

*Quantum Optics, an Introduction*  
Mark Fox  
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## Errata

A number of errors in the 2006 print run were corrected in the 2007 reprint. Please send an email to the author if you discover any new errors that are not listed here.

Updated: April 10, 2013

### 2007 reprint with corrections

**Page 58** The normalization constant in eqn 4.33 is incorrect. The equation should read:

$$N(v_x) = N_0 \left( \frac{m}{2\pi k_B T} \right)^{1/2} \exp \left( -\frac{mv_x^2}{2k_B T} \right).$$

With this normalization constant, we obtain the correct result that:

$$\int_{-\infty}^{+\infty} N(v_x) dv_x = N_0.$$

In fact, the Maxwell-Boltzmann distribution (or simply the Maxwell distribution) usually refers to the distribution of speeds within a gas, not a single velocity component. In this case, the number of atoms with speed between  $v$  and  $v + dv$  is given by:

$$N(v) dv = N_0 \left( \frac{m}{2\pi k_B T} \right)^{3/2} \exp \left( -\frac{mv^2}{2k_B T} \right) 4\pi v^2 dv.$$

See, for example, Flowers and Mendoza, *Properties of matter*, Wiley (1970), chapter 5, and also Exercise 4.5(b).

**Page 117** Section 6.5.3, second paragraph, first line: Insert “of” in front of “sub-Poissonian”.

**Page 139** First sidenote: Delete “the” in the first line.

**Page 188** Replace  $c_2$  with  $c_2^*$  in the first two lines of eqn 9.63, and in line 7 of paragraph 2. Replace  $e^{i\varphi}$  with  $e^{-i\varphi}$  in the second line of eqn 9.64.

**Page 217** Paragraph 3, line 5: delete “of” after “produces”.

**Page 225** Last line: delete “to”.

**Page 344** First line: replace “in” by “is”.

**Page 358** Solution to Exercise 13.4: insert “the” in front of “ $x$ -axis” in part (b) and “ $y$ -axis” in part (c).

**End cover** The value of  $c$  is exactly 299 792 458 m/s.

## 2006 print run

The errors in the 2007 reprint are also present in the 2006 print run.

**Page 85** The caption of Fig. 5.5 reads rather awkwardly. Both the thermal and Poisson distributions have  $\bar{n} = 10$ .

**Page 134** Figure 7.5: The labelling of the uncertainty circle of the coherent state is incorrect.  $\Delta X_1$  should be  $\Delta X_2$ , and *vice versa*.

**page 139** The two paragraphs about **photon number states** could lead to some confusion. Number states are not *quadrature* squeezed states because both  $\Delta X_1$  and  $\Delta X_2$  are greater than  $1/2$ . They are, however, *photon-number* squeezed states.

**Pages 216–21** The formulæ for the atom’s velocity in eqns 11.3, 11.4, 11.16, 11.17 and 11.18 are all incorrect. The mass should lie under the square root sign. Thus, for example, eqn 11.3 should read:

$$v_x^{\text{rms}} = \sqrt{\frac{k_B T}{m}},$$

and similarly for the other four equations.

**Page 344** First line: replace “in” by “is”.

**Page 347** Table F.1: The photon spin should be 1 rather than 0.

**Page 353** Solution to Exercise 3.7(a): This should read: Equation 3.78 implies  $E_F - E_{F-1} = A(J)\hbar^2 F$ .

**Page 355** Solution to Exercise 7.12:  $1.1 \times 10^8 \text{ V m}^{-1}$ .

**Page 358** Solution to Exercise 13.4. Part (b): insert “the” in front of “ $x$ -axis”. Part (c) should read:  $q' = |0\rangle$ .  $(1, 0, 0) \rightarrow (0, 0, -1)$  on the Bloch sphere due to the  $\pi$  rotation about the  $z$ -axis followed by the  $\pi/2$  rotation about the  $y$ -axis.