Erratum: The LPM effect in sequential bremsstrahlung

Peter Arnold\textsuperscript{a} and Shahin Iqbal\textsuperscript{a,b}

\textsuperscript{a}Department of Physics, University of Virginia, 382 McCormick Road, Charlottesville, Virginia 22904-4714, U.S.A.

\textsuperscript{b}National Centre for Physics, Quaid-i-Azam University Campus, Islamabad, 45320 Pakistan

E-mail: parnold@virginia.edu, smi6nd@virginia.edu

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The denominator $X_y (X_y X_y - X_y^2)$ on the far right-hand side of (5.44d) should be $X_y (X_y X_y - X_y^2)$. Analogously, the denominator $X_y (X_y X_y - X_y^2)$ on the far right-hand side of (5.44e) should be $X_y (X_y X_y - X_y^2)$. These errors propagate to the following corrections to the rest of the paper and significantly change the infrared behavior of the result.

The behavior $\alpha_s^2 / x^2 y^{3/2}$ shown on the right-hand side of (1.7) and (9.11) should instead be $\alpha_s^2 \ln(y) / x y^{3/2}$. But both here and in (1.6), it would be more precise and informative to write $\ln(y/x)$ instead of $\ln(y)$.

The $x_{\text{min}}^{-5/2}$ in the text following (9.11) then becomes $x_{\text{min}}^{-1/2} \ln^2 x_{\text{min}}$, and so this divergence is almost as mild as the single-splitting divergence mentioned in the next sentence of the text.

There is another error in the paper concerning the calculation of the pole terms in section 7. Section 7 successfully calculates a subset of the pole contributions associated with $\Delta t = 0$ but misses others. This error requires a lengthy analysis to explain and correct, which may be found in ref. [41] below.

The effects of the above correction to (5.44) and the correction [41] to the pole terms are that the number $10.437054610798$ in footnote 35 should be $-10.892657927744$, the corresponding statement in the main text that $[d\Gamma/dx dy]_{\text{crossed}}$ is positive for $(x, y) = (0.3, 0.6)$ is no longer true, and figure 27 and its caption should be replaced by those below.

There are some purely typographic errors. In eqs. (5.7), (5.8) and (5.9a), all occurrences of $B_1$ in those equations should be replaced by $B'$. Eq. (6.10) should include a factor of $E$ on the right-hand side. The $\Omega_\pm$ appearing on the right-hand side of (E.9) should be $\Omega_\pm$. 

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Our numerical results (solid line) for the total crossed diagram contribution to $d\Gamma/dx\,dy$ [in units of $C_\Lambda^2\alpha_s^2\sqrt{q_\Lambda/E}$] vs. $y$ for fixed $x = 10^{-4}$. The $d\Gamma \propto y^{-3/2}\ln(y/x)$ dashed line shows the $y^{-3/2}\ln(y/x)$ behavior of the $y \ll x \ll 1$ power law quoted in (9.11). The $d\Gamma \propto y^{-1}\ln(x/y)$ dashed line shows the $x^{-1}\ln(y/x)$ behavior of the same power law if one switches the labels $x$ and $y$. We have only shown results for $y \leq 0.5$; results for $y > 0.5$ are given by the permutation symmetry $y \leftrightarrow z = 1 - x - y$ of the problem.

Finally, an embarrassingly misleading choice of notation was made in section 2.2, starting in (2.16). The $d^2\Gamma_{el}/d^2b_\perp$ defined in (2.17) is not a “differential rate with respect to impact parameter” and should not have been called that, and the notation $d^2\Gamma_{el}/d^2b_\perp$ should not have been used. A better notation is to replace $d^2\Gamma_{el}/d^2b_\perp$ and $d^2\Gamma_{el}/d^2q_\perp$ by simply $\Gamma_{el}$ and $\Gamma_{el}(b, t)$ throughout this section. In the new notation, $\Gamma_{el}(0, t)$ is the rate of elastic scattering from the medium, and $\Gamma_{el}(b, t)$ is the Fourier transform of the differential rate $d^2\Gamma_{el}/d^2q_\perp$ with respect to transverse momentum transfer $q_\perp$.

[41] P. Arnold, H.C. Chang and S. Iqbal, *The LPM effect in sequential bremsstrahlung: dimensional regularization*, arXiv:1606.08853 [hep-ph].

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