

# Geometry of Quantum States

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## Erratum,<sup>1</sup> June 27, 2020

- i )** page 4, Caption of Fig. 1.4, full body,  
is: A convex body is homeomorphic to a sphere.  
should be: A convex body is homeomorphic to a ball.
- ii )** p. 27, end of the first paragraph, shifted values of  $N$ :  
is: For  $N = 2$  it is a hexagon, for  $N = 3$  a cuboctahedron,  
should be: For  $N = 3$  it is a hexagon, for  $N = 4$  a cuboctahedron,
- iii )** p. 44, Caption of Fig. 2.9, misprint in vector  
is:  $Q = (0.6, 0.4, 0.1)$   
should be:  $Q = (0.6, 0.3, 0.1)$
- iv )** p. 49, Eq.(2.49):  
In the normalization factor, the square root of curly  $N$  should be in the numerator, not in the denominator. This error occurs twice.
- v )** p. 79, Eq. (3.63)  
is:  
$$dJ = 2ig_{a\bar{b},c}dz^c \wedge mdz^a \wedge d\bar{z}^{\bar{b}} + 2ig_{a\bar{b},\bar{c}}d\bar{z}^{\bar{c}} \wedge dz^a \wedge d\bar{z}^{\bar{b}} = 0 ,$$
  
the letter  $m$  in the second  $\wedge$ -factor of the first summand is redundant,  
should read:  
$$dJ = 2ig_{a\bar{b},c}dz^c \wedge dz^a \wedge d\bar{z}^{\bar{b}} + 2ig_{a\bar{b},\bar{c}}d\bar{z}^{\bar{c}} \wedge dz^a \wedge d\bar{z}^{\bar{b}} = 0 ,$$
- vi )** p. 135, Eq. (4.103), misprint  $4 \rightarrow N$ ,  
is:  $\frac{SL(N, \mathbb{C})}{P_1^{(4)}}$   
should be:  $\frac{SL(N, \mathbb{C})}{P_1^{(N)}}$

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<sup>1</sup>We are grateful to Daniel Miller, the most eager reader of our book, who kindly informed us about the vast majority of the misprints listed below...

vii ) p. 144, Eq. (5.13), eigenstates  $|e_i\rangle$  should simply read  $|i\rangle$ , so this equation reads

$$|\psi\rangle = \sum_{i=1}^n \sqrt{p_i} e^{i\mu_i} |i\rangle, \quad |\phi\rangle = \sum_{i=1}^n \sqrt{q_i} e^{i\nu_i} |i\rangle. \quad (5.13)$$

viii ) p. 176, Eq. (6.39), missing subscript <sup>(s)</sup>,

in the integrand is:  $\tilde{W}(u, v)$   
should be:  $\tilde{W}^{(s)}(u, v)$

ix ) p. 182, Eq. (6.63), absolute value missing,

is:  $0 \leq \langle J_z \rangle \leq j$   
should be:  $0 \leq |\langle J_z \rangle| \leq j$

x ) p. 207, below Eq. (7.60),

is: where  $P_{2n}$  projects the space  $N_{K,n} \otimes N_{K,n}$  into  $N_{K,2n}$   
should be: where  $P_{2n}$  projects the space of dimension  $(N_{K,n})^2$  into  $N_{K,2n}$  dimensions.

xi ) p. 208, Eq. (7.66), change sine into cosine:

is:  $2k \sin(\theta_k) (\sin \theta_k)^{2k-1}$   
should be:  $2k \cos(\theta_k) (\sin \theta_k)^{2k-1}$

xii ) p. 208, above Eq. (7.69), misprint  $p \rightarrow y$ :

is:  $P(p) = n(1 - y)^{n-1}$   
should be:  $P(y) = n(1 - y)^{n-1}$

xiii ) p. 242, three sentences above Eq. (8.59), wrong label:

is: Looking at the planar projections of  $\mathcal{M}^{(3)}$  shown in Figure 8.8  
should be: Looking at the planar projections of  $\mathcal{M}^{(3)}$  shown in Figure 8.9

xiv ) p. 304, Eqs. (11.16), (11.17) and (11.18), curly brackets redundant,

(11.16) is:  $\{\Phi \in \mathcal{CP}\}$ , should be  $\Phi \in \mathcal{CP}$   
(11.17) is:  $\{\Phi \in \mathcal{P}\}$ , should be  $\Phi \in \mathcal{P}$   
(11.18) is:  $\{\Phi \in \mathcal{SP}\}$ , should be  $\Phi \in \mathcal{SP}$

xv ) p. 313, line 3 of first paragraph, space redundant:

is: a notion of strategic im portance in the theory of entanglement  
should be: a notion of strategic importance in the theory of entanglement

