

PHYS 4310, Homework 2 due on September 16th, 2015

Griffiths (2nd edition): 2.1 (15 points), 2.4 (15 points), 2.5 (15 points), 2.7 (12 points), 2.9 (5 points)

6. (6 points) Find the wavelength (μm) and energy (in meV) for the following wavenumbers: 10 cm^{-1} , 250 cm^{-1} , 1500 cm^{-1} .

7. (10 points) A particle is in the n^{th} energy state, $\psi_n(x)$ of an infinite square well potential with width L , where $\psi(x)$ is non-zero over the interval $x[0 : L]$. Determine the probability $P_n(1/a)$ that the particle is confined to the first $1/a$ of the width of the well (hint: you need to calculate the probability of finding a particle from 0 to L/a). As $n \rightarrow \infty$, how does $P_n(1/a)$ behave? The result $P_\infty(1/a)$ is an example of the correspondence principle: that is, as $n \rightarrow \infty$, the quantum mechanical result needs to *correspond* to the classical one.