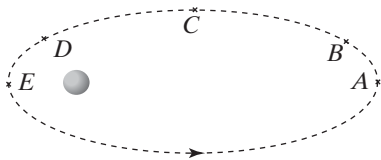


Corrections to the 3rd Edition of *Matter & Interactions*

- p. 11, midpage: Should read $\sqrt{(4\text{m})^2 + (3\text{m})^2 + (2\text{m})^2} = \sqrt{29} \text{ m} = 5.39 \text{ m}$.
- p. 29, Example statement: “a velocity of $(2 \times 10^7) \text{ m/s}$ ” should be “a velocity of $\langle 2 \times 10^7, 1 \times 10^7, -3 \times 10^7 \rangle \text{ m/s}$ ”. Also, in the second line of the solution, c in the denominator should be 3×10^8 .
- p. 31, Example statement: “(ns = nanosecond = $1 \times 10^{-19} \text{ s}$)” should be “(ns = nanosecond = $1 \times 10^{-9} \text{ s}$)”
- p. 43, 1.X.83: (a) What is the vector pointing from the star to the planet? (b) What is the vector pointing from the planet to the star?
- p. 43, 1.X.84: (a) What is the vector \vec{r} pointing from the star to the planet? (b) What is the magnitude of \vec{r} ? (c) What is the unit vector \hat{r} (vector with magnitude 1) in the direction of \vec{r} ?
- p. 47, 1.X.14: 18.5 m/s
- p. 47, 1.X.36: The acceleration at time t is $\langle 0, 8, -36t \rangle$, and the acceleration at time $t = 0$ is $\langle 0, 8, 0 \rangle$.
- p. 47, 1.X.41: $\langle 111.31, 0, 18.46 \rangle \text{ m}$
- p. 47, 1.X.44: (a) $\langle 0, 0, 2 \rangle$; (b) $\langle 7, 0, 0 \rangle$
- p. 51, 2.X.3: 3 N instead of 5 N; 1.5 N instead of 2.5 N.
- p. 60, 2nd equation in Solution: $\Delta\vec{p}_2 = \langle 0, -0.6, 0 \rangle \text{ kg} \cdot \text{m/s}$
- p. 67, first equation: $\vec{L} = \langle 0, 0.1, 0 \rangle - \langle 0, 0, 0 \rangle = \langle 0, 0.1, 0 \rangle \text{ m}$
- p. 68, third step: $s = -0.0411 \text{ m}$; $p_{fy} = -0.0118 \text{ kg} \cdot \text{m/s}$; the other values are correct.
- p. 75, 2.X.23 (b): The question should ask for speed, not velocity.
- pp. 78-80: The mass of a hockey puck is 0.16 kg, not 0.04 kg. The mass was omitted in calculating the momentum change, which should be $\vec{p}_f - \vec{p}_i = \langle 0, 0, 5.072 \rangle \text{ kg} \cdot \text{m/s}$, and $\Delta t = 0.005 \text{ s}$. In 0.005 s the puck travels 0.1 m in the x direction and 0.08 m in the y direction. At the top of p. 80, if we guess that the puck slid 20 cm, $\Delta t = 0.01 \text{ s}$, a factor of 2 different from what we find in the full analysis.
- p. 94, 2.X.25 (a): Student on the left.
- p. 99, 4th bullet: Calculate $-\hat{r} = -\vec{r}/|\vec{r}|$...
- p. 99, last 2 lines: The distance is $3.35 \times 10^{11} \text{ m}$, and the force is $7.15 \times 10^{21} \text{ N}$.
- p. 100: $\hat{F}_{\text{on } P \text{ by } S} = \langle -0.298, -0.745, 0.596 \rangle$
 $\sqrt{(-0.298)^2 + (-0.745)^2 + (0.596)^2} = 0.9995$
 The last line of the example should be this:
 $\vec{F}_{\text{on } S \text{ by } P} \langle 2.13 \times 10^{21}, 5.33 \times 10^{21}, -4.26 \times 10^{21} \rangle \text{ N}$
- p. 110, paragraph after first question: “Two negatively charged particles such as electrons also REPEL each other...”
- p. 132, 3.X.56: Replace “At a certain instant” with “When they are far apart”. Change the y component of the later momentum from $1.6 \times 10^{-21} \text{ kg} \cdot \text{m/s}$ to $1.55 \times 10^{-21} \text{ kg} \cdot \text{m/s}$.
- p. 134, last sentence of 3.P.70: “...of the meteor, and \vec{v} is the initial velocity of the center of mass of the satellite, in the x direction.”
- p. 137, 3.X.17 (a) and (b): x component should be -4 .
- p. 137, 3.X.19: Units of velocity are m/s.
- p. 137, 3.X.22: (b) $\langle 0, -7.84, 0 \rangle \text{ N}$; (c) $\langle 2.2, -1.184, 2.6 \rangle \text{ kg} \cdot \text{m/s}$.
- p. 144, next to last equation: $A = \pi(0.0025 \text{ m})^2 = 1.96 \times 10^{-5} \text{ m}^2$
- p. 156, 4.X.12: Change the final x component of velocity from 5.02 to 4.98.
- p. 157, next to next to last equation: $\frac{dp_x}{dt} = -k_s x$
- p. 159: In parts (c) and (d) of the problem statement, the text should read “...if the initial stretched length of the spring were 35 cm instead of 30 cm?”

