Primer on Semiconductors: Lecture 2.4 Short Problem

Mark Lundstrom
Purdue University, Fall 2018

Provide a numerical answer to the question below.

Consider an electron in the conduction band of GaAs with an energy equal to the average thermal energy, . Assume that the conduction band is parabolic with and effective mass of and answer the following questions.

- **Compute the magnitude of the wave vector, k.**

2) Compare your answer to 1) with the maximum wave vector in the Brillouin as estimated from where the lattice spacing is Angstroms.

What do you conclude from this exercise?