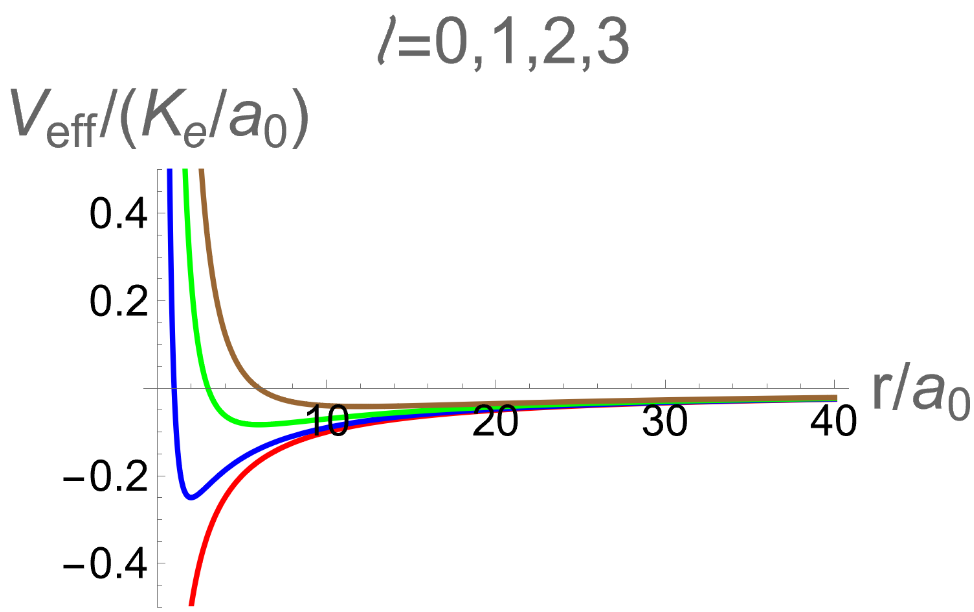
Introductory Quantum Mechanics: A Traditional Approach Emphasizing Connections with Classical Physics

Errata (as of 01/31/22)

1. Page 30. Change "Nostarnd" to "Nostrand."

2. Page 194. Eq. (9.50g) should be $Y_\ell^{-m}(\theta,\phi) = (-1)^m \left[Y_\ell^m(\theta,\phi)\right]^*$.

3. Page 208. In Fig. 10.1, I inadvertantly plotted $\left[-K_e/r + \hbar^2\ell\,(\ell+1)\,/\,\left(\mu r^2\right)\right]/\,(K_e/a_0)$ instead of $\left[-K_e/r + \hbar^2\ell\,(\ell+1)\,/\,\left(2\mu r^2\right)\right]/\,(K_e/a_0)$. The correct graph is given below:



Thanks to Prof. Salvatore Basile of the University of Palermo, Italy, for pointing this out.

4. Page 218. In Eq. (10.54a), it should be x^ℓ instead of $x^{\ell+1}$.

5. Page 227. The word "region" is missing as the last word at the end of the top paragraph.

6. Page 331. Sec. 13.3.5. Change "remains in incomplete theory" to "remains an incomplete theory."

7. Page 375. In last sentence of first paqragraph, change "large" to "small."

8. Page 396, following Eq. (17.23). The function $\Phi(k)$ is not real, in general. It is $|\Phi(k)|$ that is sharply peaked about $k = k_0$.

9. Page 396, last paragraph. Since $\Phi(k)$ is not real, in general, the arguments used in going from Eq. (17.26) to Eq. (17.28) are not valid. In effect, Eq. (17.28) should be replaced by the assumption that the initial wave packet has the form $\psi(x,0) = e^{ik_0x}\psi_{env}(x,0)$, where $\psi_{env}(x,0)$ is a real envelope function. This corresponds to a wave packet moving to the right. Equations (17.42) and (17.56) should be modified accordingly, replacing $|\psi|$ with ψ_{env}. For the Gaussian packet of Eq. (17.43),

$$\Phi(k) = \left(\frac{\sigma^2}{\pi}\right)^{1/4} e^{-(k-k_0)^2\sigma^2/2} e^{i(k-k_0)x_0}$$

is not real, but $\psi(x,0) = e^{ik_0x}|\psi(x,0)|$, as in Eq. (17.28).

10. Page 400. In seventh line change "Fig. 17.3" to "Fig. 17.2."

11. Page 406. Problem 17.3-5 (b). Since the reflection and transmission coefficients in the text [Eqs. (17.52)] have $\phi(k) = -\phi_R(k)$ and since in this problem I define

$$R(k) = |R(k)|\, e^{i\phi_R(k)}; \qquad T(k) = |T(k)|\, e^{i\phi_T(k)},$$

the quantum time delays for the reflected and transmitted packets are given by

$$\begin{aligned} t_d^R &= \frac{1}{v_0}\frac{d\phi_R}{dk_0}; \\ t_d^T &= \frac{1}{v_0}\frac{d\phi_T}{dk_0}. \end{aligned}$$

12. Page 503. Equation (20.53) should be $\langle n\ell \| r^{(1)} \| n', \ell' \rangle = -\langle n', \ell' \| r^{(1)} \| n\ell \rangle$ or $\langle n\ell \| r^{(1)} \| n', \ell \pm 1 \rangle = -\langle n', \ell \pm 1 \| r^{(1)} \| n, \ell \rangle$.

13. Page 625. In problem 1-2, for the $2S - 2P$ transition rate, you need to actually calculate the $2S_{1/2} - 2P_{1/2}$ transition rate since the $2P_{3/2}$ state lies above the $2S_{1/2}$ state.