side of page 6, the second conclusion should read as follows:

(2) Denoting the harmonic oscillator parameters $\alpha_{\rho 1}$ and $\alpha_{\lambda 1}$ for Ξ_{cc}^{++} and Ξ_{cc}^+ , $\alpha_{\rho 2}$ and $\alpha_{\lambda 2}$ for Ξ_c^+ and $\Xi_c'^+$, we found that the measured ratio R of the branching fraction of $\Xi_{cc}^{++} \rightarrow \Xi_c'^+ \pi^+$ relative to $\Xi_{cc}^{++} \rightarrow \Xi_c^+ \pi^+$ can be accommodated in the nonrelativistic quark model (NRQM), with $\alpha_{\rho 1}$ and $\alpha_{\rho 2}$ being in the vicinity of 0.42 and 0.17 GeV, respectively.

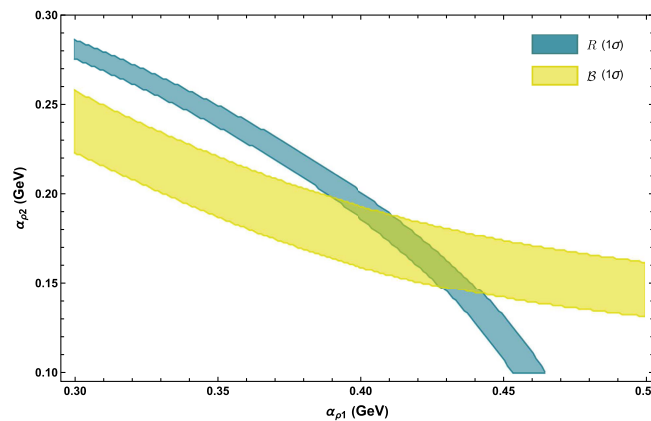


FIG. 2. Allowed regions for the harmonic oscillator parameters $\alpha_{\rho 1}$ and $\alpha_{\rho 2}$ constrained by the ratio R and the absolute branching fraction of $\Xi_{cc}^{++} \rightarrow \Xi_c^+ \pi^+$ inferred from Eq. (1.5).

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TABLE II. Form factors f_1 , g_1 , the axial-vector form factor $g_{B'B}^{A(\pi)}$, and baryonic matrix elements $a_{B_f B_i}$ calculated in the nonrelativistic quark model with the specified harmonic oscillator parameters $(\alpha_{\rho 1}, \alpha_{\rho 2})$ in units of GeV. The results of Ref. [1] obtained from the bag model are also shown here for comparison.

	$(\alpha_{\rho 1}, \alpha_{\rho 2})$	$f_1(m_p^2)$	$g_1(m_p^2)$	$g_{B'B}^{A(\pi)}$	$\langle B_f O_- B_i \rangle$
$\Xi_{cc}^{++} \rightarrow \Xi_c^+ \pi^+$					
Case 1	(0.41, 0.18)	0.365	0.156	-0.333	0.0189
Case 2	(0.42, 0.17)	0.321	0.137	-0.333	0.0169
Case 3	(0.43, 0.16)	0.276	0.118	-0.333	0.0148
Cheng <i>et al.</i> [1]		0.577	0.222	-0.217	0.0214
$\Xi_{cc}^{++} \rightarrow \Xi_c'^+ \pi^+$					
Case 1	(0.41, 0.18)	0.245	0.492	-0.333	0
Case 2	(0.42, 0.17)	0.215	0.432	-0.333	0
Case 3	(0.43, 0.16)	0.185	0.373	-0.333	0
Cheng <i>et al.</i> [1]		0.386	0.703	-0.217	8.4×10^{-5}

TABLE III. Comparison of the predicted S - and P -wave amplitudes (in units of $10^{-2} G_F \text{ GeV}^2$) of $\Xi_{cc}^{++} \rightarrow \Xi_c^{(\prime)+} \pi^+$ decays, their branching fractions (in units of 10^{-2}), and the decay asymmetry parameter α in various approaches with only the central values being cited. For the predictions of Sharma and Dhir [2], we quote only the flavor-independent pole amplitudes for both NRQM and heavy quark effective theory (HQET). Two bag models are considered in the work of Liu and Geng [3]: the static bag (SB) and homogeneous bag (HB) models.

