Errata for *Matter & Interactions II: Electric & Magnetic Interactions*

Second Edition (Wiley 2007)

How to tell if you have the first or second printing:

Look at the bottom of the copyright page.
If the numbers say 10 9 8 7 6 5 4 3 2 1 this is the first printing.
If the numbers say 10 9 8 7 6 5 4 3 2 it is the second printing.

Significant errors in both first and second printings

472, 13.X.15 answer: 5.76×10^{-15} N

489, 14.X.10: Replace "ball" by "cylinder" (in two places).

517, 14.X.9: The left force arrow should be labeled F_{on+}, and the right force arrow should be labeled F_{on-}.

533: After the stop-and-think question, insert "This ratio is $(1/2)(s/R)$, which is very small if $s \ll R$."

547, 15.P.45: The units of α are $\frac{\mathrm{C} \cdot \mathrm{m}}{\mathrm{N/C}}$.

553, example at bottom of page: $W = -4.4 \times 10^{-8}$ J

554, just before section 16.2: Last sentence should read "...by external forces (assuming that there is no energy transferred into the system due to a temperature difference)."

561: "$\Delta V = V_A - V_B$ indicates a path starting at B and ending at B" should read "...ending at A".

562, 16.X.16: The sentence starting "In Figure 16.18, location A ..." is the real start of exercise 16.X.16, with answers on page 586. The answer to the beginning part on page 562 is 2400 volts.

595, definition of conventional current: Add "In a circuit, conventional current emerges from the positive end of the battery, whereas electrons emerge from the negative end of the battery."

601, bottom of page: Note that the magnetic dipole moment of a thin coil with N turns is $\mu = NIA$.

610, figure in middle of right column: The observation location A should be marked at the right end of the axis running through the solenoid.

638: First title should be "Feedback makes current follow the wire".

647, last stop-and-think question: "...which is approximately equal just to $E_l L_b$ since ..."

655, 18.RQ.42: Middle column of table should be "$<$, $=$, or $>$".

656, 18.P.47: The lengths of the filaments in the long bulb and round bulbs are the same.

747, last line: $0+0+0 = 0$, not $-E$.

758, middle of page: Replace "...since in section ..." by "...since on the previous page ..."

775, 21.P.21, part (d): $E_{\text{fringe}} = \frac{(Q/A)s}{2\epsilon_0 R}$, where s is the gap width and R is the radius of circular plates. Use this information and Gaussian box 4 to determine the approximate amount of charge q on the outer surface of the plate.

782, 22.X.7: "...and is concentric with and encircles a solenoid ..."

791: Second title should be “High-temperature superconductors”.

Significant errors in first printing

509: The section “Observing interactions with dipoles” is a duplicate of the same experiment on the previous page.

618, 17.RQ.38: (c) asks about $1/r^2$; (d) asks about $1/r^3$.

643, Figure 18.42: E_1 should be smaller than E_2, since $E_1 L_1 = E_2 L_2$.

655, 18.RQ.33: m3 should be m^3.

657, 18.P.48: The diagram is wrong; it should be the same as the diagram for 18.RQ.37 on page 655.

720: In the first two lines of equations, there should be space separating the equations for E'_x, E'_y, and E'_z, and separating the equations for B'_x, B'_y, and B'_z.

723: In the two lines of equations near the bottom of the page, there should be space separating the equations for $E'_{\parallel}$ and $B'_{\parallel}$, and separating the equations for $E'_{\perp}$ and $B'_{\perp}$.

737, 20.P.46, end of part (c): Delete “(continued on next page)”.

744, 20.X.5: This answer belongs on the previous page.

765: In the first of Maxwell’s equations, the top of the summation sign (Σ) is cut off.

769: Preceding the line “In such cases we can use the following differential equation ...”, the following paragraph and diagram were omitted:

Here we have a differential equation relating the electric potential at some location to the charge density at that same location. A frequent use of this equation is in determining the electric potential in empty space (where the charge density ρ is zero), near some charged pieces of metal that are maintained at known potentials (a “boundary value” problem, Figure 21.54). If we knew the charge distribution on these pieces of metal, we could calculate the electric potential and electric field anywhere, through superposition. But often we know only the fixed potentials of the pieces of metal, not the charge distribution.

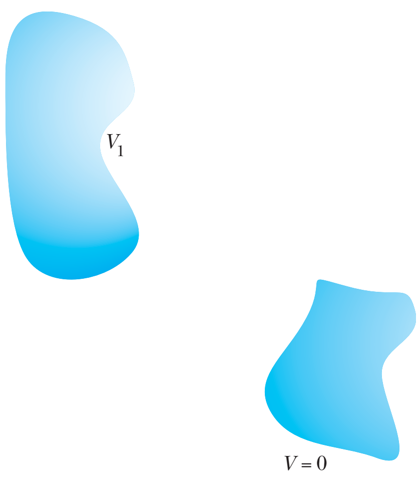

Figure 21.54. A boundary value problem. One piece of metal is maintained at a fixed potential V_1 relative to a potential defined to be $V = 0$ for the other piece. In the empty space Gauss’s law gives a differential equation to be solved for $V(x, y, z)$, $\dfrac{\partial^2 V}{\partial x^2} + \dfrac{\partial^2 V}{\partial y^2} + \dfrac{\partial^2 V}{\partial z^2} = 0$.

772: In Gauss’s law in the left column, in the last two equations in the left column, and in the first equation in the right column, the top of the summation sign (Σ) is cut off.

873, Figure 24.54: Caption should read “With the slits cut out, the net field is due just to the laser and section R.”