Published for SISSA by Springer

Received: April 30, 2015
Accepted: April 30, 2015
Published: May 18, 2015

Erratum: Nuclear electric dipole moments in chiral effective field theory

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Erratum to: JHEP03(2015)104

ArXiv ePrint: 1411.5804

As first observed in ref. [1], the usual weight factors of the neutron (d_n) and proton (d_p) single-nucleon contribution to the electric dipole moment of the deuteron are lacking a small wave-function-dependent term resulting from the subleading $^3D_1$ component of the deuteron wave function. A simple calculation reveals that the total single-nucleon contribution is

$$d_{^2\mathrm{H,single}} = \left(1 - \frac{3}{2}\,P_D\right)(d_n + d_p)\,,$$

where P_D is the probability of the deuteron $^3D_1$-state, which of course depends on the choice of the wave function.

Therefore the values 1.00 of the d_n and d_p weight factors have to be modified in the following places of our paper [2]:

(i) in the first two rows of table 1, see the enclosed table 1′,

doi:10.1007/JHEP05(2015)083

label	N^{2}LO χEFT	Av_{18}	CD-Bonn	units
d_n	0.939 ± 0.009	0.914	0.927	d_n
d_p	0.939 ± 0.009	0.914	0.927	d_p
g_1	-0.183 ± 0.017	-0.186	-0.186	$g_1\, e$ fm
$\Delta\, f_{g_1}$	0.748 ± 0.138	0.703	0.719	$\Delta\, e$ fm

Table 1′. The new entries of table 1. Captions as in table 1. Note that the new d_n and d_p weight factors displayed for the Av_{18} potential exactly agree with the ones of ref. [1].

(ii) in the first bracket on the right-hand side of eq. (3.2),

$$d_{^2\mathrm{H}} = (0.939 \pm 0.009)(d_n + d_p) - \big[(0.183 \pm 0.017)\, g_1 - (0.748 \pm 0.138)\,\Delta\big]\, e\ \mathrm{fm}\,, \quad (3.2')$$

(iii) implicitly in the first bracket of eq. (4.9),

$$d^{\theta}_{^2\mathrm{H}} = \bar\theta \cdot \Big\{\big[(0.56 \pm 0.01 \pm 1.59)\big] - (0.62 \pm 0.06 \pm 0.28) - (0.28 \pm 0.05 \pm 0.07)\Big\} \cdot 10^{-16}\, e\,\mathrm{cm}\,, \quad (4.9')$$

such that "(0.6±1.7)" is replaced by "(0.56±0.01±1.59)", where the first uncertainty is the nuclear one, while the second is the hadronic one,

(iv) explicitly on the left-hand side of eq. (4.10),

$$d^{\theta}_{^2\mathrm{H}} - 0.94(d^{\theta}_p + d^{\theta}_n) = -\bar\theta \cdot (0.89 \pm 0.30) \cdot 10^{-16}\, e\,\mathrm{cm}\ , \quad (4.10')$$

(v) and on the left-hand side of eq. (5.5),

$$\begin{aligned} d^{LR}_{^2\mathrm{H}} - 0.94(d^{LR}_p + d^{LR}_n) &= \Delta^{LR}\, \big[(1.37 \pm 0.13 \pm 0.41) + (0.75 \pm 0.14) \pm 0.1\big]\ e\ \mathrm{fm} \\ &= \Delta^{LR}\, (2.1 \pm 0.5)\, e\ \mathrm{fm}\ . \end{aligned} \quad (5.5')$$

In the latter two cases the uncertainty of the single-nucleon contributions can safely be neglected.

References

[1] N. Yamanaka and E. Hiyama, *Enhancement of the CP-odd effect in the nuclear electric dipole moment of ^{6}Li*, arXiv:1503.04446 [INSPIRE].

[2] J. Bsaisou et al., *Nuclear electric dipole moments in chiral effective field theory*, *JHEP* **03** (2015) 104 [arXiv:1411.5804] [INSPIRE].