

## MODERN PHYSICS

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### Errata

p.35: Example 2-1

The statement of the problem and the figure are unchanged. The solution should be replaced by the following:

**Solution** We analyze this problem first from the point of view of the stationary observer and then from the point of view of an observer on the train. From the point of view of the ground observer, the speed of light is  $c$ , and in time  $t$  the train has moved a distance  $vt$  to the right. Thus the light that is moving from the point  $-L$  will have moved a distance  $L + vt$ . When we set this equal to  $ct$  we can solve for  $t$  and find that  $t_- = L/(c-v)$ . The same analysis done for the light coming from the right, which travels a distance  $L$  shortened by  $vt$  gives  $t_+ = L/(c+v)$ . Thus the time difference is  $\Delta t = L/(c-v) - L/(c+v) = 2L/c(1-v^2/c^2)$ .

The observer on the train claims to be at rest. However, since the source at  $-L$  is moving away from the observer, the speed of light is  $c-v$ . The light from the right appears to be arriving with speed  $c+v$ . Thus the times at which light arrives are  $L/(c-v)$  and  $L/(c+v)$  respectively, as for the ground observer.

p.49

In the solution to Example 2-3 the material starting with “According to an observer...” should be replaced by the following:

If the polar observer’s clock reads  $t_p$  then he will see the equatorial clock read  $t_e$  where  $t_p = t_e/\sqrt{1-v^2/c^2} \approx t_e(1 + v^2/2c^2)$ . With the help of this expansion for small  $(v^2/c^2)$  we get

$$(t_p - t_e) / t_e \approx v^2/2c^2 \approx 10^{-12}$$

p. 54 In the solution to Example 2-4 the following changes are needed

- (a) In the last equation replace  $(-100 \text{ m})$  by  $(100 \text{ m})$
- (b) the clock on the left side, above the tail of the rocket in Figure 2-12 should read 10 minutes **after** noon, rather than the present ten minutes before noon.

p. 254

**Fig. 9-15** Everywhere change  $s_z = 1/2$  to  $s_z = -1/2$  and vice versa; also  $m = 1$  to  $m = -1$  and vice versa.

p.582

Equation B.4-5 should read:  $\tan \phi = \text{Im } z / \text{Re } z$

p.583 **Back of the book answers:**

**2-4** replace  $3.3 \mu\text{s}$  by  $4.1 \mu\text{s}$

**3-23** replace  $130 \text{ MeV}$  by  $150 \text{ MeV}$