Corrigendum: The role of the Riemann–Silberstein vector in classical and quantum theories of electromagnetism

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(1) In the formula (11.9) a factor of 2 is missing on the right-hand side. Moreover, this equation (and also (11.10)) is valid only in the center of the momentum frame, i.e. when the total momentum of the electromagnetic field vanishes. In the general case the corrected formula reads:

\[ \frac{d^2}{d\tau^2} \int d^3r (r - \langle r(t) \rangle)^2 F^*(r, t) \cdot F(r, t) = 2c^2 \int d^3r F^*(r, t) \cdot F(r, t), \]

(1)

where \( \tau \) is the time variable corrected by the relativistic time-dilation factor

\[ \tau = t \sqrt{1 - \langle \dot{r}(t) \rangle^2/c^2}. \]

(2)

We also used here the relation:

\[ \langle \dot{r}(t) \rangle = \frac{c}{i} \oint d^3r F^*(r, t) \times F(r, t). \]

(3)

Subsequently, \( t \) should be replaced by \( \tau \) also in (11.10).

(2) In (3.9) it was assumed that \( c = 1 \). Alternatively, all expressions on the right-hand side should be divided by \( c \).

(3) The factor of \( i \) is missing in front of the sum in (3.11).

(4) The function \( g(r) \) is missing in the last term of (8.23).

(5) The factor of \( i \) should be replaced by a minus sign in (10.3).