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Erratum

Erratum to: Analytical solution of Bohr Hamiltonian and extended form of sextic potential using bi-confluent Heun functions

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After publication of our paper [1], we noticed an error for the energy and the wave function. We evaluate the numerical results once again. We can find more accurate numerical results and the physical interpretations do not change.

1 The energy and the wave function

The solution of eq. (14) of our paper [1] can be written as

$$F_{L,\alpha} = H_b(\alpha', \beta', \delta', \gamma'; \beta^2), \tag{1}$$

$$\alpha' = \sqrt{W + a + \frac{9}{4}}, \tag{2}$$

$$\beta' = \frac{c}{4}, \tag{3}$$

$$\gamma' = \frac{1}{64}\left(-16b + c^2\right), \tag{4}$$

$$\delta' = \frac{-\varepsilon_\beta}{2}, \tag{5}$$

where we have corrected the expression for γ'. Therefore, the new expressions for energy and constraint are obtained as

$$\varepsilon_\beta = \frac{c}{2}\left(\sqrt{a + W + \frac{9}{4}} + 2n + 5\right), \tag{6}$$

$$b = \frac{c^2}{16} - 4\left(\sqrt{a + W + \frac{9}{4}} + 2n + 4\right). \tag{7}$$

According to the corrected results, we shall evaluate the numerical evaluations presented in our paper once again.

2 Numerical results

In this section, according to the expressions for energy and constraint, we evaluate the theoretical predictions in tables 1–4.

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Table 1. Comparison of our results with experimental data for three isotopes of xenon.

Isotope	^{128}Xe		^{130}Xe		^{132}Xe	
L_{band}	Theor.	Exp.	Theor.	Exp.	Theor.	Exp.
4_g	2.323	2.333	2.255	2.247	2.150	2.157
6_g	3.806	3.922	3.619	3.627	3.353	3.163
8_g	5.373	5.627	5.037	5.031		
10_g	6.988	7.597	6.484	6.457		
12_g			7.949	7.867		
14_g			9.426	9.458		
2_γ	1.830	2.189	1.793	2.093	1.734	1.944
3_γ	2.556	3.228	2.471	3.045	2.343	2.701
4_γ	4.180	3.620	3.959	3.373	3.649	2.940
5_γ	4.361	4.508	4.123	4.051	3.791	3.246
6_γ	6.286	5.150				
7_γ	6.139	6.165				
0_β	3.454	3.574	3.025	3.346	2.528	2.771
2_β	4.454	4.515				
a	3.043		1.506		0	
σ	0.493		0.297		0.422	

Table 2. Comparison of our results with experimental data for three isotopes of platinum.

Isotope	^{192}Pt		^{194}Pt		^{196}Pt	
L_{band}	Theor.	Exp.	Theor.	Exp.	Theor.	Exp.
4_g	2.391	2.479	2.410	2.470	2.388	2.465
6_g	4.004	4.314	4.060	4.298	3.994	4.290
8_g	5.743	6.377	5.852	6.392	5.725	6.333
10_g	7.559	8.624	7.730	8.672	7.530	8.558
2_γ	1.866	1.935	1.876	1.894	1.864	1.936
3_γ	2.641	2.910	2.664	2.809	2.637	2.825
4_γ	4.416	3.795	4.484	3.743	4.405	3.636
5_γ	4.617	4.682	4.690	4.563	4.604	4.526
6_γ	6.767	5.905			6.743	7.730
7_γ	6.602	6.677				
0_β	4.012	3.776	4.197	3.858	3.981	3.192
2_β	5.012	4.547	5.197	4.603	4.981	3.828
a	5.364		6.217		5.228	
σ	0.533		0.505		0.713	

Table 3. Normalized $B(E2)$ transition rats for ^{128}Xe and ^{132}Xe.

		^{128}Xe		^{132}Xe	
$L^{(i)}_{band}$	$L^{(f)}_{band}$	Theor.	Exp.	Theor.	Exp.
4_g	2_g	1.512	1.468	1.596	1.238
6_g	4_g	2.065	1.940		
8_g	6_g	2.483	2.388		
2_γ	2_g	1.546	1.194	1.632	1.775
2_γ	0_g	0	0.016	0	0.003
c		9		-4	
σ		0.166		0.249	

Table 4. Normalized $B(E2)$ transition rats for ^{192}Pt, ^{194}Pt and ^{196}Pt.

		^{192}Pt		^{194}Pt		^{196}Pt	
$L^{(i)}_{band}$	$L^{(f)}_{band}$	Theor.	Exp.	Theor.	Exp.	Theor.	Exp.
4_g	2_g	1.486	1.559	1.479	1.724	1.487	1.476
4_γ	2_γ			0.629	0.446	0.670	0.715
6_γ	4_γ					0.933	1.208
3_γ	2_γ	1.064	1.786				
2_γ	0_g	0	0.009	0	0.006	0	0.0004
2_γ	2_g	1.518	1.909	1.512	1.805		
4_γ	2_g			0	0.004	0	0.014
4_γ	4_g			0.313	0.406		
6_γ	4_g					0	0.012
c		300		300		300	
σ		0.476		0.194		0.125	

References

1. H. Sobhani, A.N. Ikot, H. Hassanabadi, Eur. Phys. J. Plus **132**, 240 (2017).