Official Errata for Quantum Measurement and Control

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(Dated: April 13, 2022)

I. CHAPTER 1

- p. 32, in Ex. 1.25, $\exp(iqP)|x\rangle$ should be $|x-q\rangle$, and $\exp(-ikX)|p\rangle$ should be $|p-k\rangle$
  — Masa Hiro Nakano 2010/07/22

- p. 36, Figure 1.2: There is a mistake. A MD measurement of an observable which is BAE need not be projective. A MD weak measurement is an example of this.

- p. 41, Definition of Projective Measurement: The text here is also wrong, as per the preceding erratum.

II. CHAPTER 2

- p. 52, (2.1): Should have a subscript 0 on ρ on the RHS of the arrow.
  — Andy Chia 2009/11/27

- p. 53, Exercise 2.1: "Taylor-series for $e^{iX\hat{G}}\hat{X}_{\rm est}e^{-iX\hat{G}}$ and ..." should read "Taylor-series for $e^{iX\hat{G}}$ and ...."
  — Andy Chia 2009/12/03

- p. 53, (2.11): Subscript X missing for $\langle(X_{\rm est}-X)^2\rangle$.
  — Andy Chia 2009/12/03

- p. 54, 1st paragraph, 5th line: Subscript X missing for $\langle(X_{\rm est}-X)^2\rangle$.
  — Andy Chia 2009/11/27

- p. 54, 1st paragraph of Sec.2.2, 2nd line: Subscript X missing for $\langle(X_{\rm est}-X)^2\rangle$.
  — Andy Chia 2009/12/03

- p. 55, 1st paragraph, 5th line: "...equal to the observed frequency..." should read "...proportional to the observed frequency...".
  — Andy Chia 2009/11/28

- p. 55, (2.19), (2.20): RHSs should be the absolute value of the limits shown.
  — Andy Chia 2009/12/11

- p. 80, penultimate paragraph: the statement "and has recently been realized experimentally [CMG07]" is almost certainly false.

III. CHAPTER 3

- p. 100, (3.7): The top limit of the integral should be t not t_1.
  — Shakib Daryanoosh 2013/01/21

- p. 101, (3.11), (3.12): The coupling Hamiltonian $\hat{V}$ in the integrand should be $\hat{V}_{SE}$.
  — Shakib Daryanoosh 2013/01/21

- p. 102, second line: V_S should be $\hat{V}_S$.

- p. 112, (3.58): The sign preceding $f(t)$ should be $+$.
  — Andy Chia 2012

- p. 129, Fig. 3.2 caption: Should say "diagonalize the stationary state matrix", not "diagonalize the stationary Bloch sphere".

- p. 132, (3.126): The overall sign of the exponent should be +.
  — Andy Chia 2012

- p. 132, (3.127): The LHS should be $|C(\alpha, \beta, t)|$.
  — Andy Chia 2012

- p. 142, (3.158): The quantum Wiener increments in the exponential should be written with a Roman rather than an italic d, i.e. $\mathrm{d}\hat{B}_{z:=-t}$ not $d\hat{B}_{z:=-t}$.
  — Andy Chia 2010/03/17

- p. 122, Exercise 3.23: The phrase "except for the special case in which $|s_0| = |s_1|$" is unnecessary (it applies to the non-uniqueness of a bi-orthogonal expression in the case of just system and apparatus).
  — Andy Chia 2012

IV. CHAPTER 4

- p. 165, (4.98): on the RHS ρ_J should be just ρ.
  — Areeya Chantasri 2018/02/19

- p. 166, Sec. 4.5.1: Full stop missing for the last sentence of the paragraph.
  — Andy Chia 2010/03/03

- p. 173: the RHSs of (4.152) and (4.153) should each be multiplied by $e^{-\gamma t/4}$
  — Ori Somech 2022/04/13

- p. 188, (4.219): Quantum Langevin equation should read $d\hat{a}(t) = -\frac{1}{2}\hat{a}(t)dt - \hat{\nu}(t)dt$.
  — Andy Chia 2010/03/03

- p. 152, (4.29): The $i\hat{H}$ term should be outside the sum.
  — Joe Hope 2010/03/10

V. CHAPTER 5

- p. 258, last para, 3rd line, "function of the photocurrent" should be "functional of the photocurrent".

