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## Problem Set #6

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1. A particle of mass  $m$  is trapped in a rectangular infinite well with side lengths  $L_1 = L, L_2 = L/\sqrt{2}, L_3 = L/\sqrt{3}$ . Make a table of  $n_x, n_y, n_z$  values with corresponding values of  $E$  for the six lowest energy eigenvalues with  $E$  measured in units of  $\pi^2 \hbar^2 / 2mL^2$ .

Problems 2-4 refer to: An electron is trapped in a rectangular infinite well with side lengths  $L_1 = L, L_2 = L_3 = L/10$ . Let  $L = 2$  nm.

2. What are the electron's ground state and first excited state energies (in eV). Use  $\pi^2 (\hbar c)^2 / 2mc^2 L^2$ , where all quantities are in eV, eV-nm, or nm.
3. What is the wavelength of the photon that is emitted when the electron in problem 2 makes a transition from the first excited state to the ground state?
4. Suppose the energy of the electron state  $(n_x, 1, 1)$  is greater than or equal to the energy of the state  $(1, 2, 1)$ . What is the smallest value of  $n_x$  for which this is true?