

Erratum: Calculation of isotope shifts and King-plot nonlinearities in Ca^+ [Phys. Rev. A **108**, 022802 (2023)]

A. V. Viatkina , V. A. Yerokhin , and A. Surzhykov 

(Received 15 April 2026; published 13 May 2026)

DOI: [10.1103/jw7x-tnwz](https://doi.org/10.1103/jw7x-tnwz)

In the original paper, a factor of two in Eqs. (10) and (14) has been omitted. The correct expressions read

$$\delta E_{\text{MS}}^{(2)} = \left(\frac{m}{M}\right)^2 (E_0 - 2K_{\text{SMS}}^{(1)} + K_{\text{SMS}}^{(2)}), \quad (10)$$

$$K^{(2)} \equiv E_0 - 2K_{\text{SMS}}^{(1)} + K_{\text{SMS}}^{(2)}. \quad (14)$$

Consequently, the second-order mass-shift coefficients $\tilde{K}^{(2)}$ in Table I change. In turn, the values of second-order mass shifts and total isotope shifts in Table V are modified. Following the change in isotope shifts, the total values of King-Plot nonlinearities and the relative impact of different contributions in Tables VI and VIII change slightly as well. The total three-dimensional King-Plot nonlinearity in Table VII increases to $9.7 \times 10^3 \text{ kHz}^3$, and the rest of Table VII remains the same.

TABLE I. Mass shift constants in Ca^+ .

	Units	$4s$	$4p_{1/2}$	$4p_{3/2}$	$3d_{3/2}$	$3d_{5/2}$
$\tilde{K}^{(2)}$	$\text{GHz} \times \text{amu}^2$	−3.12	−8.66	−8.67	−2.50	−2.49

TABLE V. Isotope-shift contributions, with reference isotope $A_0 = 40$. MS stands for mass shift; “sec.” indicates “second order”.

A	Isotope shift	Units	$4s$	$4p_{1/2}$	$4p_{3/2}$	$3d_{3/2}$	$3d_{5/2}$
42	Total	MHz	−1519.6	−1122.9	−1136.5	1329.7	1315.5
	MS, sec.	MHz	0.182	0.504	0.505	0.146	0.145
44	Total	MHz	−2935.1	−2141.7	−2167.8	2553.1	2525.9
	MS, sec.	MHz	0.339	0.942	0.942	0.272	0.270
46	Total	MHz	−4287.3	−3068.2	−3105.6	3695.6	3656.4
	MS, sec.	MHz	0.477	1.323	1.324	0.382	0.380
48	Total	MHz	−5528.6	−3922.6	−3970.4	4746.6	4696.3
	MS, sec.	MHz	0.598	1.660	1.661	0.479	0.477

TABLE VI. Two-dimensional King-plot NLs. The NL units are Hz for method (a) and kHz^2 for method (b). The “3rd point” column corresponds to the isotope shifts in $A = 42, 44, 46$ isotopes and the “4th point” to the isotope shifts in $A = 42, 44, 48$ isotopes with respect to $A_a = 40$. Approximate percentages of each higher-order term contribution to the total NLs are given in the respective columns.

Transitions	Contribution	3 rd point		4 th point	
		(a)	(b)	(a)	(b)
$3d_{3/2} \rightarrow 4s$; $3d_{5/2} \rightarrow 4s$	Total	33	769	169	3.1×10^3
	MS, sec.	98.8%	98.8%	19.3%	19.3%
	FS, sec.	0.8%	0.8%	0.2%	0.2%
	Np	0.2%	0.2%	80.4%	80.4%
$4p_{1/2} \rightarrow 4s$; $3d_{3/2} \rightarrow 4s$	Total	1.6×10^4	3.3×10^5	1.6×10^4	2.6×10^5
	MS, sec.	99.7%	99.7%	99.6%	99.6%
	FS, sec.	0.0%	0.0%	0.0%	0.0%

TABLE VIII. NLs and their uncertainties for the two-dimensional King plots. For each entry, the upper line shows a NL calculated with method (a) and its uncertainties, while the lower line gives the maximal experimental uncertainties of (both) transition frequencies that allow to detect the NL values listed in the upper line. $\epsilon_{\text{const.}}$ is the theoretical error of the NL value stemming from the numerical uncertainty of isotope-shift constants, whereas ϵ_{radii} is the NL uncertainty originating from the experimental values of nuclear charge radii. The units are kHz.

Transitions		Value	ϵ_{const}	ϵ_{radii}
$3d_{3/2} \rightarrow 4s$; $3d_{5/2} \rightarrow 4s$	3 rd point	0.033 (0.003)	1.7 (0.17)	0.008 (0.0008)
	4 th point	0.168 (0.010)	1.5 (0.09)	0.014 (0.0008)
$4p_{1/2} \rightarrow 4s$; $3d_{3/2} \rightarrow 4s$	3 rd point	16 (1.5)	2.5 (0.2)	4.0 (0.35)
	4 th point	16 (0.9)	2.5 (0.13)	7.0 (0.35)

The numerical changes described above do not significantly affect the overall analysis of King-plot nonlinearities and the conclusions drawn in the paper.

We would like to thank Luca Huber for pointing out the initial omission in Eqs. (10) and (14).