Erratum: The three-loop polarized singlet anomalous dimensions from off-shell operator matrix elements

J. Blümlein [ID],[a] **P. Marquard** [ID],[a] **C. Schneider** [ID][b] **and K. Schönwald** [ID][c]

[a] *Deutsches Elektronen-Synchrotron DESY,*
   Platanenallee 6, 15738 Zeuthen, Germany

[b] *Johannes Kepler University Linz,*
   Research Institute for Symbolic Computation (RISC), Altenberger Straße 69, A-4040 Linz, Austria

[c] *Institut für Theoretische Teilchenphysik,*
   Karlsruher Institut für Technologie (KIT), D-76128 Karlsruhe, Germany

   E-mail: johannes.bluemlein@desy.de, peter.marquard@desy.de,
   cschneid@risc.jku.at, kay.schoenwald@kit.edu

The anomalous dimension $\Delta\gamma_{\rm NS}^{(2),\rm s}$ has been obtained with a wrong projection on the structure function g_5 from the forward Compton amplitude before as outlined in refs. [1, 2]. In ref. [2] it was also calculated by two additional methods.

Eqs. (3.4)–(3.6) shall read

$$\Delta\gamma_{\rm NS}^{(2),\rm s} = 4\frac{1+(-1)^N}{2}N_F\frac{d_{abc}d^{abc}}{N_c}\left\{\frac{S_1 P_1}{N^4(1+N)^4} + \left[-\frac{2(1+N+N^2)(2+N+N^2)}{N^3(1+N)^3}\right.\right.$$
$$\left.\left. - \frac{4(-1+N)(2+N)S_1}{N^2(1+N)^2}\right]S_{-2} + \frac{(2+N+N^2)}{N^2(1+N)^2}[2S_{-3}-4S_{-2,1}-S_3]\right\}, \tag{3.4}$$

$$P_1 = -3N^6 - 9N^5 - 5N^4 + 5N^3 + 19N^2 + 15N + 6, \tag{3.5}$$

$$\Delta P_{\rm NS}^{(2),\rm s} = -N_F\frac{d_{abc}d^{abc}}{N_c}\left\{(1+x)\left(-76{\rm H}_{0,1} - 56{\rm H}_{-1,0} - 56{\rm H}_{-1,0,0} - 32{\rm H}_{-1,0,1} + 80{\rm H}_{-1,-1,0}\right.\right.$$
$$\left. - 24{\rm H}_{0,0,0,1} + 8{\rm H}_{0,1,0,0}\right) - (1-x)\left(164{\rm H}_1 - 12{\rm H}_{1,0,0} + 16{\rm H}_{0,0,-1,0} + 16{\rm H}_{0,-1,0,0}\right.$$
$$\left. - 32{\rm H}_{0,-1,-1,0}\right) + 164x{\rm H}_0 - 20x{\rm H}_{0,0} + 56x{\rm H}_{0,0,0} + 4(-9+17x){\rm H}_{0,0,1} - 8(3+7x)$$
$$\times {\rm H}_{0,-1,0} - 16x{\rm H}_{0,0,0,0} + \left[4(19+5x) + (1+x)\left(72{\rm H}_{-1} + 16{\rm H}_{0,1}\right) - (1-x)\right.$$
$$\times \left(-40{\rm H}_1 - 16{\rm H}_{0,-1}\right) - 4(-9+31x){\rm H}_0 + 8(3+5x){\rm H}_{0,0}\right]\zeta_2 - 4(5+3x)\zeta_2^2$$
$$\left. + \left[-128x + 32x{\rm H}_0\right]\zeta_3\right\}, \tag{3.6}$$

with $d_{abc}d^{abc} = 40/3, N_c = 3$ and N_F the number of light flavors. In the small-x limit one obtains

$$\Delta P_{\mathrm{NS}}^{(2),\mathrm{s}}(x) \propto N_F \frac{d_{abc}d^{abc}}{N_c} \zeta_2 \big[20\zeta_2 + 4\big(-19 - 9\ln(x) - 3\ln^2(x)\big)\big].$$

Data Availability Statement. This article has no associated data or the data will not be deposited.

Code Availability Statement. This article has no associated code or the code will not be deposited.

References

[1] L. Bonino et al., *Polarized Neutral and Charged Current Semi-Inclusive Deep-Inelastic Scattering at NNLO in QCD*, arXiv:2510.00100 [INSPIRE].

[2] A. Behring et al., *The heavy quark-antiquark asymmetry in the variable flavor number scheme*, arXiv:2512.13508 [INSPIRE].