Erratum: Radiative force from optical cycling on magnesium monofluoride [Phys. Rev. A 105, 042806 (2022)]

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In Tables II and III of our original paper [Phys. Rev. A **105**, 042806 (2022)], the observed transition frequencies should be revised. According to Ref. [44], we miscalibrated our wave meter by the cesium D_1 line, the absolute A-X transition frequencies of MgF will be off by 2.246 GHz with reference to Ref. [44]. Besides, the ω_e and $\omega_e\chi_e$ constants of the X state and the A state should not be simultaneously fitted from our experimental data. Thus, the constants of the $X^2\Sigma^+_{1/2}$ state are fixed at the values given in Ref. [34] now, and the molecular constants of the $A^2\Pi_{1/2}$ state are refitted. The newly fitted molecular constants in Table I should be updated alongside the recalculated transition frequencies in Tables II and III. The corrected versions of the three tables are shown as follows.

TABLE I. Molecular constants (in cm^{-1}) for the $X^2\Sigma^+_{1/2}$ state and the $A^2\Pi_{1/2}$ state in MgF.

	$A^2\Pi_{1/2}$				
	T_e	ω'_e	B'_e	α'_e	$\omega_e\chi'_e$
This paper	27833.98563(95)	747.99114(29)	0.528957(80)[b]	0.00474(15)	4.26867(92)
[37]	27813.1	746			
[38]	27829.60(3)				
		$X^2\Sigma^+_{1/2}$			
		ω_e	B_e	α_e	$\omega_e\chi_e$
[37]		718.2			
[38]		721.6	0.51922	0.00470	4.94
[43][a]			0.519272	0.004717	
[34]		720.14042(30)	0.519272510(42)	0.004717446(43)	4.26018(16)

[a]Here, the megahertz unit in Ref. [43] is converted to cm^{-1}.
[b]The spectroscopic constants of the $A^2\Pi$ state of MgF have been reported recently [44] that include the B_0 of $A^2\Pi$ state. The B_0 value in our paper is recalculated as $B'_0 = B'_e - \alpha'_e(v + \frac{1}{2})$, which is 15786.7 MHz. This is close to the value (15788.2 MHz) in Ref. [44].

TABLE II. Observed ($v_{\text{obs.}}$) and calculated ($v_{\text{cal.}}$) transition frequencies of the (0, 0) band of $A^2\Pi_{1/2} - X^2\Sigma^+_{1/2}$ in MgF (in gigahertz).

N	J	J'	$v_{\text{obs.}}$	$v_{\text{obs.}} - v_{\text{cal.}}$
		P_{11}		
1	1.5	0.5	834294.356	−0.037
2	2.5	1.5	834279.006	−0.030
3	3.5	2.5	834263.744	−0.047
4	4.5	3.5	834248.618	−0.044
5	5.5	4.5	834233.598	−0.054
6	6.5	5.5	834218.740	−0.028
7	7.5	6.5	834203.964	−0.051

TABLE II. (*Continued.*)

