Errata for
The Feynman Lectures on Physics Volume II
Commemorative Issue

The errors in this list appear in *The Feynman Lectures on Physics: Commemorative Issue* (1989) and earlier editions; these errors have been corrected in *The Feynman Lectures on Physics: Definitive Edition* (2005).

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:1-5, Eq 1.7

$$\text{Circulation of } \mathbf{E} \text{ around C } = \frac{d}{dt}\left(\text{flux of } \mathbf{B} \text{ through S}\right). \qquad (1.7)$$

Wrong sign (see Table 18-1).

$$\text{Circulation of } \mathbf{E} \text{ around C } = -\frac{d}{dt}\left(\text{flux of } \mathbf{B} \text{ through S}\right). \qquad (1.7)$$

II:1-8, par 3

According to Eq. (1.9) the circulation of ***B*** around *C* is given by the current in the wire (times c^2).

Innacurate statement.

According to Eq. (1.9) the circulation of ***B*** around *C* (times c^2) is given by the current in the wire (divided by ε_0).

II:2-10, par 5

$$\nabla T = \nabla_x T + \nabla_y T + \nabla_z T.$$

Incorrect formula for gradient.

$$\nabla T = \mathbf{i}\nabla_x T + \mathbf{j}\nabla_y T + \mathbf{k}\nabla_z T .$$

II:4-10, Eq 4.39

$$E = \frac{1}{4\pi\varepsilon_0}\frac{Q}{r^2}, \qquad (4.39)$$

Typographical error ('*r*' vs. '*R*').

$$E = \frac{1}{4\pi\varepsilon_0}\frac{Q}{R^2}, \qquad (4.39)$$

II:5-9, par 3

The same argument can be used to show that no static distribution of charges *inside* a closed conductor can produce any fields *outside*.

Error in physics.

The same argument can be used to show that no static distribution of charges *inside* a closed grounded conductor can produce any fields *outside*.

II:6-5, par 3

We should then write Eq. (6-17) as

$$\Delta\phi_{+} = -\nabla\phi_0 \cdot \Delta\boldsymbol{r}_{+},$$

Incorrect reference.

We should then write the equation above Eq. (6-17) as

$$\Delta\phi_{+} = -\nabla\phi_0 \cdot \Delta\boldsymbol{r}_{+},$$

II:8-9, par 6

$$\frac{Z_B q_e^2}{4\pi\varepsilon_0 a},$$

Typographical error ('a' vs. 'r') .

$$\frac{Z_B q_e^2}{4\pi\varepsilon_0 r},$$

II:10-7, last par

Any motion of conductors that are embedded in solid dielectric...

Missing word "a".

Any motion of conductors that are embedded in a solid dielectric...

II:13-4, just after Eq. (13.15)

The integral over $\boldsymbol{j}$, according to (13.5), is the total current I through the surface S.

Typographical error ('$\boldsymbol{j}$' vs. 'S')

The integral over S, according to (13.5), is the total current I through the surface S.

II:18-8, Eq. (18.15)

$$\nabla \times \boldsymbol{B} = \frac{j}{\varepsilon_0 c^2}. \qquad (18.15)$$

Typographical error ('***j***' should be bold).

$$\nabla \times \boldsymbol{B} = \frac{\boldsymbol{j}}{\varepsilon_0 c^2}. \qquad (18.15)$$

II:21-1, sidebar

Review: ...

Chapter 36, Vol I, *Relativistic Effects in Radiation*

Incorrect reference.

Review: ...

Chapter 34, Vol I, *Relativistic Effects in Radiation*

II:21-1, para 2

When we studied light we began by writing down an equation for the electric field produced by a charge which moves in an arbitrary way. That equation was

$$\mathbf{E} = \frac{q}{4\pi\varepsilon_0}\left[\frac{\mathbf{e}_{r'}}{r'^2} + \frac{r'}{c}\frac{d}{dt}\left(\frac{\mathbf{e}_{r'}}{r'^2}\right) + \frac{1}{c^2}\frac{d^2}{dt^2}\mathbf{e}_{r'}\right], \qquad (21.1)$$

$$c\mathbf{B} = \mathbf{e}_{r'} \times \mathbf{E}.$$

[See Eq. (28.3), Vol I.]