- p. 238, 239, (5.100)–(5.102): Typesetting error for the subscript I.
  — Andy Chia 2009/11/29

- p. 220, Fig. 5.1: $\hat{b}_3$ and $\hat{b}_2$ should be swapped to match the description in the text on page 221 where $\hat{b}_2$ is said to be the transmitted field and $\hat{b}_3$ the reflected field.
  — Andy Chia 2010/02/27

VI. CHAPTER 6

- p. 286, (6.60): the RHS should be the negative of what appears.
  — Soroush Khademi 2022/04/1

- p. 289, paragraph 2, "if one has two estimates" should be "if one has two independent estimates"

- p. 290, below (6.180), "extimate with a convariance" should be "estimate with a covariance".

- p. 294, below (6.102), "Since $M < 0$, the Kalman filter for the mean is exactly a low-pass filter of the current $\mathbf{y}$." should say "If $M < 0$, the Kalman filter for the mean is a type of low-pass filter of the current $\mathbf{y}$. More generally, when M has some pairs of eigenvalues with non-zero imaginary parts (but still with negative real parts, since it is strictly stable), the Kalman filter is akin to a band-pass filter."

- p. 307, (6.180): Every term on the RHS should be multiplied by $\mathrm{d}t$
  — Andy Chia 2010/01/17

- p. 310, (6.189): Diagonal dots should be replaced by lower dots i.e. $\mathrm{H} = \mathrm{diag}(\eta_1, \ldots, \eta_L)$
  — Andy Chia 2010/03/14

- p. 315, (6.216): the RHS should be $(\hbar/2)^N/\sqrt{\det[V]}$, the square-root reciprocal of that shown.
  — Kiarn Laverick 2018/03/27

- p. 322, (6.251), the second term of RHS should be multiplied by $\mathrm{d}t$.
  — Kiarn Laverick 2018/02/27

- p. 322, (6.252): The LHS should be $\dot{V}_{\mathrm{c}}$.

- p.328, (6.277): $\hbar$ should be $\frac{\hbar}{2}$.
  — Kiarn Laverick 2018/02/15

- p.329, Fig. 6.7 caption: the two instances of $\hbar/2$ should be replaced by $\hbar/4$.
  — Kiarn Laverick 2018/02/15

- p.334, (6.304): $\hat{q}\cos\theta - \hat{p}\sin\theta$ should be $\hat{q}\cos\theta + \hat{p}\sin\theta$.

- p.335, paragraph before Sec. 6.6.7, as a result of the preceding erratum, $\pi/4$ in the penultimate sentence should be $-\pi/4$, and the immediately following words (in the next sentence) must be significantly changed to: "The fact that the optimal θ is very different from this — closer to $+\pi/4$, in fact — points to ...."

VII. CHAPTER 7

- p.355, Exercise 7.17: The Hamiltonian should have $I - Z$ instead of $I + Z$ in (7.48).
  — Andy Chia 2010/02/21

VIII. REFERENCES

- p.431, [Bel64]: The title should say *Podolsky*, not *Podolsy*.
  — Ron Wiseman 2009

IX. APPENDIX A

- p. 410, (A.67): Hat missing for Hamiltonian
  — Andy Chia 2010/04/09

- p. 417, (A.119): $e^{-ikx/2}$ should be $e^{ikx/2}$
  — Andy Chia 2010/04/16

- p. 417, (A.120): $e^{ikx/2}$ should be $e^{-ikx/2}$
  — Andy Chia 2010/04/16

- p. 417, (A.117): Given that earlier $\hbar$ was set equal to unity, its appearance here is unnecessary
  — Andy Chia 2010/04/16

X. APPENDIX B

- p. 421, (B.25): The first term under the square root should read $\langle(\Delta\tau)^2\rangle$
  — Andy Chia 2010/03/24

- p. 428, (B.66): Small x should be capitalized — $\mathrm{d}X(t) = \mathrm{d}N(t)\left(\exp\left[\chi(X)\frac{\partial}{\partial X}\right]\right)X(t)$
  — Andy Chia 2010/05/01