Concept of degeneracy in the case of electrons in a 3D box.

QB

1. cubical box of length L is enclosed with 5 identical (all spin-up) electrons. Find the highest energy of the electron and its corresponding wavefunction (spatial states).

2. For a 3 D infinite potential well of length L which is symmetric about the origin, write the wavefunctions for all the combinations of the following three positive integer quantum numbers (n_x, n_y, n_z)=(1,1,3).

3. Plot the wavefunction of the following states in 3D box of side 20nm:
   a. ψ_{111}
   b. ψ_{222}
   c. ψ_{333}

4. Plot the probability density of the following states in 3D box of side 20nm:

d. ψ_{111}

e. ψ_{222}

f. ψ_{333}