	A^{fac}	A^{nf}	A^{tot}	B^{fac}	B^{nf}	B^{tot}	$\mathcal{B}$	α	R
$\Xi_{cc}^{++} \rightarrow \Xi_c^+ \pi^+$									
This work									
Case 1	4.7	-9.5	-4.8	-10.5	16.7	6.2	1.53	-0.65	
Case 2	4.1	-8.5	-4.4	-9.3	14.9	5.6	1.24	-0.65	
Case 3	3.5	-7.4	-3.9	-8.0	13.0	5.0	0.98	-0.65	
Cheng <i>et al.</i> [1]	7.4	-10.8	-3.4	-15.1	18.9	3.8	0.69	-0.41	
Gutsche <i>et al.</i> [4]	-8.1	11.5	3.4	13.0	-18.5	-5.6	0.71	-0.57	
Sharma and Dhir [2]									
NRQM	7.38	0	7.38	-16.77	-24.95	-41.72	6.64	-0.99	
HQET	9.52	0	9.52	-19.45	-24.95	-44.40	9.19	-0.99	
Shi <i>et al.</i> [5]									
LCSR + HQET	9.52	-16.67	-7.18	-19.45	-20.47	-39.92	6.22	+0.99	
(Light cone sum rules)									
Ke and Li [6]									
$\theta = 16.27^\circ$							2.14	-0.09	
$\theta = 85.54^\circ$							2.14	-0.95	
Liu and Geng [3] ^a									
SB ($\theta = -24.7^\circ$)	4.83	-9.99	-5.16	5.16	13.6	18.8	2.24	-0.93	
HB ($\theta = 24.7^\circ$)	7.08	-20.3	-13.2	-22.1	33.0	10.9	10.3	-0.30	
$\Xi_{cc}^{++} \rightarrow \Xi_c'^+ \pi^+$									
This work									
Case 1	2.8	0	2.8	-34.0	0	-34.0	2.19	-0.80	1.43
Case 2	2.49	0	2.49	-29.8	0	-29.8	1.69	-0.80	1.36
Case 3	2.2	0	2.2	-25.7	0	-25.7	1.26	-0.80	1.27
Cheng <i>et al.</i> [1]	4.5	-0.04	4.5	-48.5	-0.06	-48.4	4.65	-0.84	6.74
Gutsche <i>et al.</i> [4]	-4.3	-0.1	-4.4	37.6	1.4	39.0	3.4	-0.93	4.33
Sharma and Dhir [2]									
NRQM	4.29	0	4.29	-53.65	0	-53.65	5.39	-0.78	0.81
HQET	5.10	0	5.10	-62.37	0	-62.37	7.34	-0.79	0.80
Shi <i>et al.</i> [5]									
LCSR + HQET	5.10	-0.83	4.27	-62.37	-8.86	-71.23	8.85	-0.64	1.42
Ke and Li [6]									

(Table continued)

TABLE III. (*Continued*)

	A^{fac}	A^{nf}	A^{tot}	B^{fac}	B^{nf}	B^{tot}	$\mathcal{B}$	α	R
$\theta = 16.27^\circ$							3.02	−0.99	1.41
$\theta = 85.54^\circ$							3.02	−0.51	1.41
Liu and Geng [3]									
SB ($\theta = -24.7^\circ$)	7.38	−4.82	2.56	−51.0	7.26	−43.7	3.25	−0.63	1.45
HB ($\theta = 24.7^\circ$)	0.61	9.65	10.3	−28.1	−17.4	−45.5	8.91	−0.96	0.90
LHCb [7]									1.41 ± 0.20

^aWe wish to thank C. W. Liu and C. Q. Geng for providing us the numerical values of the S - and P -wave amplitudes in their work.

(7) On the left side of page 7, the fourth conclusion should read as follows:

(4) Decay asymmetries are predicted to be −0.65 and −0.80 for $\Xi_c^+ \pi^+$ and $\Xi_c'^+ \pi^+$ modes, respectively, which can be tested in the near future.

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