Clarification needed.

When we studied light we began by writing down equations for the electric and magnetic fields produced by a charge which moves in an arbitrary way. Those equations were

$$\mathbf{E} = \frac{q}{4\pi\varepsilon_0}\left[\frac{\mathbf{e}_{r'}}{r'^2} + \frac{r'}{c}\frac{d}{dt}\left(\frac{\mathbf{e}_{r'}}{r'^2}\right) + \frac{1}{c^2}\frac{d^2}{dt^2}\mathbf{e}_{r'}\right], \qquad (21.1)$$

$$c\mathbf{B} = \mathbf{e}_{r'} \times \mathbf{E}.$$

[See Eqs. (28.3) and (28.4), Vol I. As explained below, the signs here are the negatives of the old ones.]

II:21-1, par 3

In chapters 28 and 36 of Vol. I it was convenient to take **r** (and hence $\boldsymbol{e}_r$) pointing *toward* the source.

Incorrect reference.

In chapters 28 and 34 of Vol. I it was convenient to take **r** (and hence $\boldsymbol{e}_r$) pointing *toward* the source.

II:21-1, Eq 21.1'

$$\mathbf{E} = -\frac{q}{4\pi\varepsilon_0 c^2 r'}\begin{bmatrix}\text{acceleration of the charge at (t - } r'/c\text{)} \\ \text{projected at right angles to } r'\end{bmatrix}, \qquad (21.1')$$

Wrong sign.

$$\mathbf{E} = \frac{q}{4\pi\varepsilon_0 c^2 r'}\begin{bmatrix}\text{acceleration of the charge at (t - } r'/c\text{)} \\ \text{projected at right angles to } r'\end{bmatrix}, \qquad (21.1')$$

II:21-2, par 2

We considered the relativistic effects in only one chapter, chapter 36.

Incorrect reference.

We considered the relativistic effects in only one chapter, chapter 34.

II:21-9, par 3

At any rate, we have now provided the underpinnings of our entire previous discussion of light (excepting some matters discussed in Chapter 36 of Vol. I),

Incorrect reference.

At any rate, we have now provided the underpinnings of our entire previous discussion of light (excepting some matters discussed in Chapter 34 of Vol. I),

II:21-9, par 3

We will discuss next how the fields can be obtained for more rapidly moving charges (leading to the relativistic effects of Chapter 36 of Vol. I).

Incorrect reference.

We will discuss next how the fields can be obtained for more rapidly moving charges (leading to the relativistic effects of Chapter 34 of Vol. I).

II:21-13, par 2

The component of ***v*** in the direction of ***r′*** is $v \times (x\text{-}vt)/r'$

Missing prime on '*t*'.

The component of ***v*** in the direction of ***r′*** is $v \times (x\text{-}vt')/r'$

II:26-1, Fig 26-1

Finding the fields at *P* due to a charge *q* moving along the *x*-axis with constant speed *v*.

The caption does not match the figure.

Finding the fields at (*x,y,z*) due to a charge *q* moving along the *x*-axis with constant speed *v*.

II:26-3, para 3

—which are the components of the displacements $\boldsymbol{r}_P$ from the present position to (*x,y,z*) (see Fig. 26-3).

Typographical errors (incorreect plural, bad subscript on '***r'***).

—which are the components of the displacement ***r*** from the present position to (*x,y,z*) (see Fig. 26-3).

II:26-3, para 4

That means that ***E*** is in *the same direction* as $\boldsymbol{r}_P$, as shown in Fig. 26-3.

