Erratum: Rigorous calculation of heating in alkali-metal traps by background gas collisions [Phys. Rev. A 61, 033606 (2000)]

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The numerical values in Table I of the original paper have erroneously been calculated with the incorrect expression $v_m = (3k_B T_b/2m)^{1/2}$. In Table I of this erratum the correct expression $v_m = (2k_B T_b/m)^{1/2}$ has been used, which results in new values for the parameters k , Q , $\sigma(0)$, θ_0 , and the derived expressions $n_b \tau_1 (1 - \Delta Q/Q)$, $\mathcal{E}_{ref}$, and $v_m Q \mathcal{E}_{ref}$.

The influence of these changes on the most important conclusion of the paper, i.e., the comparison with the trap heating data for Cs of the group of Chu [1], is rather small due to compensating effects. The correct value for the calculated energy transfer rate is $\dot{U}_m/(Nk_B) = 4.3 \mu\text{K/s}$, as compared to the experimental value of $\approx 4 \mu\text{K/s}$. The incorrect calculated result was $\dot{U}_m/(Nk_B) = 4.5 \mu\text{K/s}$. Although the calculated values in the other examples discussed in Sec. V of the paper also change slightly, the general insight remains without dispute.

TABLE I. System parameters for the alkali-metal gases, together with collision parameters k , Q , $\sigma(0)$, and θ_0 at a velocity $v_m = (2k_B T_b/m)^{1/2}$ corresponding to the maximum of the Maxwell-Boltzmann distribution of the background gas atoms at temperature $T_b = 300 \text{ K}$.

Alkali	Li	Na	K	Rb	Cs
m (a.u.)	7	23	39	87	133
C_6 (a.u.) ^a	1393	1556	3897	4691	6851
v_m (m/s)	844	466	358	239	194
k ($\text{\AA}^{-1}$)	4.67	8.47	11.0	16.5	20.4
Q ($\text{\AA}^2$)	951	1261	2023	2558	3240
$\sigma(0)$ ($\text{\AA}^2$)	1.91×10^5	1.10×10^6	4.81×10^6	1.70×10^7	4.21×10^7
θ_0 (mrad)	24.6	11.8	7.1	4.3	3.1
$n_b \tau_1 (1 - \Delta Q/Q)$ ($\text{m}^{-3} \text{s}$)	1.25×10^{14}	1.70×10^{14}	1.38×10^{14}	1.63×10^{14}	1.59×10^{14}
$\mathcal{E}_{ref}$ (mK)	45.4	10.4	3.83	1.36	0.702
$v_m Q \mathcal{E}_{ref}$ ($\text{m}^3 \text{K/s}$)	3.65×10^{-16}	6.12×10^{-17}	2.77×10^{-17}	8.32×10^{-18}	4.40×10^{-18}

^aReference [2].

[1] V. Vuletic', C. Chin, J. Kerman, and S. Chu, Phys. Rev. Lett. **81**, 5768 (1998).

[2] A. Derevianko, W. Johnson, M. Safronova, and J. Babb, Phys. Rev. Lett. **82**, 3589 (1999).