

Erratum: Forces on alkali Rydberg atoms due to nonlinearly polarized light **[Phys. Rev. A **111**, 053120 (2025)]**

 A. Bhowmik  and D. Blume 


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In our publication, we investigated the forces on alkali Rydberg atoms—specifically rubidium and cesium—arising from nonlinearly polarized light. All results presented in our original paper remain valid, with the exception of Fig. 8(b). According to the caption, Fig. 8(b) was intended to show the dynamic polarizabilities of the ground state and the Rydberg state $60S_{1/2,+1/2}$ of rubidium. However, the figure instead displays the corresponding results for cesium. We correct this here by providing the updated version of Fig. 8, which now correctly includes the rubidium data as originally intended. We would like to emphasize that the error in the figure in our original publication does not affect the other results or the main conclusions of the paper.

In Appendix A, the solution to the radial part of the Schrödinger equation of Rydberg states, i.e., Eq. (A3), had a typographical error. The correct form of the equation is

$$R_{n_{\text{eff}},L,J}(r) = \frac{1}{[a_0 n_{\text{eff}}^2 \Gamma(n_{\text{eff}} + L + 1) \Gamma(n_{\text{eff}} - L)]^{1/2}} W_{n_{\text{eff}},L+1/2}(y). \quad (\text{A3})$$

The results shown in our paper were calculated using the correct expression for the radial wave function.

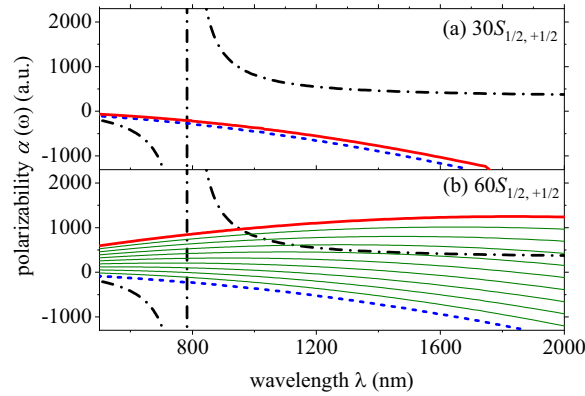


FIG. 8. Polarizability of the ground and Rydberg states for Rb as a function of wavelength. The Rydberg states are (a) $30S_{1/2,+1/2}$ and (b) $60S_{1/2,+1/2}$. The quantization axis is perpendicular to the polarization vector, i.e., $\theta_p = \pi/2$. The black dashed-dotted lines show the polarizability of the ground state. The blue dashed and red solid lines show $\alpha(\omega)$ of the Rydberg state for linearly and circularly polarized light, respectively. In (b), the thin green lines show the polarizability of the Rydberg states for elliptically polarized light for various values of $A \cos \theta_k$ [$A \cos \theta_k = 0.1$ (bottom-most curve) to 0.9 (topmost curve)]. For the $60S_{1/2,+1/2}$ state, variation of the geometric factor $A \cos \theta_k$ affords appreciable tunability of $U_{\text{stark}}(X, Y, Z, \omega)$.