Erratum: Kinetic energy spectra and angular distributions of projectile-like fragments in $^{12,13}C + ^{93}Nb$ reactions [Phys. Rev. C 102, 024610 (2020)]

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Absolute cross sections reported in the original article were underestimated by a factor of 2.5. This was due to the error in the calculation of the Rutherford scattering cross section. In the calculation of the Rutherford cross section, a factor of 10 was missing which was required to convert fm^2 to millibarns, and a factor of 4 was missing in the denominator, resulting in an overall factor of 2.5. Therefore, absolute cross sections given in Figs. 7 and in 9 of the original article are lower by a factor of 2.5 compared to the expected value. However, this uniform multiplication by a constant factor does not change the conclusions of the original article as they were primarily based on relative yields and angular distributions which remain unchanged. Due to the change in the absolute cross sections, FRESCO [1] calculations have been performed with the modified spectroscopic factors, accordingly Table II of the original article gets revised as given in this erratum. For the angular distributions corresponding to the inelastic state of ^{12}C (4.44 MeV, 2^+), FRESCO calculations have been performed using the $B(E2; 2_1^+ \rightarrow 0_1^+)$ value of 8.800 $e^2\,fm^4$ [2] in addition to 5.429 $e^2\,fm^4$ [3] that was used earlier. It should be mentioned here that the increase in the spectroscopic factor value for $^{12}C \rightarrow {}^{11}B$ is higher compared to the values for the other channels as the earlier reported value should have

TABLE II: Structure information and spectroscopic factors (S) for the overlaps $A = C \pm x$ corresponding to different states of the nuclei A, C, and x used in the FRESCO [1] calculations. BE: Binding energy of the nucleon and g.s. is the ground state.

A	C	x	n, l, j	BE (MeV)	S (this paper)	S (reported value)	[c]Reference
^{12}C(g.s., 0^+)	^{11}B(g.s., $3/2^-$)	$-p$	1 $p_{3/2}$	15.957	10.24	1.85–4.1	[4]
^{12}C(g.s., 0^+)	^{11}B(2.124 MeV, $1/2^-$)	$-p$	1 $p_{1/2}$	18.081	46.23	[a]	
^{93}Nb(g.s., $9/2^+$)	^{94}Mo(g.s., 0^+)	$+p$	1 $g_{9/2}$	8.490	1.0	[a]	
^{93}Nb(g.s., $9/2^+$)	^{94}Mo(0.87 MeV, 2^+)	$+p$	1 $g_{9/2}$	7.619	1.0	[a]	
^{12}C(g.s., 0^+)	^{13}C(g.s., $1/2^-$)	$+n$	1 $p_{1/2}$	4.496	0.684	0.26–0.43	[5]
						0.58	[6]
^{12}C(g.s., 0^+)	^{13}C(3.68 MeV, $3/2^-$)	$+n$	1 $p_{3/2}$	1.262	4.376	0.36	[6]
^{93}Nb(g.s., $9/2^+$)	^{92}Nb(g.s., 7^+)	$-n$	2 $d_{5/2}$	8.830	0.36	0.36	[7]
^{93}Nb(g.s., $9/2^+$)	^{92}Nb(0.136 MeV, 2^+)	$-n$	2 $d_{5/2}$	8.966	0.20	0.20	
^{93}Nb(g.s., $9/2^+$)	^{92}Nb(0.226 MeV, 2^-)	$-n$	1 $f_{5/2}$	9.056	0.163	[b]	
^{93}Nb(g.s., $9/2^+$)	^{92}Nb(0.286 MeV, 3^+)	$-n$	2 $d_{5/2}$	9.116	0.13	0.13	
^{93}Nb(g.s., $9/2^+$)	^{92}Nb(0.357 MeV, 5^+)	$-n$	2 $d_{5/2}$	9.187	0.10	0.10	
^{93}Nb(g.s., $9/2^+$)	^{92}Nb(0.390 MeV, 3^-)	$-n$	2 $p_{3/2}$	9.220	0.137	[b]	
^{93}Nb(g.s., $9/2^+$)	^{92}Nb(0.480 MeV, 4^+)	$-n$	2 $d_{5/2}$	9.310	0.180	0.180	
^{93}Nb(g.s., $9/2^+$)	^{92}Nb(0.501 MeV, 6^+)	$-n$	2 $d_{5/2}$	9.331	0.180	0.180	
^{12}C(g.s., 0^+)	^{13}N(g.s., $1/2^-$)	$+p$	1 $p_{1/2}$	1.943	1.325	0.53	[6]
^{12}C(g.s., 0^+)	^{13}N(2.365 MeV, $1/2^+$)	$+p$	2 $s_{1/2}$	0.423	2.5	1.0	[8]
^{93}Nb(g.s., $9/2^+$)	^{92}Zr(g.s., 0^+)	$-p$	1 $g_{9/2}$	6.043	0.36	[a]	
^{13}C(g.s., $1/2^-$)	^{14}C(g.s., 0^+)	$+n$	1 $p_{3/2}$	8.177	2.5	1.63	[9]
^{13}C(g.s., $1/2^-$)	^{14}C(6.589 MeV, 0^+)	$+n$	1 $p_{1/2}$	1.588	2.5	[a]	
^{13}C(3.68 MeV, $3/2^-$)	^{14}C(g.s., 0^+)	$+n$	1 $p_{3/2}$	11.857	2.5	[a]	
^{13}C(3.68 MeV, $3/2^-$)	^{14}C(6.589 MeV, 0^+)	$+n$	1 $p_{3/2}$	5.268	2.5	[a]	
^{92}Nb(g.s., 7^+)	^{91}Nb(g.s., $9/2^+$)	$-n$	1 $g_{9/2}$	7.887	1.0	[a]	

