

## Errata

*Fundamentals of Carrier Transport, 2<sup>nd</sup> Edition*

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**Chapter 1:**

- page 10: in the second line below eq. (1.31), change “solutions for a periodic are called...” to “solutions for a periodic potential are called...”
- page 11: in Fig. 1.4, on the horizontal axis, replace ‘ $k_l$ ’ by “0” and place “ $k_l$ ” below the tic mark to the right.
- page 20: in the last line, change “the  $x$ - $z$  plane” to “the  $x$ - $y$  plane”.
- page 21: in the caption of Fig. 1.12, change “ $3\pi/2$ ” to “ $2\pi/3$ ” and in the fourth line below Fig. 1.13 make the same substitution.
- page 23: in Fig. 1.14, change  $\Delta E_{c0} = 0.15$  eV to  $\Delta E_{v0} = 0.15$  eV .
- page 23: in the first line of the caption for Fig. 1.15, change “Al/GaAs/GaAs/AlGaAs” to “AlGaAs/GaAs/AlGaAs”.
- page 24: in the third line below eq. (1.46b), change “force of an electron” to “force on an electron.”
- page 26: in the line above eq. (1.52), change “so only discrete values of  $k$  are given by” to “so only discrete values of  $k$  given by”.
- page 29: in the line just above the last equation of the example, change  $x = k^2$  to  $x' = k'^2$ .
- page 37 in Fig. 1.24b, all states below the Fermi level in subband 1 should be shown as occupied, since  $T = 0$ K.
- page 38 in eq. (1.89), replace “ $\bar{h}^2$ ” with “ $\hbar^2$ ”.
- page 44: in the line before eq. (1.114), replace “ $\delta(x)$ ” with “ $\pi \delta(x)$ ”.

page 46: in eq. (1.125), insert a comma between “a” and “e” in the superscript.

page 46: in the line below eq. (1.129), change “The scattered momentum...” to “The scattered electron...”.

## Chapter 2:

page 57: to be consistent with the derivations, reverse the direction of the vector “ $\beta$ ” in Fig. 2.2c.

page 58: change “ $E' - E$ ” to “ $E' = E$ ” on line 2 of the paragraph above section 2.2.

page 58: change “In following sections, ...” to “In the following sections, ...” on line 4 of the first paragraph of sec. 2.2.

page 60: change “ $A = q^2 / \dots$ ” to “ $A = q / \dots$ ” in the equation on line 4 of text.

page 60: change “Four” to “For” in the last line.

page 63: change “ $i$ ” to “ $= -$ ” in the equation on line 5 of text.

page 67: change “... density of state ...” to “... density of states ...” on line 5 of sec. 2.3.4.

page 67: change “various mechanism; ...” to “various mechanisms, ...” on line 2 of last paragraph of sec. 2.3.4.

page 68: change “ $e^{r/L_D}$ ” to “ $e^{-r/L_D}$ ” inside the integrand of eq. (2.34).

page 68: change “ $N_1$ ” to “ $N_j$ ” in eqs. (2.36a), (2.36b), and (2.36c).

page 69: change “[...]” to “[...]” in the denominator of the integrand in eq. (2.38). Also change “ $N_1$ ” to “ $N_j$ ”.

page 75: change “... must be a positive number, ...” to “... must be a positive real number, ...” on first line after eq. (2.57).

page 76: change “... eq. (1.127)...” to “... eq. (1.126) ...” on the line just above eq. (2.60).

page 77: change “magnitude” to “amplitude” on line 3 from the bottom of the page.

page 80: change “ $\beta'$ ” to “ $\beta$ ” to show that it is a vector, on the line just above eq. (2.78).