- p. 172, 4.P.44: There are 6.02×10^{23} atoms in one mole.
- p. 173, 4.P.51: The initial length of the wire should be 0.95 m.
- p. 176: Section 14.13 should be Section 4.13.
- p. 177, 4.X.12: The x components in the three vectors are -2, -0.16, and -0.16.
- p. 193, 5.X.6 (d): Is the rate of change of the magnitude of the comet's momentum positive, negative, or zero?
- p. 208, point 2 in left column: "...and drawing the resultant arrow starting at the tip of \vec{p}_i ..."
- p. 222: For added clarity, in the box labeled "REST ENERGY" the equation should read $E_{\text{rest}} = mc^2$, and in the first sentence after this box $m = E_{\text{rest}}/c^2$.
- p. 243, next to the next to the last equation in the Example: $K_f + (0.1 \text{ kg})(9.8 \text{ N/kg})(-3 \text{ m}) = 0$
- p. 278, 6.X.53: Add to the first sentence "where $E = \gamma mc^2$ ". In F and G replace W_{ext} with W_{surr} .
- p. 279, 6.P.60: Interchange the words "final" and "initial" between A and B.
- p. 279, 6.P.67: In (a) the force is 240 N. In (b) the force is 60 N and the displacement is 3 meters.
- p. 280: Figure 6.X.71 should look like this:



- p. 281, 6.P.82: The radius of an airless planet is 2000 km (2×10^6 m), and its mass is 1.2×10^{23} kg. An object is launched straight up from the surface. (a) What initial speed is needed so that when the object is far from the planet its final speed is 900 m/s? (b) What initial speed is needed so that when the object is far from the planet its final speed is 0 m/s? (This is called the "escape speed.")
- p. 319, 7.X.25: The relaxed length is 0.66 meters.
- p. 320, 7.P.32: "heavy black horizontal line" should be "blue horizontal line".
- p. 320, 7.P.33 (a): Delete "(shown here as an example to get you started)".
- p. 321: Heading should be Sections 7.4-7.9.
- p. 322: Heading should be Sections 7.10-17.14.
- p. 327, last equation: $E_{H,f} + K_{\text{photon}} = E_{H*,i}$
- p. 337, 8.X.11: "What is the energy of the photon emitted by a..."
- p. 391, last two equations:

$$0 = p_3 \cos(90^\circ - \theta) + p_4 \cos(90^\circ + \phi)$$

$$\frac{p_1^2}{2m} = \frac{p_3^2}{2m} + \frac{p_4^2}{2M}$$
- p. 423, last section: This should be titled "If the Masses Don't Lie in a Plane Perpendicular to the Axis." In the first sentence, delete "the same plane,". Add to the caption for Figure 11.20, "The two masses at this instant are in the xy plane." (This is implicitly shown by the momenta coming out of the page.) In the last paragraph on p. 423, replace r by r_1 in three places.
- p. 433, result at top of page: $\omega = 0.316$ radians/s.
- p. 440, Figure 11.51: The location A should be at the top of the rod, so that the torque $\vec{\tau}_A = 0$.
- p. 453, Figure 11.68: The Earth's orbit should pass behind the Sun.
- p. 465, 11.P.69: The two figures of the diver are reversed. First the diver is tucked, then extended.

