Quantum Optics – Taming the Quantum
Erratum

(Updated 11/25/2024)

This short document lists known misprints in the first edition of Quantum Optics – Taming the Quantum (Springer Verlag, 2021). I would appreciate it very much if you would be kind enough to inform me of additional misprints that you may have found. The best way is to simply send them to my email address: pierre.meystre@optics.arizona.edu.

Thanks in advance!

Pierre Meystre

CHAPTER 1

In Eqs. (1.71) Ω_1 should be Ω_r.

Page 19: The second line of text should read ... "and with $T_2 = (2/\Gamma + \gamma_{\rm ph})^{-1}$ in the first case and $T_2 = (1/\Gamma + \gamma_{\rm ph})^{-1}$ in the second case."

Eq. (1.94) should read

$$\mathcal{L} = \frac{1}{2}\sum_\alpha m_\alpha \dot{\mathbf{r}}_\alpha^2 + \frac{\epsilon_0}{2}\int \mathrm{d}^3 r\left[\mathbf{E}(\mathbf{r},t)^2 - c^2\mathbf{B}(\mathbf{r},t)^2\right] + \int \mathrm{d}^3 r\left\{\mathbf{J}(\mathbf{r},t)\cdot\mathbf{A}(\mathbf{r},t) - \rho(\mathbf{r},t)U(\mathbf{r},t)\right\} .$$

Eq. (1.110) should read

$$H = \sum_\alpha \int d^3 r \frac{1}{2m_\alpha}[\mathbf{p}_\alpha - q_\alpha \mathbf{A}(\mathbf{r}_\alpha,t)]^2\delta(\mathbf{r}-\mathbf{r}_\alpha) + \epsilon_0\int d^3 r[\mathbf{E}^2(\mathbf{r},t) + c^2\mathbf{B}^2(\mathbf{r},t)] .$$

CHAPTER 2

Page 42: the last equation should read $\sum_{n=0}^{\infty}\exp(-nx) = (1-\exp(-x))^{-1}$.

Page 50: The sentence after Eq. (2.122) should read: "... the product of their variances is $\sigma^2_{d_1}\sigma^2_{d_2} \geq 1/16$.

In Eq. (2.155) $\hat{S}_2(\lambda)$ should read $\hat{S}_2(\zeta)$.

$$\begin{aligned} U &= \rho_{eg}e^{\mathrm{i}\omega \mathrm{t}} + \text{c.c.}\,, \\ V &= \mathrm{i}\rho_{eg}e^{\mathrm{i}\omega \mathrm{t}} + \text{c.c.}\,, \\ W &= \rho_{ee} - \rho_{gg}\,, \end{aligned} \tag{1}$$

Figures 2.9 and 2.10: The angle of the input mirror should be rotated by 90 degrees.

Figure 2.10: The horizontal input field should be labeled E_b.

CHAPTER 3

Equation (7.8) should read

$$|\psi(t)\rangle = C_e(t)e^{-\mathrm{i}\Delta t/2}|e,0\rangle + C_g(t)e^{-\mathrm{i}\Delta t/2}|g,1\rangle\,.$$

CHAPTER 4

In the line following Eq. (4.6) the text should read: ‘where λ_i are the so-called Schmidt coefficients, with $\sum_i \lambda_i^2 = 1,$ ...’

CHAPTER 5

Eq. (5.159) should read

$$\frac{\mathrm{d}\hat{a}}{\mathrm{d}t} = [\mathrm{i}(\omega - \Omega) - \kappa/2]\hat{a} + \sqrt{\kappa}\hat{a}_{\mathrm{in}}(t)\,. \tag{2}$$

CHAPTER 6

Page 181, second line: the equation should read $|\pm\rangle = \frac{1}{\sqrt{2}}[|1\rangle \pm |0\rangle]$.

Page 183, the first and second first lines should read "... the operator $\sum_k p_k|\boldsymbol{B}_k\rangle\langle\boldsymbol{B}_k|$, and hence all $|\boldsymbol{B}_k\rangle\langle\boldsymbol{B}_k|$, must be quantum non-demolition operators..."

CHAPTER 7

Eq. (7.53) should read

$$\phi'(\bar{n}) = \frac{1}{4v}\int \frac{4g^2(x)\mathrm{d}x}{\sqrt{\Delta^2 + 4g^2(\bar{n}+1)}}\,.$$

The first line of Eq. (7.124) should read

$$E(d) = \sum_\alpha \frac{1}{2}\hbar\omega_\alpha = \frac{\hbar c}{2}\sum_\alpha |k|$$

with $|k|$, not $|k_\perp|$.