- xvi )** p. 316, below Eq. (12.13), statement to be improved:  
 is: Another nice feature is that the phase factor ensures that all displacement operators are of order  $N$ .  
 should be: Another nice feature is that the phase factor ensures that all displacement operators raised to power  $N$  give identity.
- xvii )** p. 342 (very first line), typo  
 is:  $A_{0,0}^2 = F$ .  
 should be:  $A_{0,0} = F^2$
- xviii )** p.381, slightly improved version of Fig. 13.5 is enclosed below,

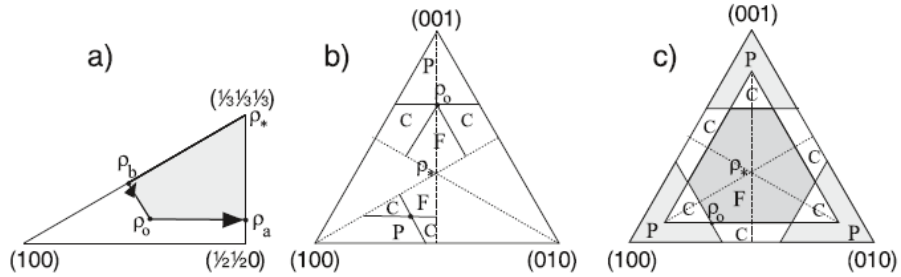


Figure 1: Figure 13.5 The eigenvalue simplex for  $N = 3$ : (a) a Weyl chamber; the shaded region is accessible from  $\rho_0$  with bistochastic maps. (b) The shape of the light cone depends on the degeneracy of the spectrum.  $F$  denotes the future,  $P$  the past, and  $C$  the non-comparable states. (c) Splitting the simplex into Weyl chambers.

- xix )** p. 346, 11-th line after Eq. (12.98), *one 't' is redundant*  
 is: that tthe  $N(N + 1)$   
 should be: that the  $N(N + 1)$
- xx )** p. 347, formula (12.100), number  $t$  in the exponent missing, in the sum on the left hand side is missing,  
 the sum is:  $\sum_{I,J} |\text{Tr} U_I^\dagger U_J|^2$   
 should be:  $\sum_{I,J} |\text{Tr} U_I^\dagger U_J|^{2t}$
- xxi )** p. 422, the very first line, redundant letter  $b$ ,  
 is: complex random pure state on  $NKb$  dimensional Hilbert space,  
 should be: complex random pure state on  $NK$  dimensional Hilbert space,
- xxii )** p.444, Eq. (16.28), change  $|\Omega\rangle \rightarrow |\Psi\rangle_{23}$   
 left hand side, is:  $|\Psi\rangle_1 |\Omega\rangle_{23}$   
 should be:  $|\Psi\rangle_1 |\Phi^+\rangle_{23}$

**xxiii** ) p. 461, 4 lines below Eq. (16.61), font change  $N \rightarrow N$

is:  $\frac{1}{N} \text{Tr} \rho D_{\Phi} \geq 0$   
should be:  $\frac{1}{N} \text{Tr} \rho D_{\Phi} \geq 0$

**xxiv** ) p. 472, Eq. (16.62) – (16.64), curly brackets redundant

(16.62) is:  $\{\Phi \in \mathcal{SP}\}$ , should be  $\Phi \in \mathcal{SP}$

(16.63) is:  $\{\Phi \in \mathcal{P}\}$ , should be  $\Phi \in \mathcal{P}$

(16.64) is:  $\{\Phi \in \mathcal{CP}\}$ , should be  $\Phi \in \mathcal{CP}$

**xxv** ) p. 472, Property (E6), a missing superscript ”-”,

is:  $E(|\psi\rangle\langle\psi^-|) = 1$   
should be:  $E(|\psi^- \rangle\langle\psi^-|) = 1$

**xxvi** ) p. 490, Fig. 16.14. Labels at the entanglement axis  $E$  (vertical in gray)

are: ...0.4, 0.5, *v.6*  
should be: ...0.4, 0.5, 0.6

**xxvii** ) p. 505, third line, typo:  $e \rightarrow h$ ,

is: Her Athens over which see ruled  
should be: Her Athens over which she ruled

**xxviii** ) p. 527, Eq. (17.74), second line, tex error. The equation should read:

$$\begin{aligned} |\Phi_2^5\rangle = & |00000\rangle + |11000\rangle + |01100\rangle + |00110\rangle + |00011\rangle + |10001\rangle - \\ & -|10010\rangle - |10100\rangle - |01001\rangle - |01010\rangle - |00101\rangle - \\ & -|11110\rangle - |11101\rangle - |11011\rangle - |10100\rangle - |01111\rangle . \end{aligned} \quad (17.74)$$

**xxix** ) p. 528, line 2, wrong font used,

is:  $K=4$   
should be:  $K = 4$

**xxx** ) p. 576, reference [112], coma missing

is:  $CP^n$ , or entanglement illustrated,  
should be:  $CP^n$ , or, entanglement illustrated,

**xxxi** ) p. 603, reference [765], wrong numbers

is: 87:05430  
should be: 87:054301