

# Quantum Optics – Taming the Quantum Erratum

(Updated 05/23/2024)

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!

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## CHAPTER 1

In Eqs. (1.71)  $\Omega_1$  should be  $\Omega_r$ .

Eq. (1.94) should read

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

Eq. (1.110) should read

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

## CHAPTER 2

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

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 4

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

## CHAPTER 5

Eq. (5.123) should read

$$\frac{d\hat{p}}{dt} = \sum_{\psi} P_{\psi} [|\dot{\psi}\rangle\langle\psi| + |\psi\rangle\langle\dot{\psi}|] = -\frac{i}{\hbar} (\hat{H}_{\text{eff}} |\psi\rangle\langle\psi| - |\psi\rangle\langle\psi| \hat{H}_{\text{eff}}^{\dagger}) + \sum_i \hat{C}_i |\psi\rangle\langle\psi| \hat{C}_i^{\dagger}. \quad (3)$$

Eq. (5.159) should read

$$\frac{d\hat{a}}{dt} = [i(\omega - \Omega) - \kappa/2] \hat{a} + \sqrt{\kappa} \hat{a}_{\text{in}}(t). \quad (4)$$

## CHAPTER 6

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

## CHAPTER 7

Eq. (7.53) should read

$$\phi'(\bar{n}) = \frac{1}{4v} \int \frac{4g^2(x)dx}{\sqrt{\Delta^2 + 4g^2(\bar{n} + 1)}}. \quad (5)$$

The first line of Eq. (7.124) should read

$$E(d) = \sum_{\alpha} \frac{1}{2} \hbar \omega_{\alpha} = \frac{\hbar c}{2} \sum_{\alpha} |k| \quad (6)$$

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