Erratum: Calculation of the pion-photon transition form factor using dispersion relations and renormalization-group summation [Phys. Rev. D 98, 096017 (2018)]

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The graphics shown in the right panels of Figs. 1 and 2 of the journal version are the result of an erroneous computer code. The corresponding corrected curves are displayed here in Fig. 1.

Analogously, also the predictions shown in Fig. 3 in the journal are wrong. The correct contribution to the transition form factor (TFF), comprising the twist-two and twist-four terms, is shown as a dashed line in Fig. 2 below.

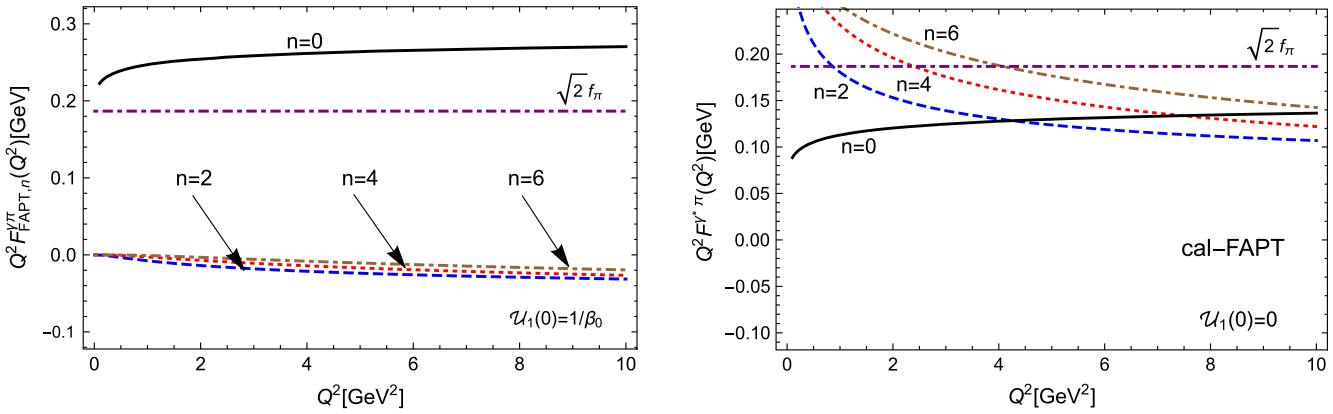

FIG. 1. Corrected graphical results of the right panels of Figs. 1 (left) and 2 (right) of the journal version. The curves in the left panel were calculated with the modified FAPT scheme, $Q^2F^{\gamma\pi}_{\mathrm{FAPT},n}(Q^2)$, according to Eq. (22) for $\mathfrak{A}_1^{(1)}(0) = 1/\beta_0$ from (20b), and with $m^2 = 4m_\pi^2 \approx 0.08$ GeV^2 from Eq. (20a) for the higher harmonics. Those in the right panel follow from Eq. (22) in cal-FAPT with $\mathfrak{A}_\nu(0) = \mathcal{A}_\nu(0) = 0$ according to Eq. (20b).

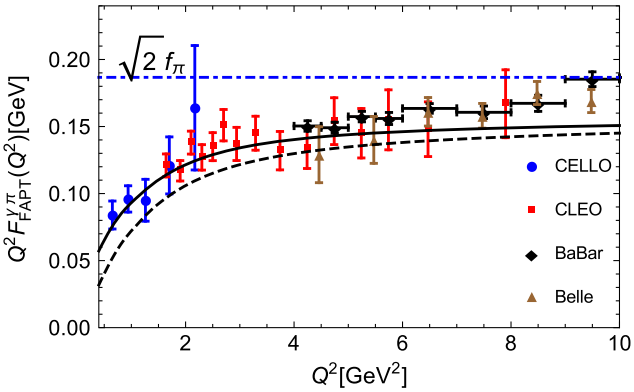

FIG. 2. Theoretical prediction from Eq. (38) for the scaled $\gamma^*\gamma\pi^0$ transition form factor $Q^2F^{\gamma\pi}_{\mathrm{FAPT}}(Q^2)$ using the BMS DA [1]—dashed line—shown in comparison with various experimental data up to 10 GeV^2 with labels as indicated in the figure. The solid line shows the analogous theoretical prediction obtained by including into the TFF the twist-six contribution.

As one sees, fractional analytic perturbation theory (FAPT) resummation of the radiative corrections induces a sizeable suppression of the transition form factor. To get agreement with the experimental data, it is mandatory to include into expression (36) the twist-six contribution. This is done by taking into account the spectral density $\bar{\rho}(Q^2, x)$ for the initial light-cone sum rules in Eq. (28), the corresponding contribution $\bar{\rho}_{\text{tw-6}}$ [2,3], given by

$$\bar{\rho}_{\text{tw-6}}(Q^2, x) = 8\pi \frac{C_F}{N_c} \frac{\alpha_s \langle \bar{q}q \rangle^2}{f_\pi^2} \frac{x}{Q^4} \left[-\left(\frac{1}{1-x} \right)_+ + (2\delta(\bar{x}) - 4x) + (3x + 2x \log x + 2x \log \bar{x}) \right], \tag{1}$$

where $\alpha_s = 0.494$ and $\langle \bar{q}q \rangle^2 = (0.240 \pm 0.01)^6$ GeV^6 [2]. The resulting TFF is shown in the figure in terms of a solid line. Thus, the conclusion drawn in the journal version that one gets agreement with the data by taking into account only the twist-two and twist-four terms has to be corrected accordingly.

The deviations of the results given in Figs. 4 and 5 of the journal version differ from their corrected counterparts by less than about 5 percent and are therefore not shown here.

ACKNOWLEDGMENTS

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