Errata List for *Advanced Classical Electromagnetism*

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Chapter 2

P.23: In the line below eq.(2.61) a factor of $(-1)^m$ should be inserted in the relation between $Y_{\ell,-m}$ and $Y_{\ell m}$, i.e., the corrected relation should read $Y_{\ell,-m}(\theta,\varphi) = (-1)^m Y^*_{\ell m}(\theta,\varphi)$.

P.29: Two lines below the statement of the theorem, "figure 2.1" should be replaced by "section 2.1".

P.32: Three lines below eq.(2.109), "the left side of eq.(2.106)" should be replaced by "the left side of eq.(2.105)".

P.35: In the third line of problem 3(b), the formula for the Bohr radius a is missing a factor of $4\pi\epsilon_0$. The corrected relation should read $a = 4\pi\epsilon_0\hbar^2/me^2 = 5.3 \times 10^{-11}$m.

Chapter 4

P.51: On the right side of the first line of eq.(4.9), $(-1)^{\mathrm{sgn(P)}}$ should be replaced by sgn(P).

P.51: In the line below eq.(4.9), add "and sgn(P) denotes the sign of the permutation (+1 for even permutations and −1 for odd permutations)." [Thus, the corrected line below eq.(4.9) now should read "where δ_{ij} denotes the Kronecker delta and sgn(P) denotes the sign of the permutation (+1 for even permutations and −1 for odd permutations)."]

P.68: In the equation displayed in problem 8, delete the spurious factor of $\mu_0/4\pi$. The corrected relation should read $M_{12} = \oint \boldsymbol{A}_1 \cdot d\boldsymbol{l}_2$.

Chapter 5

P.87: In eq.(5.101), a prime ($'$) should be put on the argument $\boldsymbol{x}$ of $\hat{f}$, i.e., the corrected eq.(5.101) should read $\hat{\psi}(\omega,\boldsymbol{x}) = \int G^{\mathrm{H}}(\boldsymbol{x},\boldsymbol{x}')\hat{f}(\omega,\boldsymbol{x}')d^3x'$.

P.97: In eq.(5.147), the minus sign appearing on the right side should be deleted. The corrected eq.(5.147) should read $\nabla^2\chi|_{t=0}(\boldsymbol{x}) = \frac{1}{c^2}\frac{\partial\phi}{\partial t}(t=0,\boldsymbol{x})$.

P.107: In the line below eq.(5.205), the equation at the end of the line should read $k = \pm\omega/c$ (not $k = \pm\omega$).

Chapter 6

P.124: Since I am discussing plane wave solutions on this page, it would be more consistent with my previous discussion of plane waves in vacuum in section 5.5 not to put "hats" (i.e., the symbol $\hat{}$ that denotes Fourier transforms) on the various plane wave quantities. Thus, all of the "hats" appearing on this page should be deleted. There are a total of 15 instances of this: 3 on line 2; 4 in eq.(6.61); 2 on the line following eq.(6.61); 4 in eq.(6.62); and 2 in the line following eq.(6.62).

P.130: The ρ that appears in the partial derivatives in eqs.(6.90) and (6.91) should be ρ_M. Thus, eq.(6.90) should read $\delta P = (\frac{\partial P}{\partial \rho_M})_s \delta\rho_M$ and eq.(6.91) should read $c_s^2 = (\frac{\partial P}{\partial \rho_M})_s$.

Chapter 7

P.138: An unnecessary restriction was made here in requiring $\boldsymbol{\mathcal{C}}$ to be real. This restricts consideration to linear polarization, but circular/elliptical polarization can be treated by allowing $\boldsymbol{\mathcal{C}}$ to be complex. Allowing $\boldsymbol{\mathcal{C}}$ to be complex would complicate the discussion of interference in a non-useful way, so I will continue to require $\boldsymbol{\mathcal{C}}$ to be real from eq.(7.40) onwards. However, I will allow $\boldsymbol{\mathcal{C}}$ to be complex prior to eq.(7.40). The following changes should be made to accommodate this:

- P.138: In the line below eq.(7.21), replace "with S and $\boldsymbol{\mathcal{C}}$ real and S rapidly varying compared with $\boldsymbol{\mathcal{C}}$." with "with S real and S rapidly varying compared with $\boldsymbol{\mathcal{C}}$. However, we allow $\boldsymbol{\mathcal{C}}$ to be complex, since requiring $\boldsymbol{\mathcal{C}}$ to be real would restrict consideration to linear polarization."
- P.138: In the line above eq.(7.25), replace "dotting eq.(7.23) with $\boldsymbol{\mathcal{C}}$, we find" with "dotting eq.(7.23) with $\boldsymbol{\mathcal{C}}^*$ and adding it to its complex conjugate, we find"
- P.141: Below eq.(7.40) (before "By a similar calculation...") add the following sentence: Here and in the following, we will, for simplicity, restrict consideration to linearly polarized waves, so we will take $\boldsymbol{\mathcal{C}}_1$ and $\boldsymbol{\mathcal{C}}_2$ to be real.

P.139: Two lines below (7.27), the first symbol "$\boldsymbol{\mathcal{C}}$" in that line should be boldface (i.e., it should be $\boldsymbol{\mathcal{C}}$, not $\mathcal{C}$).

P.142: In the line above (7.46), the word "of" is missing: The end of that line should read "...solution is a wave packet of the form"

P.144: In the line below (7.49), Schwarz is misspelled, i.e., it should be "Schwarz," not "Schwartz."

P.148: In the third line of subsection 7.3.1, an extra word "by" appears. The beginning of the second sentence of that subsection should read: "This problem was solved independently by..."

Chapter 8

P.159: In the third line of the last full paragraph on this page, the word "is" appears twice in succession. The beginning of the second sentence of that paragraph should read "This is given by a Galilean..."

Chapter 9

P.194: In the fifth line above eq.(9.29), the word "fundamental" should be inserted. The beginning of the last sentence of the paragraph above eq.(9.29) should read "Although no fundamental charged scalar field is known..."

P.195: In eq.(9.37), the superscript index ν appearing on the right side should be changed to a μ (in two places). The corrected equation should read: $J^\mu = \frac{q}{\hbar}\mathrm{Im}[\Phi^*(\partial^\mu\Phi - i\frac{q}{\hbar c}A^\mu\Phi)]$.