

EECS 277C Nanotechnology HW #1

1. Consider a single electron in a box. Calculate the size of the box at which only the ground state is occupied at room temperature.
2. Same as 1. But use the effective mass of Si, GaAs, InSb (3 answers).
3. At what temperature would a 10 nm x 10 nm x 10 nm box have to be lowered to in order for only the lowest energy state to be occupied?
4. Now, consider many electrons in a box with Fermi energy of 10 eV. Find the total # of states in a box with size that you calculated in problem #1.