Erratum: Metrology of high- n Rydberg states of molecular hydrogen with $\Delta\nu/\nu = 2 \times 10^{-10}$ accuracy [Phys. Rev. A **97, 012501 (2018)]**

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In this article, we reported the frequencies of the transitions from the $GK^1\Sigma_g^+(v=0, N=2)$ state of H_2 to the $n=50$ and the $n=70f$ ($N=3, S=0$) Rydberg states belonging to a series converging on the $X^+2\Sigma_g^+(v^+=0, N^+=0)$ ground state of H_2^+ to be $380\,132\,832.236(0.035)_{\text{stat}}(0.054)_{\text{sys}}$ MHz, and $380\,777\,345.01(0.07)_{\text{stat}}(0.18)_{\text{sys}}$ MHz, respectively. To convert these observed frequencies into the corresponding energy intervals, the photon-recoil shifts [$\Delta\nu = h\nu^2/(2Mc^2)$] of 159.1 and 159.7 kHz, respectively, should be subtracted, which we did not explicitly state in the article. The energy differences $\Delta E_{50f, GK}$ and $\Delta E_{70f, GK}$ between the $GK^1\Sigma_g^+(v=0, N=2)$ and the $n=50$ and $70f$ ($N=3, S=0$) Rydberg states are therefore

$$\Delta E_{50f, GK} = h \times 380\,132\,832.077(0.035)_{\text{stat}}(0.054)_{\text{sys}} \text{ MHz}, \quad (1)$$

and

$$\Delta E_{70f, GK} = h \times 380\,777\,344.85(0.07)_{\text{stat}}(0.18)_{\text{sys}} \text{ MHz}, \quad (2)$$

respectively, and these values, rather than the transition frequencies, should be used for comparison with the results of calculations of these energy intervals.

In this article, we also made a comparison with precision measurements of the frequencies of the transitions from the ground state of Cs and Rydberg states belonging to a series converging to the ground state of Cs^+ . To convert these frequencies into energy intervals, the photon-recoil shift of 14.8 kHz should be subtracted. Consequently, the ionization energy of Cs reported in Ref. [1] must be corrected by -14.8 kHz (or $-4.94 \times 10^{-7} \text{ cm}^{-1}$, which is less than the experimental uncertainty in this case) to

$$E_I(\text{Cs}) = hc \times 31\,406.467\,732\,0(14) \text{ cm}^{-1}. \quad (3)$$

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[1] J. Deiglmayr, H. Herburger, H. Saßmannshausen, P. Jansen, H. Schmutz, and F. Merkt, Precision measurement of the ionization energy of Cs I, *Phys. Rev. A* **93**, 013424 (2016).