Errata for
The Feynman Lectures on Physics Volume II
New Millennium Edition (submitted 6/19/2020)

The errors in this list appear in *The Feynman Lectures on Physics: New Millennium Edition* and earlier editions; errors validated by Caltech will be corrected in future printings of the *New Millennium Edition* or in future editions.

Errors are listed in the order of their appearance in the book. Each listing consists of the errant text followed by a brief description of the error, followed by corrected text.

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II:13-11, par 4

We also know that U and $\boldsymbol{p}$ form a relativistic four-vector. Since ρ and $\boldsymbol{j}$ depend on the velocity $\boldsymbol{v}$ exactly as do U and $\boldsymbol{p}$, we can conclude that ρ and $\boldsymbol{j}$ are also the components of a relativistic four-vector.

ρ and $\boldsymbol{j}$ do *not* "depend on the velocity $\boldsymbol{v}$ as do U and $\boldsymbol{p}$", due to the presence of of c^2 in the expression for U and its absence in the expression for ρ (see unnumbered Eqs. above and below Eq 13.34). Factors of 1/c and c are missing. When $c \neq 1$ the 4-momentum is $(U/c, \boldsymbol{p})$, where U and $\boldsymbol{p}$ are the relativistic energy and momentum, and the 4-current density is $(c\rho, \boldsymbol{j})$.

We also know that $U/c = m_0 c\Big/\sqrt{1-v^2/c^2}$ and $\boldsymbol{p}$ form a relativistic four-vector. Since $c\rho = c\rho_0\Big/\sqrt{1-v^2/c^2}$ and $\boldsymbol{j}$ depend on the velocity $\boldsymbol{v}$ exactly as do U/c and $\boldsymbol{p}$, we can conclude that $c\rho$ and $\boldsymbol{j}$ are also the components of a relativistic four-vector.

II:21-13, par 5

We will soon show that $\boldsymbol{A}$ and ϕ together constitute a four-vector, like the momentum $\boldsymbol{p}$ and the total energy U of a particle.

$(\phi, \boldsymbol{A})$ and $(\rho, \boldsymbol{j})$ are 4-vectors only when $c = 1$. Otherwise, they must be written $(\phi/c, \boldsymbol{A})$ and $(c\rho, \boldsymbol{j})$. (See other correction in this par and correction for II:13-11 par 4, above.)

We will soon show that (when $c = 1$) $\boldsymbol{A}$ and ϕ together constitute a four-vector, like the momentum $\boldsymbol{p}$ and the total energy U of a particle.

II:21-13, par 5

In fact, it is almost apparent from Eqs. (21.4) and (21.5) that $\boldsymbol{A}$ and ϕ are components of a four-vector, because we have already shown in Chapter 13 that $\boldsymbol{j}$ and ρ are the components of a four-vector.

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In fact, it is almost apparent from Eqs. (21.4) and (21.5) that $\boldsymbol{A}$ and ϕ/c are components of a four-vector, because we have already shown in Chapter 13 that $\boldsymbol{j}$ and $c\rho$ are the components of a four-vector.

II:26-11, par 4

We know that the momentum is part of a four-vector p_μ whose time component is the energy $m_0c^2\big/\sqrt{1-v^2/c^2}$. … This fourth component must equal the rate-of-change of the energy, or the rate of doing work, which is $F\cdot v$. We would then like to write the right-hand side of Eq. (26.24) as a four-vector like ($F\cdot v$, F_x , F_y , F_z).

Factors of 1/c missing. When the interval is written (ct,x,y,z) , as it is throughout this section, the 4-momentum is $(E/c,\boldsymbol{p})$ where E and $\boldsymbol{p}$ are the relativistic energy and momentum.

We know that the momentum is part of a four-vector p_μ whose time component is the energy $m_0c^2\big/\sqrt{1-v^2/c^2}$ divided by c. … This fourth component must be related to the rate-of-change of the energy, or the rate of doing work, which is $F\cdot v$. We would then like to write the right-hand side of Eq. (26.24) as a four-vector like ($F\cdot v/c$, F_x , F_y , F_z).

II:26-11, Eq 26.28

$$f_\mu=\left(\frac{F\cdot v}{\sqrt{1-v^2/c^2}},\frac{F}{\sqrt{1-v^2/c^2}}\right) \qquad (26.28)$$

Factor of 1/c missing. (See correction for II:26-11, par 4, above.)

$$f_\mu=\left(\frac{F\cdot v/c}{\sqrt{1-v^2/c^2}},\frac{F}{\sqrt{1-v^2/c^2}}\right) \qquad (26.28)$$

II:26-13, Eq 26.38 and following unnumbered Eqs

$$f_t = q\left(0 + \frac{v_x}{\sqrt{1-v^2/c^2}}E_x + \frac{v_y}{\sqrt{1-v^2/c^2}}E_y + \frac{v_z}{\sqrt{1-v^2/c^2}}E_z\right), \qquad (26.38)$$

or

$$f_t = \frac{q\boldsymbol{v}\cdot\boldsymbol{E}}{\sqrt{1-v^2/c^2}}$$

But from Eq. (26.28), f_t is supposed to be

$$\frac{\boldsymbol{F}\cdot\boldsymbol{v}}{\sqrt{1-v^2/c^2}} = \frac{q(\boldsymbol{E}+\boldsymbol{v}\times\boldsymbol{B})\cdot\boldsymbol{v}}{\sqrt{1-v^2/c^2}}$$

Factors of 1/c missing on the components of $F_{\mu\nu}$ given in Table 26-1 corresponding to components of ***E***. (See footnote on page II:26-13.)

$$f_t = q\left(0 + \frac{v_x}{\sqrt{1-v^2/c^2}}E_x/c + \frac{v_y}{\sqrt{1-v^2/c^2}}E_y/c + \frac{v_z}{\sqrt{1-v^2/c^2}}E_z/c\right), \qquad (26.38)$$

or

$$f_t = \frac{q\boldsymbol{v}\cdot\boldsymbol{E}/c}{\sqrt{1-v^2/c^2}}$$

But from Eq. (26.28), f_t is supposed to be

$$\frac{\boldsymbol{F}\cdot\boldsymbol{v}/c}{\sqrt{1-v^2/c^2}} = \frac{q(\boldsymbol{E}+\boldsymbol{v}\times\boldsymbol{B})\cdot\boldsymbol{v}/c}{\sqrt{1-v^2/c^2}}$$

II:27-11, par 1

It's angular momentum about P is then mvr_B.

Grammatical error (It's vs Its) .

Its angular momentum about P is then mvr_B.

II:28-9, Eq 28.15

$$A_\mu(1,t_1) = \int j_\mu(2,t_2) F(s_{12}^2)\, dV_2 dt_2$$

Since (as shown, for example, in Eq. 28.14) (ct,x,y,z) is used for the 4-interval, $c\,dt$ must be used for the time differential, not simply dt .

$$A_\mu(1,t_1) = \int j_\mu(2,t_2) F(s_{12}^2)\, dV_2\, c dt_2$$

II:28-9, par 1

(The integral must, of course, be over the four-dimensional volume $dt_2 dx_2 dy_2 dz_2$.)

See correction for II:28-9 Eq 28.15 (above).

(The integral must, of course, be over the four-dimensional volume $cdt_2 dx_2 dy_2 dz_2$.)