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# Erratum: Electromagnetic corrections to baryon masses [Phys. Rev. D 71, 073015 (2005)]

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During subsequent work, we have found errors in several equations and a table given in this paper. The corrections are given below.

(i) An overall factor $\frac{1}{2}$ is missing on the right-hand side of Eq. (4.13) defining $\mathcal{I}_{2,l}$.

(ii) There is an extra term $-12(\mathcal{I}_{1,\pi} - \mathcal{I}_{1,K})$ in the coefficient of $\Gamma_{13}$ in the second row of Eq. (4.16).

(iii) There is an extra factor $4\pi$ in the coefficient of $I_{\mu\mu}$ in Eq. (3.30) and beyond.

(iv) The coupling $1/f$ should be replaced with $\beta/f$ throughout the paper.

(v) The coefficient of $I_{2,l}$ in Eq. (3.7) is too small by a factor of 4.

(vi) The following term should be added to the right-hand side of Eq. (4.21):

$$\mathrm{Tr}\,(\mu)[2I_\pi(\mu_{i'i}\mathbb{1}_{j'j} + \mathbb{1}_{i'i}\mu_{j'j}) - 2(I_\pi - I_K)(\mu_{i'i}M^s_{j'j} + M^s_{i'i}\mu_{j'j})].$$

(vii) The coefficient of the term $\mathrm{Tr}M^sQ[\mu_a\sum_i Q_i + \mu_b\sum_i (QM^s)_i]$ in the last line of Eq. (4.22) and again on the left-hand side of Eq. (4.23) should be replaced by $-\frac{4}{3}(\mu_a + \mu_b)(I_{9,\pi} - I_{9,K}) + \frac{2}{3}\mu_b I_{9,\pi}$.

(viii) The coefficient of $\sum_i M^d_i$ on the right-hand side of Eq. (4.23) should be replaced by $-\frac{4}{9}\mu_a(\mu_a + \mu_b)(I_{9,\pi} - I_{9,K}) + \frac{2}{9}\mu_a\mu_b I_{9,\pi}$.

(ix) After the corrections above are taken into account, Eq. (4.24) should read

$$\mathcal{H}_{\mathrm{moment}} = -I_{\mu\mu}(\mu_a^2\Gamma_5 + 2\mu_a\mu_b\Gamma_{14}) + \mathcal{H}'_9 + \mathcal{H}'_{10} + \frac{2}{9}[\mu_a(9\mu_a + \mu_b)I_{9,\pi} - 2\mu_a(\mu_a + \mu_b)(I_{9,\pi} - I_{9,K})]\sum_i M^d_i.$$

(x) The contributions of $\Gamma_{10}, \Gamma_{11}, \Gamma_{13}$, and $\Gamma_{14}$ to the baryon mass splittings were given incorrectly in Table I. The correct version of the table is presented here in the revised Table I.

As corrected, the contributions of the $\Gamma$'s satisfy the relations

$$\Gamma_{10} = -\Gamma_{13}, \qquad \Gamma_{11} = -\Gamma_{14}, \qquad \Gamma_2 = -\frac{1}{3}\sum_i M^d_i + \frac{1}{2}(\Gamma_4 - \Gamma_5)$$

as can be seen from the table. The extra relation $\Gamma_{11} = \Gamma_{10}$ (or $\Gamma_{14} = \Gamma_{13}$) given before is incorrect, but the corrected relation,

$$\Gamma_{11} = \Gamma_{10} + \tfrac{1}{2}(\Gamma_4 - \Gamma_5),$$

still allows us to reduce the contributions of all the $\Gamma$'s in the corrected Table I to our standard form for the mass-difference operator,

$$\mathcal{H}_{\mathrm{em}} = a\sum_i M^d_i + b\Gamma_4 + c\Gamma_5 + c\Gamma_{13}.$$

TABLE I. Table of the contributions of the operators $\Gamma_i$ to the mass splittings within baryon multiplets. The one- and two-body operators that are not listed either give contributions that can be absorbed in the input mass parameters ($\Gamma_1, \Gamma_7, \Gamma_8$) or are identical for the baryon octet and decuplet to others on the list ($\Gamma_{20} \equiv \Gamma_{19}$, $\Gamma_{26} \equiv \Gamma_{25}$).

| | $\sum_i M^d_i$ | $\Gamma_2$ | $\Gamma_4$ | $\Gamma_5$ | $\Gamma_{10}$ | $\Gamma_{11}$ | $\Gamma_{13}$ | $\Gamma_{14}$ | $\Gamma_{19}$ | $\Gamma_{25}$ |
|---|---|---|---|---|---|---|---|---|---|---|
| $n - p$ | 1 | −1/3 | −1/3 | −1/3 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Sigma^- - \Sigma^0$ | 1 | 1/6 | 2/3 | −1/3 | −1/6 | 1/3 | 1/6 | −1/3 | 0 | 0 |
| $\Sigma^0 - \Sigma^+$ | 1 | 1/6 | −1/3 | −4/3 | −1/6 | 1/3 | 1/6 | −1/3 | 0 | 0 |
| $\Xi^- - \Xi^0$ | 1 | 2/3 | 2/3 | −4/3 | −1/3 | 2/3 | 1/3 | −2/3 | 0 | 0 |
| $\Delta^- - \Delta^0$ | 1 | −1/3 | 2/3 | 2/3 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Delta^0 - \Delta^+$ | 1 | −1/3 | −1/3 | −1/3 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Delta^+ - \Delta^{++}$ | 1 | −1/3 | −4/3 | −4/3 | 0 | 0 | 0 | 0 | 0 | 0 |
| $\Sigma^{*-} - \Sigma^{*0}$ | 1 | −1/3 | 2/3 | 2/3 | −1/6 | −1/6 | 1/6 | 1/6 | 0 | 0 |
| $\Sigma^{*0} - \Sigma^{*+}$ | 1 | −1/3 | −1/3 | −1/3 | −1/6 | −1/6 | 1/6 | 1/6 | 0 | 0 |
| $\Xi^{*-} - \Xi^{*0}$ | 1 | −1/3 | 2/3 | 2/3 | −1/3 | −1/3 | 1/3 | 1/3 | 0 | 0 |

 