Erratum: Parity nonconservation in electron recombination of multiply charged ions [Phys. Rev. A 72, 032109 (2005)]

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The phase factor on the right-hand side of Eq. (29) is incorrect. This error propagates to Eqs. (30) and (31) and results in incorrect signs in Eqs. (32) and (38), and affects Figs. 4 and 5. Correct forms of Eqs. (29)–(31) are

$$\frac{\langle 2|V_{\mathrm{C}}|\mathbf{p},\mu;1s_{1/2,-\mu}\rangle}{\langle 1|V_{\mathrm{C}}|\mathbf{p},\mu;1s_{1/2,-\mu}\rangle} = -\,i^{l_2-l_1}e^{i(\delta_2-\delta_1)}(\boldsymbol{\sigma}\cdot\hat{\mathbf{p}})\frac{\left\langle P_2,0\left|V_{\mathrm{C}}\right|\varepsilon,\frac{1}{2},l_2,\mu;1s_{1/2,-\mu}\right\rangle}{\left\langle P_1,0\left|V_{\mathrm{C}}\right|\varepsilon,\frac{1}{2},l_1,\mu;1s_{1/2,-\mu}\right\rangle} \tag{29}$$

$$= -\,i^{l_2-l_1}e^{i(\delta_2-\delta_1)}\eta_{1,2}(\boldsymbol{\sigma}\cdot\hat{\mathbf{p}})\sqrt{\frac{\Gamma_2^{(a)}}{\Gamma_1^{(a)}}}, \tag{30}$$

$$\sigma_1^{\mathrm{PNC}} = -\,2\,\eta_{1,2}(\boldsymbol{\sigma}\cdot\hat{\mathbf{p}})\sigma_1^{\mathrm{PC}}\left(\frac{\Gamma_2^{(a)}}{\Gamma_1^{(a)}}\right)^{1/2}\mathrm{Re}\left\{e^{i(\delta_2-\delta_1)}\frac{i^{l_2-l_1}\langle 1|H^{\mathrm{PNC}}|2\rangle}{E_{1s}+\varepsilon-E_2+\frac{i}{2}\Gamma_2}\right\}. \tag{31}$$

The final expressions (32) and (38) for the PNC cross section and PNC strength of the two resonances should read

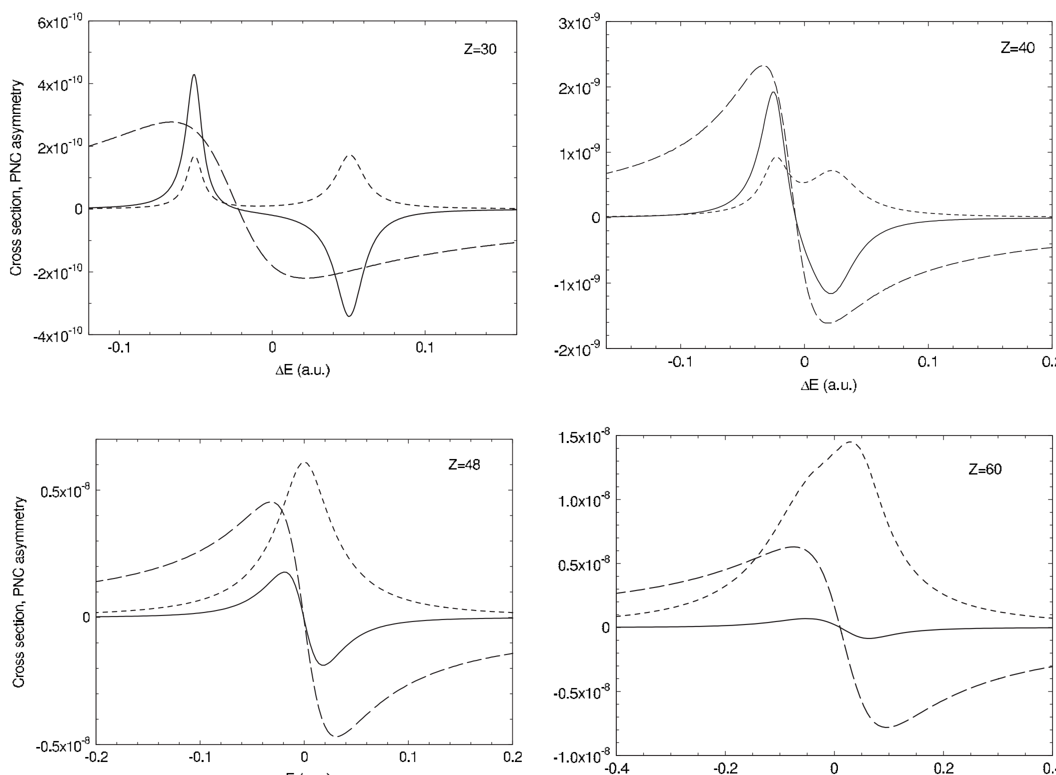

FIG. 1. PC and PNC DR cross sections (in a.u.) and PNC asymmetry for $(2s^2)_0$ and $(2s2p)_0$ resonances in H-like ions. Solid lines correspond to $10^3\,\sigma^{\mathrm{PNC}}|_{\boldsymbol{\sigma}\cdot\hat{\mathbf{p}}=1}$, long-dashed lines are the PNC asymmetry $\mathcal{A}$, and short-dashed lines correspond to $10^{-n}\sigma^{\mathrm{PC}}$, where $n=7,6,5,4$ for $Z=30,40,48,60$.