Typographical error (bad subscript on '***r'***).

That means that ***E*** is in *the same direction* as ***r***, as shown in Fig. 26-3.

II:26-13 para 2

Looking back in Table 26-1 for the components of $F_{\mu\nu}$ that correspond to E_x, B_z, and B_y, we get

$$f_x = q\left(u_t F_{xt} - u_y F_{xy} - u_z F_{xz}\right),$$

Clarification needed.

Looking back in Table 26-1 for the components of $F_{\mu\nu}$ that correspond to E_x, B_z, and B_y, we get*

$$f_x = q\left(u_t F_{xt} - u_y F_{xy} - u_z F_{xz}\right),$$

---

*When we put the *c*'s back in Table 26-1, all components of $F_{\mu\nu}$ corresponding to components of ***E*** are multiplied by $1/c$.

II:27-11, par 1

$$m = U^2/c$$

Misplaced exponent.

$$m = U/c^2$$

II:28-6, par 2

The first term in the series depends on the acceleration $\ddot{x}$, the next term is proportional to x, and so on."

Dots missing over second '*x*'.

The first term in the series depends on the acceleration $\ddot{x}$, the next term is proportional to $\dddot{x}$, and so on."

II:28-6, Eq. (28.9)

$$F = \alpha \frac{e^2}{ac^2}\ddot{x} - \frac{2}{3}\frac{e^2}{c^3}\dddot{x} + \gamma \frac{e^2 a}{c^4} + \cdots$$

Wrong sign (2nd term).

$$F = \alpha \frac{e^2}{ac^2}\ddot{x} + \frac{2}{3}\frac{e^2}{c^3}\dddot{x} + \gamma \frac{e^2 a}{c^4} + \cdots$$

II:28-7, par 1

The rate at which we do work on an accelerating charge must be equal to the rate of loss of energy per second by radiation.

Inaccurate statement.

The rate at which we do work on an accelerating charge must be equal to the rate of loss of energy by radiation.

II:28-13, Eq 28-17

$$\Box^2\phi - \mu^2\phi = 0 \qquad (28.17)$$

Wrong sign (see definition of $\Box^2$, Table 25-2).

$$-\Box^2\phi - \mu^2\phi = 0 \qquad (28.17)$$

II:28-13, para 2

It’s solution is

Punctuation error

Its solution is

II:28-13, par 4

Relating frequency to energy and wave number to momentum, as we did at the end of chatper 36 of Vol. I,

Incorrect reference.

Relating frequency to energy and wave number to momentum, as we did at the end of chatper 34 of Vol. I,

II:31-10, par 3

Notice, however, that such body forces will be proportional to the *volume* of the little triangle and, therefore, to Δx, Δy, Δz,

Typographical error (commas in product).

Notice, however, that such body forces will be proportional to the *volume* of the little triangle and, therefore, to ΔxΔyΔz,

II:31-10, par 4

The *x*-component S_{xn} of the stress across the plane is equal to ΔF_{xn} divided by the area, which is $\Delta\sqrt{z\Delta x^2 + \Delta y^2}$,

Typographical error.

The *x*-component S_{xn} of the stress across the plane is equal to ΔF_{xn} divided by the area, which is $\Delta z\sqrt{\Delta x^2 + \Delta y^2}$,

II:31-11, par 2

Equation (31.24) says that the tensor S_{ij} relates the force $\boldsymbol{S}_n$ to the unit vector ***n***, just as α_{ij} relates ***P*** to ***E***.

Wrong word, "force" instead of "stress".

Equation (31.24) says that the tensor S_{ij} relates the stress $\boldsymbol{S}_n$ to the unit vector ***n***, just as α_{ij} relates ***P*** to ***E***.