[a]S values extracted in the present paper.
[b]S values were obtained by averaging the S values for nearby energy states.
[c]References [4–9] in the table correspond to Refs. [45–50], respectively, in the original article.

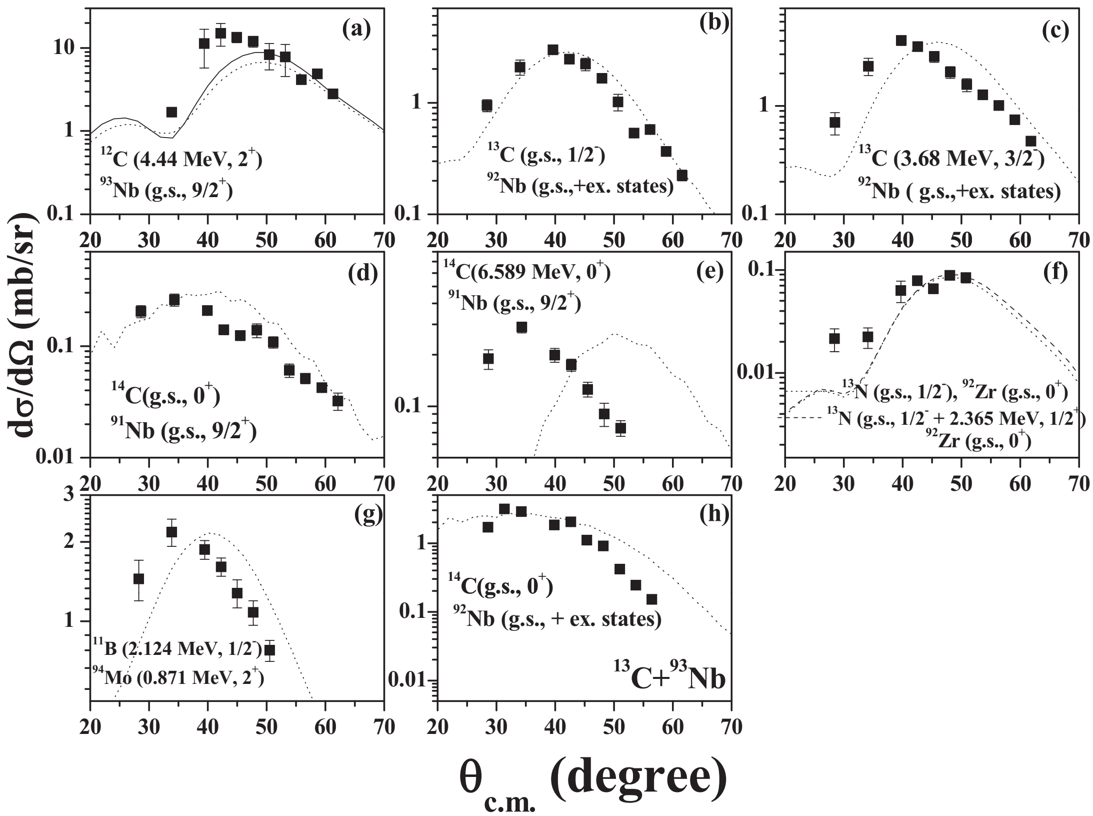

FIG. 8. Plots of angular distributions of specific states of the projectilelike fragments (PLFs) and targetlikefragments (TLFs) populated in different transfer reactions and inelastic excitation which were formed in $^{12}\mathrm{C} + {}^{93}\mathrm{Nb}$ (a)–(g) and $^{13}\mathrm{C} + {}^{93}\mathrm{Nb}$ (h) reactions. The specific states of projectile/PLFs and/or target/TLFs involved in transfer/inelastic scatterings are mentioned in each panel. Filled squares are the experimental data points and dotted/dashed/solid lines are FRESCO [1] calculations. For (a) solid and dotted lines correspond to $B(E2; 2_1^+ \rightarrow 0_1^+)$ values of 8.800 and 5.429 $e^2\,\mathrm{fm}^4$ respectively. For (b), (c), and (h), the population of multiple excited states of ^{92}Nb in the energy range up to 500 keV was considered.

been 18.5 in place of 13.69. The modified Fig. 8 with the new FRESCO calculations and absolute cross sections is also given in this erratum.