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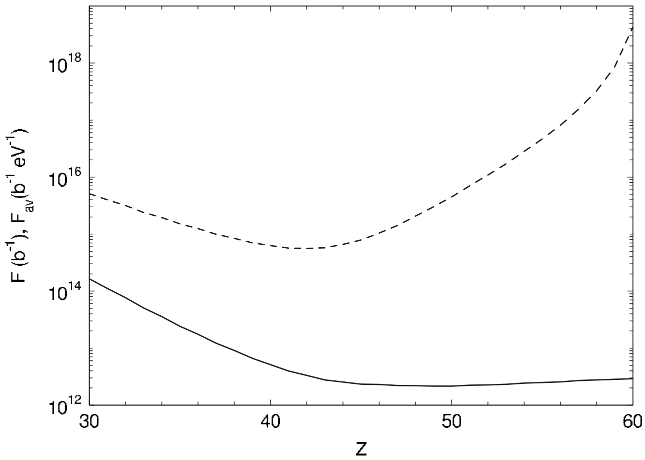

FIG. 2. PNC measurement feasibility function F in b^{-1} (solid line) and F_{av} in $\mathrm{b}^{-1}\,\mathrm{eV}^{-1}$ (dashed line). The minima approximately correspond to the level crossing at $Z \approx 48$.

$$\sigma^{\mathrm{PNC}} = -\frac{\pi(\boldsymbol{\sigma}\cdot\hat{\mathbf{p}})\sqrt{\Gamma_+^{(a)}\Gamma_-^{(a)}}h^{\mathrm{PNC}}}{2p^2\left(\Delta_+^2+\frac{1}{4}\Gamma_+^2\right)\left(\Delta_-^2+\frac{1}{4}\Gamma_-^2\right)}\left[(\Gamma_+^{(r)}\Delta_- + \Gamma_-^{(r)}\Delta_+)\cos\delta_{sp} - \frac{1}{2}(\Gamma_+^{(r)}\Gamma_- - \Gamma_-^{(r)}\Gamma_+)\sin\delta_{sp}\right], \tag{32}$$

$$S_{1,2}^{\mathrm{PNC}} \equiv \int \sigma^{\mathrm{PNC}}\big|_{\boldsymbol{\sigma}\cdot\hat{\mathbf{p}}=1} d\varepsilon = -\frac{\pi^2}{p^2}\frac{\sqrt{\Gamma_+^{(a)}\Gamma_-^{(a)}}h^{\mathrm{PNC}}\left(\frac{\Gamma_+^{(r)}}{\Gamma_+}-\frac{\Gamma_-^{(r)}}{\Gamma_-}\right)}{\left[(E_+-E_-)^2+\frac{1}{4}(\Gamma_++\Gamma_-)^2\right]}\left[(E_+-E_-)\cos\delta_{sp} - \frac{1}{2}(\Gamma_++\Gamma_-)\sin\delta_{sp}\right]. \tag{38}$$

The signs in square brackets in Eq. (32) here are opposite to those in Eq. (32) of the original paper, and Eq. (38) here differs from Eq. (38) of the original paper by the sign in the numerator and the sign before the second term in square brackets. The original Fig. 4 is replaced by Fig. 1.

When using the correct form of σ^{PNC}, Eq. (32), we see that the contributions of the two resonances have opposite signs. The PNC asymmetry $\mathcal{A} \equiv \frac{\sigma^+-\sigma^-}{\sigma^++\sigma^-}$ now changes sign between the resonances for all ions ($\sigma^{\pm}$ are the cross sections for positive and negative helicity of the electron beam). As a result, the energy-averaged PNC effect is strongly suppressed at large Z. This effect is manifested by the factor $(\Gamma_+^{(r)}/\Gamma_+ - \Gamma_-^{(r)}/\Gamma_-)$ in Eq. (38), which decreases with Z, as $\Gamma_{\pm}^{(r)}/\Gamma_{\pm} \to 1$.

Correct plots of the feasibility functions F and F_{av} (original Fig. 5) are shown in Fig. 2.

The feasibility functions F and F_{av} correspond to measurements with a monoenergetic and broad beams, respectively, with smaller values being favorable. The function F in Fig. 2 is less steep than in Fig. 5 of the paper. Consequently, the feasibility of a PNC experiment with a monoenergetic beam is slightly higher for ions with $Z < 40$ and a little lower for $Z > 43$ than was predicted in the paper. The feasibility of a PNC measurement with a broad energy beam is now significantly worse for all ions. This is a consequence of the cancellation of the two contributions mentioned above.

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