Errata

Erratum: Theoretical hyperfine structure of muonic helium [Phys. Rev. A 20, 706 (1979)]

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Inadvertently, some of the revisions we wished to be made in the galley proofs were not made in the published paper. These revisions are given below.

(i) The first two sentences in Sec. I should read:

The need for an accurate calculation of the hyperfine structure[1-4] of the recently observed muonic helium atom[5] ($\alpha^{++}\mu^-e^-$) has been accentuated by a recent precise measurement.[6] The comparison of the theoretical and experimental values of the hyperfine structure interval $\Delta\nu$ can test the atomic structure calculation of this basic atom and also can yield precise values of the magnetic moment and mass of the negative muon, which can in turn be compared with more accurately known values for the positive muon as a test of CPT invariance.

(ii) The last two sentences in the second paragraph of Sec. I should read:

Apart from the usual reduced-mass correction, the principal differences between $\Delta\nu$ for $\alpha^{++}\mu^-e^-$ and for μ^+e^- are due to the structure of the pseudonucleus $(\alpha\mu)^+$ and to the penetration of the electron inside this pseudonucleus. The correction is of relative order m_e/m_μ and is analogous to the hyperfine structure anomaly first observed for deuterium,[10] where the electron penetrates inside the distribution of magnetism in the deuteron.

(iii) The third sentence after Eq. (2.3) should be replaced by the following:

The uncertainty of $(\Delta\nu)_F$ associated with the numerical accuracy of the computation increases, up to about 0.2 MHz, with the number of terms in the trial wave function. Owing to the fact that this sequence of $(\Delta\nu)_F$ oscillates and converges slowly, it is difficult to choose a fitting curve and obtain an extrapolated value.

(iv) The following sentence should be inserted after Eq. (2.4):

Higher-order polynomial fits were found to give extrapolated values consistent with the above value.

(v) The last sentence of Sec. III should read:

The second correction term $-\frac{1}{3}(Z_2\alpha)^2$ gives the contribution due to the muon, similar to the relativistic correction to the Zeeman effect.[11]

(vi) The following paragraph should be inserted as the next to last paragraph in the text in Sec. VI:

Recently an experiment[6] done at the Swiss Institute of Nuclear Research (SIN) has reported a value of $\Delta\nu = 4464.9(0.5)$ MHz. This experimental result became known to us during the final stage of our computations. Our theoretical value of $\Delta\nu = 4465.1 \pm 1.0$ MHz is in good agreement with this more accurate experimental value.

(viii) Reference 6 should be replaced by:

K. P. Arnold *et al.*, in Abstracts of the Eighth International Conference on High-Energy Physics and Nuclear Structure, Vancouver, 1979 (unpublished).

(viii) A recent preprint by S. D. Lakdawala and P. J. Mohr entitled "Hyperfine Structure in Muonic Helium" evaluates $\Delta\nu$ by a second-order perturbation calculation, which permits a simple identification of the effect of the structure of the pseudonucleus $\alpha\mu^-$ on the value of $\Delta\nu$.

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Erratum: Gauge invariance and pseudoperturbations [Phys. Rev. A 20, 1553 (1979)]

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(i) On p. 1555, two and three lines above Eq. (3.1), in the definition of the unitary transformation U, ϕ should be upper case Φ as in Eq. (3.1).

(ii) In Eq. (6.3), $\vec{E}_{k,\lambda}$ should read $\vec{e}_{\vec{k},\vec{\lambda}}$.