- page 90: change "... that carrier" to "... that carriers" on the second line of the second paragraph.
- page 95: change "expects" to "expect" on line 7.
- page 96: change "... band energy versus position versus distance" to "... band energy versus distance" on line 3 in caption of Fig. 2.20.
- page 98: change " $p_z$ " to " $p'_z$ " in eq. (2.123b)
- page 102: change " $h$ " to " " in the y tick labels of Fig. 2.22a.
- page 106: change " $(\dots)_{E'=E}$ " to " $(\dots)_{E'=E}$ " in the RHS of eq. (2.155).
- page 114: the GaAs lattice constant in line 2 of Table 2.1 should be 5.65 Angstroms.
- page 117: change "... expression for  $1/\tau(p)$  terms of the ..." to "... expression for  $1/\tau(p)$  in terms of the ..." on the first line of prob. 2.2(b).

### Chapter 3:

- page 120: change " $f_0(\mathbf{p})=\dots$ " to " $f_0(\mathbf{r}, \mathbf{p})=\dots$ " in eq. (3.3).
- page 120: change " $E_{C0}(\mathbf{r}, t)$ " to " $E_{C0}(\mathbf{r})$ " in eq. (3.4) and in the first line after this equation.
- page 122: change " $\mathbf{u}(\mathbf{p}=\dots)$ " to " $\mathbf{u}(\mathbf{p})=\dots$ " and " $f_0(-\mathbf{p}=\dots)$ " to " $f_0(-\mathbf{p})=\dots$ " in the last 2 lines of the text.
- page 123: change " $F_n(\mathbf{r}, p)$ " to " $F_n(\mathbf{r}, t)$ " in eq. (3.16).
- page 125: change " $\dots = (F_n - E_{C0})/k_B T_C$  where ..." to " $\dots = (F_n - E_{C0})/k_B T_C$  where ..." just below Table 3.1.
- page 125: change "solve  $f(\dots)$ " to "solve for  $f(\dots)$ " on line 13 of text.
- page 127: change " $f_x$ ", " $f_y$ " and " $f_z$ " to " $f$ " in the RHS of eqs. (3.23a) and (3.23b).
- page 129: change "Carrier's" to "Carriers" in the caption of Fig. 3.4.
- page 129: in Fig. 3.4, the streamlines should not cross.
- page 135: in Fig. 3.5 " $\mathcal{E}_z$ " in italics is very faint.
- page 140: change " $g(p^2)$ " to " $g(p)$ " in eq. (3.70).

page 140: change "... eq. (3.59)..." to "...eq. (3.68)..." on the line just above eq. (3.71).

page 155: change " $\langle u_z \rangle$ " to " $\langle v_z \rangle$ " in prob. 3.9.

page 156: insert a "-" before the delta function in the RHS of prob. 3.14.

#### Chapter 4:

page 160: change "... (4.4.)" to "... (4.4)." in the third line below eq. (4.8).

page 161: change "where  $F_n$  the ..." to "where  $F_n$ , the ..." on the first line after eq. (4.12)

page 161: change " $E_{c0}(\mathbf{p})$ " to " $E_{c0}(\mathbf{r})$ " in eq. (4.14).

page 162: change "... (or  $j=x,y$ , or  $z$ )." to "... (or  $x_j = x, y$ , or  $z$ )." in eq. (4.20).

page 164: change " $f_s$ " to " $\partial f_s$ " in RHS of eq. (4.31).

page 166: insert the "x" axis label in Fig. 4.1.

page 171: insert the subscript " $f$ " for  $\tau$  in equation (4.62a) and (4.62b).

page 173: change " $J_{Qi}$ " to " $J_{Qj}$ " in eq. (4.70b).

page 176: change "The phenomena is known as..." to "The phenomenon is known as ..." on line 3 from the bottom of the page.

page 178: change " $\Delta J_{Qi} = 0$ " to " $\Delta J_{Qi} > 0$ " on line immediately below eq. (4.88b).

page 185: change "... contacts  $M$  and  $P$  ..." to "... contacts  $M$  and  $N$  ..." on the second line above eq. (4.112).

page 187: change "... contacts,  $a$ ,  $b$ ,  $c$ , and  $d$ ." to "... contacts,  $a$ ,  $b$ , and  $c$ ." on line second line below eq. (4.118).

page 193: in the first row of Table 4.2, below the heading "Electrons", change " $1.19 \times 10^6 \text{ cm}^2 \text{K}^2 / \text{Vs}$ " to " $1.19 \times 10^8 \text{ cm}^2 \text{K}^2 / \text{Vs}$ ".

page 208: insert the subscript " $f$ " for  $\tau$  in prob. 4.8.