II:32-10, just above Eq. (32.41)

$$j = Nq_e \boldsymbol{v}_{\text{drift}}..$$

Typographical error ('v' should be bold).

$$j = Nq_e v_{\text{drift}}.$$

II:34-11, par 1

$$\langle J \cdot J \rangle_{av} = 3\langle J_z^2 \rangle.$$

Missing 'av' on right-hand side.

$$\langle J \cdot J \rangle_{av} = 3\langle J_z^2 \rangle_{av}.$$

II:36-7, par 3

The field ***B*** in the torus is, from Eq. (36.20), given as a constant times the current *I* in the winding.

Transcription(?) error.

The field ***H*** in the torus is, from Eq. (36.20), given as a constant times the current *I* in the winding.

II:36-13, par 2

$$M = N\mu \tanh\left(\frac{H + \lambda M/\varepsilon_0 c^2}{kT}\right).$$

Missing factor in argument of tanh (see Eqs 36.29, 35.21).

$$M = N\mu \tanh\left(\mu \frac{H + \lambda M/\varepsilon_0 c^2}{kT}\right).$$

II:36-13, par 2

It is, however, an equation that cannot be solved explicitly, so we will do it graphically

Missing period at end of sentence.

It is, however, an equation that cannot be solved explicitly, so we will do it graphically.

II:36-14, par 3

$$T_c = \lambda \frac{N_\mu^2}{k\varepsilon_0 c^2} \; .$$

Typographical error (μ is not a subscript).

$$T_c = \lambda \frac{N\mu^2}{k\varepsilon_0 c^2} \; .$$

II:37-2, footnote

*See Chapter 43.

Incorrect reference. (There are only 42 chapters in Vol II.) The annotated text concerns the exclusion principal, which is introduced in III:4-7.

*See Chapter 4 of Vol III (section 4-7).

II:39-2, par 4

$$u_x = \frac{\theta}{2} y, \qquad u_y = -\frac{\theta}{2} \, .$$

Missing factor 'x' in second equation.

$$u_x = \frac{\theta}{2} y, \qquad u_y = -\frac{\theta}{2} x \, .$$

II:39-11, par 4

Now we can calculate the energy stored in the springs, which is $k^2/2$ times the square of the extension for each spring.

Wrong constant for spring energy.

Now we can calculate the energy stored in the springs, which is k/2 times the square of the extension for each spring.

II:39-12, Table 39-1, Atom 1

Atom	Location x,y		u_y	k
1	0,a	0	0	

Wrong y-coordinate for location of Atom 1.

Atom	Location x,y	u_x	u_y	k
1	0,0	0	0	-

II:40-8, par 2

Therefore, the pressure on every face is almost exactly the same as the static pressure in a fluid at rest - from Eq. (30.14).

Incorrect reference.

Therefore, the pressure on every face is almost exactly the same as the static pressure in a fluid at rest - from Eq. (40.14).

II:40-9, par 4

The curl of the magnetic field is zero if there are no currents and the divergence of the magnetic field is always zero.

Clarification needed.

The curl of the magnetostatic field is zero if there are no currents and the divergence of the magnetic field is always zero.

II:40-10, par 4

The complete equations of hydrodynamics, Eqs. (40.8), (40.9), and (40.10), are not linear, which makes a vast difference.

Incorrect references.

The complete equations of hydrodynamics, Eqs. (40.9), (40.10), and (40.11), are not linear, which makes a vast difference.

II:41-2, par 2

Now $\partial v_x/\partial y$ is the *rate of change* of the shear strain we defined in chapter 38,

Incorrect reference.

Now $\partial v_x/\partial y$ is the *rate of change* of the shear strain we defined in chapter 39,

II:41-3, par 4

We can get the *torque* acting *across a cylindrical surface* at the radius *r* by multipying the shear stress by the moment arm *r* and the area *2πrl.*

Undefined variable *'l'*.

We can get the *torque* acting *across a cylindrical surface* at the radius *r* by multipying the shear stress by the moment arm *r* and the area *2πrl* (where *l* is the length of the cylinder).