N	J	J'	$\nu_{obs.}$	$\nu_{obs.} - \nu_{cal.}$
8	8.5	7.5	834189.382	−0.018
9	9.5	8.5	834174.916	−0.017
10	10.5	9.5	834160.628	0.006
11	11.5	10.5	834146.498	0.021
12	12.5	11.5	834132.520	0.011
		Q_{11}		
0	0.5	0.5	834325.444	0.033
1	1.5	1.5	834340.976	−0.072
2	2.5	2.5	834356.846	0.049
3	3.5	3.5	834372.664	0.003
4	4.5	4.5	834388.648	0.003
5	5.5	5.5	834404.766	0.013
6	6.5	6.5	834420.992	−0.002
7	7.5	7.5	834437.420	0.047
8	8.5	8.5	834453.954	0.055
9	9.5	9.5	834470.642	0.061
10	10.5	10.5	834487.496	0.066
		R_{11}		
0	0.5	1.5	834372.100	0.033
1	1.5	2.5	834418.842	0.033
2	2.5	3.5	834465.710	0.044
3	3.5	4.5	834512.706	0.062
4	4.5	5.5	834559.832	0.086
5	5.5	6.5	834606.962	−0.017
6	6.5	7.5	834654.274	−0.078
7	7.5	8.5	834701.768	−0.103
8	8.5	9.5	834749.380	−0.167
9	9.5	10.5	834797.096	−0.293
		P_{12}		
2	1.5	0.5	834232.540	0.033
3	2.5	1.5	834186.112	−0.096
4	3.5	2.5	834140.066	0.045
5	4.5	3.5	834094.050	0.101
6	5.5	4.5	834048.120	0.124
		Q_{12}		
1	0.5	0.5	834294.520	0.051
2	1.5	1.5	834279.182	0.019
3	2.5	2.5	834263.920	−0.049
4	3.5	3.5	834248.882	−0.008
5	4.5	4.5	834233.936	0.005
6	5.5	5.5	834219.116	0.019
7	6.5	6.5	834204.410	0.015
8	7.5	7.5	834189.868	0.037
9	8.5	8.5	834175.434	0.019
10	9.5	9.5	834161.188	0.033
11	10.5	10.5	834147.116	0.056
12	11.5	11.5	834133.198	0.055
		R_{12}		
1	0.5	1.5	834341.176	0.052
2	1.5	2.5	834357.016	0.093
3	2.5	3.5	834372.922	0.084
4	3.5	4.5	834388.916	0.043
5	4.5	5.5	834405.086	0.054
6	5.5	6.5	834421.416	0.093
7	6.5	7.5	834437.812	0.059
8	7.5	8.5	834454.326	−0.004
9	8.5	9.5	834471.068	0.005
10	9.5	10.5	834487.996	0.034

TABLE III. Observed and calculated transition frequencies of (0,1) and (1,1) bands of $A^2\Pi_{1/2} - X^2\Sigma^+_{1/2}$ in MgF (in gigahertz).

N	J	J'	$\upsilon_{obs.}$	$\upsilon_{obs.} - \upsilon_{cal.}$
		$(v=1)-(v'=0)$		
		P_{11}		
1	1.5	0.5	812959.152	−0.107
2	2.5	1.5	812944.372	−0.122
3	3.5	2.5	812929.958	−0.165
		Q_{11}		
1	1.5	1.5	813005.854	−0.061
2	2.5	2.5	813022.216	−0.039
3	3.5	3.5	813038.946	−0.047
		$(v=1)-(v'=1)$		
		P_{11}		
1	1.5	0.5	835128.514	0.051
2	2.5	1.5	835113.352	0.068
3	3.5	2.5	835098.246	0.021
4	4.5	3.5	835083.434	0.146
		Q_{11}		
0	0.5	0.5	835159.140	−0.033
1	1.5	1.5	835174.712	0.007
2	2.5	2.5	835190.328	−0.028
3	3.5	3.5	835206.114	−0.016
4	4.5	4.5	835222.038	0.007
		R_{11}		
0	0.5	1.5	835205.338	−0.078
1	1.5	2.5	835251.792	0.015
2	2.5	3.5	835298.214	−0.048
3	3.5	4.5	835344.812	−0.061
		P_{12}		
2	1.5	0.5	835066.994	−0.048
3	2.5	1.5	835021.154	0.001

The molecular constants have some influence on the calculation of the Franck-Condon (FC) factors. So, we recalculated the FC factors of the *A*-*X* transition using the newly fitted constants. But, the prediction of optical cycling and deflection was calculated by the experimental result of FC factors ($f_{00} = 0.972$ and $f_{01} = 0.028$), which are unaffected. All the detailed modifications in the main text are shown as follows. At lines 4 and 5, the last second paragraph, right column, p. 3, "$f_{00} = 0.9711$, $f_{01} = 0.0282$, and $f_{02} = 0.000726$" should be corrected to "$f_{00} = 0.9703$, $f_{01} = 0.0289$, and $f_{02} = 0.000766$," respectively. In the last line, paragraph 1, left column, page 4, "more than 50 000 scattered photons" should be corrected to "more than 29 400 scattered photons."

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