Erratum

Page 85, line -6: Please read $U(t) = \exp(-\mathrm{i}tH)$.

Page 14, Exercise 1.4.1. I am overly optimisitic here. I am assuming that the reader knows the following fact from integration theory: If a (reasonnable) function f defined on an interval I is such the $\int_I \mathrm{d}x f(x)\xi(x) = 0$ for each function ξ which is continuous and with support in I then f is zero a.e. on I.

Page 115, Exercise 4.4.4. The definition of $\mathcal{H}$ should be the definition of $\mathcal{H}'$ and conversely.

Page 163, equation (6.57). This equation is correct, but it is needed only in the case $v = u$. Besides, there is bungled sentence. Instead of "Using integration by parts..." just above (6.57) please read:

The function g_k is an eigenvalue of the Laplacian, of eigenvalue $-\boldsymbol{k}^2/\hbar^2$, as expressed in (6.7). Using integration by parts

$$\int_B \mathrm{d}^3\boldsymbol{x} \sum_{1\leq\nu\leq 3} (\partial_\nu u(\boldsymbol{x}))^2 = -\int_B \mathrm{d}^3 u(\boldsymbol{x}) \sum_{1\leq\nu\leq 3} \frac{\partial^2 u}{(\partial x_\nu)^2}(\boldsymbol{x}),$$

and that the functions g_k form an orthonormal basis, it is straightforward to formally express the Hamiltonian as...

Page 186, proof of Lemma 8.1.9 and Exercise 8.1.10. It would be more in line with the mainstream terminology to call a Hermitian operator whose eigenvalues are ≥ 0 a positive *semidefinite* Hermitian operator rather than a positive Hermitian operator. (On the other hand, as defined on page 194, a positive *definite* Hermitian operator has all its eigenvalues > 0.)

Page 220, equation (9.33). Please read $C \in SL(2,\mathbb{C})$ rather than $C \in SU(2)$. The implication is true for all $C \in SL(2,\mathbb{C})$ and later in the proof it is used that way.

Page 239, four lines from bottom. Instead of
"It holds that $\gamma_\mu S(A) = S(A)\kappa(A)^\nu{}_\mu\gamma_\nu = S(A)\gamma_\nu\kappa(A)^\nu{}_\mu$"
please read
"It holds that $\gamma_\mu S(A) = S(A)\kappa(A^{-1})^\nu{}_\mu\gamma_\nu = S(A)\gamma_\nu\kappa(A^{-1})^\nu{}_\mu$".

Page 740, first column, line -11, read "momentum state space."

The next page numbers refer to the solution of the exercises, which is online on CUPs' web site.

Page 827, solution of Exercise 8.5.3. It is challenging to produce a beautiful geometric picture, but I realized after finishing the book that there is a way to look at this which makes the result trivial to understand (but not necessarily to visualise). The basic observation is that if for a unit vector $\boldsymbol{v}$ we denote by $R_{\boldsymbol{v},\theta}$ the rotation of angle θ around the axis determined by $\boldsymbol{v}$, then for any unit vectors $\boldsymbol{u}, \boldsymbol{v}$, the loop $R_{\boldsymbol{v},4\pi\theta}, 1/2 \leq \theta \leq 1$ can be continuously deformed into the loop $R_{\boldsymbol{u},4\pi\theta}, 1/2 \leq \theta \leq 1$. This is done simply by moving continously the axis of rotation from $\boldsymbol{u}$ to $\boldsymbol{v}$. As a special case, the loop $R_{4\pi\theta}, 1/2 \leq \theta \leq 1$ can be continuously deformed into the loop $R'_{4\pi\theta}, 1/2 \leq \theta \leq 1$, where R'_θ now denote the rotation of angle θ around the third axis oriented *upside down*, which is the same as the rotation of angle $-\theta$ around the third axis, and also the same as the rotation of angle $4\pi - \theta$ around this third axis. Consequently the loop $R_{4\pi\theta}, 0 \leq \theta \leq 1$ can be deformed continously in the loop $S_{4\pi\theta}, 0 \leq \theta \leq 1$ where S_θ is the rotation of angle θ around the third axis if $0 \leq \theta \leq 2\pi$ and is the rotation of angle $4\pi - \theta$ if $2\pi \leq \theta \leq 4\pi$ around the same axis. But it should then be obvious how to contract the loop $S_{4\pi\theta}, 0 \leq \theta \leq 1$.

Page 828 solution of Exercise 8.8.1. The reference given (that the computation is done on page 713) is nonsensical. The computation goes as follows. For $A = \exp(-\mathrm{i}\theta\sigma_3/2)$ then $\kappa(A)$ is the rotation $R(\theta)$ of angle θ around the z axis, so that (8.33) shows that $V(\theta)(\varphi)(\boldsymbol{p}) = \varphi(R(\theta)^{-1}(\boldsymbol{p}))$ and the computation is finished as in (D.64).