[1] I. J. Thompson, *Nuclear Theory and Modelling* (Livermore National Laboratory, Livermore, CA), p. 94551, USA and Department of Physics, University of Surrey, Guildford GU2 7XH, England, Version FRES 2.9, September 2011, LLNL-SM-485670.
[2] C. Forssén, R. Roth, and P. Navrátil, J. Phys. G: Nucl. Part. Phys. **40**, 055105 (2013).
[3] A. Kundu, S. Santra, A. Pal, D. Chattopadhyay, T. N. Nag, R. Ghandi. P. C. Rout, B. J. Roy, B. K. Nayak, and S. Kailas, Phys. Rev. C **100**, 024614 (2019).
[4] E. T. Li, Z. H. Li, Y. J. Li, B. Guo, Y. B. Wang, D. Y. Pang, J. Su, S. Q. Yan, S. Zeng, L. Gan, Z. C. Li, J. C. Liu, X. X. Bai, Z. D. Wu, S. J. Jin, L. Y. Zhang, X. Q. Yu, L. Li, H. B. Sun, G. Lian, Q. W. Fan, and W. P. Liu, Phys. Rev. C **90**, 067601 (2014).
[5] X. D. Liu, M. A. Famiano, W. G. Lynch, M. B. Tsang, and J. A. Tostevin, Phys. Rev. C **69**, 064313 (2004).
[6] C. A. Pearson, J. M. Covan, D. Zissermann, T. G. Miller, F. P. Gibson, R. Haglund, W. Morrison, and G. Westley, Nucl. Phys. **A191**, 1 (1972).
[7] M. A. Rumore, S. A. Dickey, C.A. Fields, and J. J. Kraushaar, Nucl. Phys. A **423**, 350 (1984).
[8] C. D. Nesaraja, C. R. Brune, B. T. Crowley, J. H. Kelley, S. O. Nelson, R. M. Prior, K. Sabourov, D. R. Tilley, A. Tonchev, and H. R. Weller, Phys. Rev. C **64**, 065804 (2001).
[9] M. B. Tsang, J. Lee, and W. G. Lynch, Phys. Rev. Lett. **95**, 222501 (2005).