Field Guide to Physical Optics
Errata September 2013 (page 1 of 2) to First Printing

1. On page 33 the equation in parentheses should have a greater than symbol instead of less than: $n_1 > n_2$.

2. Page 35:
   a. The equation in the text of the first paragraph should have a positive sign instead of a negative sign: $N_j = n_j + ik_j$
   b. The last equation on this page should read: $\mathbf{M} = \prod_{j=1}^{m} \mathbf{M}_j = \mathbf{M}_1 \mathbf{M}_2 \cdots \mathbf{M}_m$
   c. The last paragraph is replaced with the following new paragraph:

   There is a separate characteristic matrix for TE and TM polarization found by inserting the appropriate tilted optical admittance.

3. Page 37:
   a. Paragraph four should read:
   Total irradiance is the time average of the square of the electric field. In a nonmagnetic, nonabsorbing medium:

   b. The last equation should read:

$$I(\mathbf{r}) = \frac{1}{T}\int_{-T/2}^{T/2} \frac{cn\varepsilon_0}{2}\left|E(\mathbf{r},t)\right|^2 dt = \frac{cn\varepsilon_0}{2}\left\langle \left|E(\mathbf{r},t)\right|^2 \right\rangle_T$$
$$= \frac{cn\varepsilon_0}{2}\left\langle E_x^2 + E_y^2 + E_z^2 \right\rangle_T = I_x(\mathbf{r}) + I_y(\mathbf{r}) + I_z(\mathbf{r})$$

   c. The last paragraph has the following additional sentence added to the end: The factor of $cn\varepsilon_{0/2}$ is admittance, converting squared electric field to power per unit area.

4. Page 38:
   a. The last part of the last sentence in the third paragraph should read:

   …, the x-component contribution to the total irradiance in a nonmagnetic nonabsorbing medium becomes

   b. The last equation should read:

$$I_x = \frac{cn\varepsilon_0}{2}\left\langle E_x^2 \right\rangle = \frac{cn\varepsilon_0}{2}\left\langle A_{\Sigma x}^2 \cos^2 \tfrac{\mathbf{k}_\Delta \cdot \mathbf{r} - \omega_\Delta t + \phi_\Delta}{2} + A_{\Delta x}^2 \sin^2 \tfrac{\mathbf{k}_\Delta \cdot \mathbf{r} - \omega_\Delta t + \phi_\Delta}{2} \right\rangle_{\Delta t}$$
$$= \frac{cn\varepsilon_0}{4}\left\{ A_{\Sigma x}^2 + A_{\Delta x}^2 + \left(A_{\Sigma x}^2 - A_{\Delta x}^2\right) \operatorname{sinc} \tfrac{\omega_\Delta \Delta t}{2} \cos\left(\mathbf{k}_\Delta \cdot \mathbf{r} - \omega_\Delta t + \phi_\Delta\right) \right\}$$
$$= \frac{cn\varepsilon_0}{2}\left\{ A_{1x}^2 + A_{2x}^2 + 2\sqrt{A_{1x}^2 A_{2x}^2} \operatorname{sinc} \tfrac{\omega_\Delta \Delta t}{2} \cos\left(\mathbf{k}_\Delta \cdot \mathbf{r} - \omega_\Delta t + \phi_\Delta\right) \right\}$$
$$= I_{1x} + I_{2x} + 2\sqrt{I_{1x} I_{2x}} \operatorname{sinc} \tfrac{\omega_\Delta \Delta t}{2} \cos\left(\mathbf{k}_\Delta \cdot \mathbf{r} - \omega_\Delta t + \phi_\Delta\right)$$

5. On page 39, the second equation should read:

$$I = \frac{cn\varepsilon_0}{2} U(z,t) U^*(z,t)$$
$$= \frac{cn\varepsilon_0}{2}\left[|A_1|^2 + |A_2|^2 + 2|A_1||A_2|\cos(\phi_1 - \phi_2)\right]$$
$$= I_1 + I_2 + 2\sqrt{I_1 I_2}\cos\phi_\Delta$$

6. Page 41:
   a. The first sentence should read:

   The field and irradiance in nonabsorbing, nonmagnetic media from two **superposed plane waves** with the same frequency but different wavevectors and amplitudes is

   b. The first equation should read:

$$\mathbf{U} = \mathbf{A}_1 e^{i(\mathbf{k}_1\cdot\mathbf{r} - \omega t + \phi_1)} + \mathbf{A}_2 e^{i(\mathbf{k}_2\cdot\mathbf{r} - \omega t + \phi_2)}$$
$$I = \frac{cn\varepsilon_0}{2}\mathbf{U}\cdot\mathbf{U}^* = \frac{cn\varepsilon_0}{2}\left[A_1^2 + A_2^2 + 2\mathbf{A}_1\cdot\mathbf{A}_2\cos(\mathbf{k}_\Delta\cdot\mathbf{r} + \phi_\Delta)\right]$$
$$= I_1 + I_2 + 2\sqrt{I_1 I_2}\,p_{12}\cos(\mathbf{k}_\Delta\cdot\mathbf{r} + \phi_\Delta)$$

7. On page 44, in the second figure, θ (theta) should be ϕ (phi).

8. Page 81, the figures are switched.

9. Page 94:

   a. In the three equations, lowercase *a* should be uppercase *A*.

$$A_\nu^2 = \frac{1}{2}\delta(\nu - \nu_0 + \Delta\nu/2) + \frac{1}{2}\delta(\nu - \nu_0 - \Delta\nu/2)$$
$$V = \cos\left(\frac{\pi z}{c}\Delta\nu\right)$$

$$A_\nu^2 = \frac{1}{\Delta\nu}\,rect\left(\frac{\nu - \nu_0}{\Delta\nu}\right), \quad V = \frac{\sin(n\pi z\Delta\nu/c)}{n\pi z\Delta\nu/c}$$

$$A_\nu^2 = \frac{1}{\sqrt{\pi/8}\Delta\nu} e^{-2(\nu-\nu_0)^2/(\Delta\nu/2)^2}, \quad V = e^{-\frac{1}{8}\left(\frac{\pi n\Delta\nu}{c}z\right)^2}$$

   b. Similarly, the a_ν^2 label on the vertical axes in each of the figures should be A_ν^2.