Physics Letters B 771 (2017) 633–634

Contents lists available at ScienceDirect

Physics Letters B

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Corrigendum

Corrigendum to "High-energy limit of quantum electrodynamics beyond Sudakov approximation" [Phys. Lett. B 745 (2015) 69; Corrigendum: Phys. Lett. B 751 (2015) 596]

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ARTICLE INFO

Article history:
Received 23 May 2017
Accepted 24 May 2017
Available online 8 June 2017
Editor: A. Ringwald

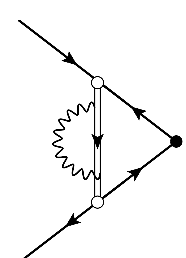
The double logarithmic contribution from the diagram in Fig. 2(e) has been missed. The all-order result in Eq. (6) should be corrected to

$$\begin{aligned} F_1^{(1)} &= -4x^2 \int \phi^a(\eta_2,\xi_1)\phi^b(\eta_1,\xi_2)\phi^c(\eta_1,\xi_1)\phi^c(\xi_2,\eta_2) \\ &\quad \times\phi^d(\eta_1,\xi_1)\phi^d(\xi_2,\eta_2)\phi^d(\eta_2,\xi_1)\phi^d(\xi_1,\eta_2) \\ &\quad \times\phi^e(\eta_1,\eta_2,\xi_1,\xi_2)K(\eta_1,\eta_2,\xi_1,\xi_2)\,\mathrm{d}\eta_1\mathrm{d}\eta_2\mathrm{d}\xi_1\mathrm{d}\xi_2 \\ &= -4x^2\int \exp\left[-x\left(1-2\eta_1\xi_1+4\eta_1\xi_2-2\eta_2\xi_2\right)\right] \\ &\quad \times K(\eta_1,\eta_2,\xi_1,\xi_2)\,\mathrm{d}\eta_1\mathrm{d}\eta_2\mathrm{d}\xi_1\mathrm{d}\xi_2\,, \end{aligned}$$

with the form factors in Eq. (7) given by

$$\begin{aligned} \phi^a(\eta,\xi) &= \exp\left[-x\left(1-2(\eta+\xi)-(\eta-\xi)^2\right)\right], \\ \phi^b(\eta,\xi) &= \exp\left[-2x\eta\xi\right], \\ \phi^c(\eta,\xi) &= \exp\left[x\eta\left(2+\eta-2\xi\right)\right], \\ \phi^d(\eta,\xi) &= \left[\phi^c(\eta,\xi)\right]^{-1}. \end{aligned}$$

$$\phi^e(\eta_i,\eta_j,\xi_i,\xi_j) = \exp\left[2x\left(\eta_i-\eta_j\right)\left(\xi_i-\xi_j\right)\right].$$



(e)

Fig. 2(e). Feynman diagram contributing to the double-logarithmic correction factors ϕ^e.

Table 1
The normalized coefficients of the series (9) up to $n=7$.

n	1	2	3	4	5	6	7
$(-1)^n n! c_n$	$\frac{4}{5}$	$\frac{137}{210}$	$\frac{341}{630}$	$\frac{23704}{51975}$	$\frac{10529}{27027}$	$\frac{96553}{286650}$	$\frac{1352489}{4594590}$

This changes the coefficients of the series (9). The corrected coefficients are listed in a new Table 1. This also changes the asymptotic behavior of the form factor. The corrected numerical result for the function $f(x)$ is given in a new Fig. 3 below. The function rapidly grows to the maximum value $f(x)=0.881566\ldots$ at $x=2.60904\ldots$ corresponding to

$$F_1^{(1)} = -0.293855\ldots \tag{1}$$

and then decays monotonically. For large $x \gg 1$ the asymptotic behavior of the function is exponential $f(x)\sim e^{-\frac{x}{2}+2\ln x}$ and the double logarithmic result is not a valid approximation anymore. The main conclusions of the paper are unchanged.

DOI of original article: http://dx.doi.org/10.1016/j.physletb.2015.10.035.

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http://dx.doi.org/10.1016/j.physletb.2017.05.069
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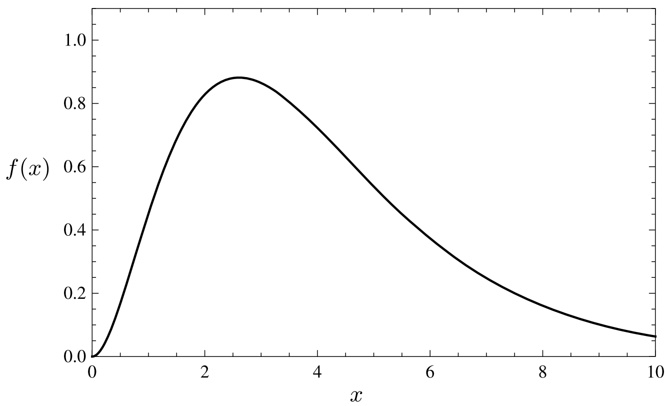

Fig. 3. The result of the numerical evaluation of the function $f(x) = -3F_1^{(1)}$.