

Erratum: Two-Loop Four-Graviton Scattering Amplitudes [Phys. Rev. Lett. **124**, 211601 (2020)]

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The Letter presents the two-loop four graviton scattering amplitudes. This is done by computing the two-loop remainder, which is determined from the bare one- and two-loop amplitudes of Einstein-Hilbert gravity, and the counterterm tree and one-loop amplitudes [see Eq. (7)]. All these ingredients were obtained for generic state-counting and dimensional regularization parameters, D_s and D , respectively. When assembling the remainders we used the 't Hooft-Veltman scheme $D_s = D = 4 - 2\epsilon$ for all input, apart from the one-loop amplitudes $\mathcal{M}_h^{(1)}$. In the latter, a typographical error was made in determining the dependence on D_s , which effectively amounted to setting $D_s = 4 + 4\epsilon$ and $D = 4 - 2\epsilon$.

This error propagated into our determination of the two-loop remainder, and thus Eq. (15) does not correspond to the remainder in the 't Hooft-Veltman scheme as stated in the text. Instead, the corrected 't Hooft-Veltman scheme remainder in the Regge limit reads

$$\mathcal{R}_{\{-,-,+,+\}}^{(2)} = s^3 \left\{ 2 \frac{s}{t} \pi^2 \left(\frac{i\pi}{2} - L \right)^2 - 3\pi^2 L^2 + \frac{107}{10} \pi^2 L + \frac{14\,191}{1350} \pi^2 - \frac{158}{45} \pi^4 - \frac{13\,049}{2160} \right. \\ \left. + i\pi \left[-\frac{14}{3} L^3 + \frac{87}{10} L^2 - \left(8\pi^2 - \frac{9437}{225} \right) L - 20\zeta_3 + \frac{2621}{210} \pi^2 - \frac{25\,567}{750} \right] + \mathcal{O}\left(\frac{t}{s}\right) \right\}. \quad (1)$$

The numbers that have changed with respect to Eq. (15) of the published Letter are displayed in bold font. The expressions for the finite remainders given in the Supplemental Material of the Letter were also corrected to give the results in the 't Hooft-Veltman scheme.

Regarding our results for the amplitudes themselves (and not the remainders), we note that the error reported in this Erratum only affects terms proportional to ϵ in the one-loop amplitudes. These had not been determined previously, which explains why this error was not identified when comparing with previous determinations of the one-loop amplitudes. Furthermore, the results we gave for the two-loop amplitudes were correct despite the inconsistent treatment of the one-loop amplitudes. This is because they are obtained by adding the exact same quantity back to the two-loop remainder that had initially been subtracted in the numerical determinations which were used in the analytic reconstruction [see the discussion around Eq. (14)].

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Correction: A reference citing the corrected Supplemental Material of the published Letter was set improperly during the proof cycle and has been removed, along with its citation in text.