Erratum: Direct Photon Production at Next-to-Next-to-Leading Order **[Phys. Rev. Lett. 118, 222001 (2017)]**

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Since the original publication [1], a systematic study of the above-cut contribution to the previously presented NNLO cross sections has been performed. This revealed a small bug in the numerical code used to perform the calculation, resulting from small errors in the cancellation of real-emission singularities in subleading partonic channels. In addition, the implementation of the jetiness cut in this erratum has been changed from

$$\tau_1 > \tau_1^{\text{cut}}, \quad (1)$$

where τ_1^{cut} is a constant, to

$$\tau_1 > \delta \times p_T^\gamma, \quad (2)$$

such that the cut scales with the transverse momentum of the photon. With this setup the overall performance of the code is improved by taking advantage of the fact that kinematic configurations with a harder photon are subject to smaller power corrections.

The updated version of Figs. 2 and 3 of the original publication are shown in Figs. 1 and 2 here. In order to retain a correspondence with the original versions of these figures, the values of δ are converted to a physical scale via, $\tau_{1,a}^{\text{cut}} = \delta \times p_T^{\gamma,\text{cut}}$. The results shown in Fig. 1 (for $p_T^\gamma > 150$ GeV) demonstrate that the asymptotic correction for $\tau_{1,a}^{\text{cut}} \rightarrow 0$ is not significantly different to the original one. In Fig. 2, showing the cut dependence in the range $65 < p_T^\gamma < 150$ GeV, we observe that the asymptotic value is approximately twice the result that was originally reported.

FIG. 1. Results corresponding to Fig. 2 of the original Letter, Ref. [1].

FIG. 2. Results corresponding to Fig. 3 of the original Letter, Ref. [1].

FIG. 3. Results corresponding to the lower two panels of Fig. 4 of the original Letter, Ref. [1]. The upper panel presents scale variation only, the lower panel combines the scale variation with the pdf uncertainty.

FIG. 4. Results corresponding to Fig. 5 of the original Letter, Ref. [1].

We now update the results for the photon transverse momentum spectrum presented originally in Figs. 4 and 5. Based on the results indicated above, for this we choose $\delta = 1 \times 10^{-3}$ for the region $65 < p_T^\gamma < 150$ GeV, i.e., $\tau_{1,a}^{\text{cut}} = 0.065$ GeV and $\delta = 2 \times 10^{-3}$ for $p_T^\gamma > 150$ GeV, i.e., $\tau_{1,a}^{\text{cut}} = 0.3$ GeV. The updated results corresponding to Figs. 4 and 5 of the original publication are shown in Figs. 3 and 4. The impact of the corrections is visible in the region $65 < p_T^\gamma < 150$ GeV, where the higher NNLO correction brings the theoretical prediction slightly closer to the central value of the experimental result.

The corrected results shown here are in agreement with a second calculation of this process presented in Ref. [2].

[1] J. M. Campbell, R. K. Ellis, and C. Williams, *Phys. Rev. Lett.* **118**, 222001 (2017).

[2] X. Chen, T. Gehrmann, N. Glover, M. Höfer, and A. Huss, *J. High Energy Phys.* **04** (2020) 166.