**Chapter 5:**

- page 214: insert “ $f$ ” right after the summation symbol in RHS of eq. (5.8).
- page 217: change “ $\ll \tau_E \gg$ ” to “ $\ll 1/\tau_E \gg$ ” on the third line below eq. (5.17).
- page 219: change “ $1\tau_m(p)$ ” to “ $1/\tau_m(p)$ ” on line 4 of text.
- page 222: change “ $G\dots\dots=(-q)\mathcal{E}\cdot\mathbf{v}_d =$ ” to “ $G\dots\dots=(-q)n\mathcal{E}\cdot\mathbf{v}_d = \dots$ ” in eq. (5.35).
- page 224: change “ $W_{ii} = \Sigma\dots = \dots$ ” to “ $W_{ii} = 1/2 \Sigma\dots = \dots$ ” in eq. (5.42).
- page 228: change “(5.56) and (5.27b)” to “(5.56) into (5.27b)” in the third line after eq. (5.57).
- page 241: change “eq. (4.141b)” to “eq. (4.141b).” on the line immediately above Summary.
- page 244: change “ $dt$ ” to “ $\partial t =$ ” in the denominators on LHS of eqs. (P5.4) and (P5.5).
- page 244: change “*IEEE ... Electronic ...*” to “*IEEE ... Electron...*” in prob. 5.7. Similar change needs to be made in several other places.
- page 244: change “ $E_i$ ” to “ $E_i$ ” in the numerator of third term in the RHS of eq. (P5.4)

**Chapter 6:**

- page 255: change “... with  $E(p) = 0.5\text{eV}$ ...” to “... with  $E(p) = 0.15\text{eV}$ ” on line 10 of the text.
- page 255: show a scattering event, “X”, at  $t = t_2$  in Fig. 6.6a.
- page 274: change “... the time,  $TJ_L(p_i)AT\dots$ ” to “... the time  $T, J_L(p_i)AT\dots$ ” on the second line below eq. (6.41).

**Chapter 7:**

- page 283: remove “ $q$ ” from the last term in eq. (7.1).
- page 288: square root should be only on the numerator in the RHS of eq. (7.12).

- page 292: change “dominants” to “dominates” on the last line of the paragraph below the shaded example box.
- page 303: change “eq. (7.36)” to “eq. (7.34)” on the first line of page.
- page 307: in the caption of Fig. 7.15, change “*Physics Review*” to “*Physical Review*” in line 2 and “American Institute of Physics” to “American Physical Society” in line 3.
- page 309: change the line properties for doping  $10^{15}$  and  $10^{17}$  in Fig. 7.17(b) so that they can be distinguished.

### Chapter 8:

- page 324: change “*Journal of Applied Physics*” to “*Applied Physics Letters*” in line 4 from the bottom of the text.
- page 327: change “fund” to “find” on line 3 from bottom of text.
- page 335: in the fifth line below the figure, change “the average electron is still low” to “the average electron energy is still low”.
- page 340: change the dashed part of the line for  $\langle n \rangle$  in Fig. 8.13 (c) to solid.
- page 344: change “can not” to “cannot” in line 7 of the text.
- page 348: change  $\mu_p$  to  $\mu_n$  in eq. (8.42a) and  $D_n$  to  $D_p$  in eq. (8.42b).
- page 354: in the last line, change “eq. (8.34b)” to “eq. (8.43b)”

### Chapter 9:

- page 390: change “ $\dots = te^{ik_z z}$ ” to “ $\dots = te^{ik_2 z}$ ” in eq. (9.78b).

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