p. 471, 11.X.5 and 11.X.7: All of these angular momenta are into the page. Also, the answer to 11.X.5 (c) is $I = 0.072 \text{ kg} \cdot \text{m}^2$.

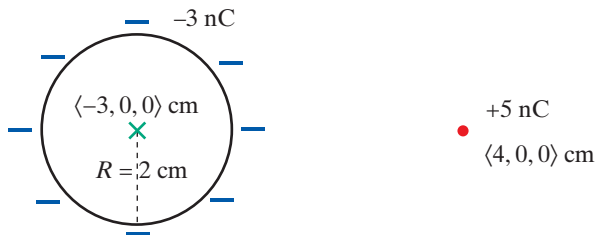
p. 555, midpage: The number of atoms in a cubic centimeter of solid metal is closer to 1×10^{23} than 1×10^{24} .

p. 577, 14.X.31, 2nd sentence: “What is the magnitude of the electric field due to the electron at a location 1×10^{-10} m away?”

p. 579, 14.P.46, 1st sentence: “The electric field at a location C points west, and the magnitude is $2 \times 10^6 \text{ N/C}$.”

p. 580, Figure 14.64 should look like this:

$\times \langle 0, 6, 0 \rangle \text{ cm}$



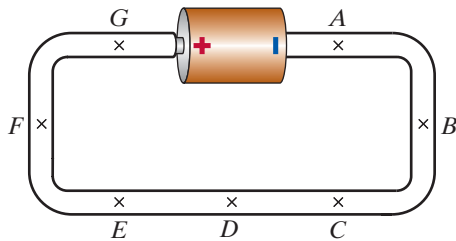
p. 620, 15.X.53: In (A) delete “static”. In (D) and (E) replace “at equilibrium” by “in equilibrium”.

p. 620, 15.X.54: Delete the 2nd sentence (about static equilibrium). In (A) delete “not” and change “at static equilibrium” to “in equilibrium”. In (B) change “aluminum” to “metal”. In (C) replace “at static equilibrium” by “in equilibrium”. In (E) delete “static” and replace “no” by “a”.

p. 653, just before Figure 16.47: $E_{\text{fringe}} \approx \frac{Q/A}{2\epsilon_0} \left(\frac{s}{R} \right)$

p. 727, 4th equation: $B_{\text{magnet}} = \frac{\mu_0}{4\pi} \frac{2\mu}{r^3}$

p. 785: Figure 19.75 should look like this:



p. 785: Figure 19.76 should be the same as Figure 19.72.

p. 785, 19.X.50: The two sentences in part 7 should be considered two parts, 7 and 8.

p. 791, 19.X.3: 0.011 N/C

p. 876, first set of equations: $E'_y = (E_y - vB_z)/\sqrt{1 - v^2/c^2}$

p. 884: Section 20.2 should be Section 21.2.

p. 892: Section 20.6 should be Section 21.6.

p. 893: Sections 20.7-20.8 should be Section 21.7, Section 20.9 should be Section 21.8, Section 20.10 should be Section 21.9, and Section 20.11 should be Section 21.10.

p. 979, 23.P.27: Figure 23.67 is missing a dot labeled “ Q ” on the loop, opposite the “ P ”. Also, add “At location Q ?” to part (f).

p. 1035, Figure 24.115: There is a missing θ between the \vec{a} vector and the \vec{r} vector.

If you have the hardbound edition with all 25 chapters, be aware that there is a blank page between the inside back cover and a useful list of Greek symbols and other information.