
PROBLEM SET 8

NOTE:

No class Tuesday Nov. 21 or Thursday Nov. 23 (Thanksgiving).

Makeup class on Tuesday December 5 at 9:30 am in 2111 FRH.

Office hours: Dr. Zhi Chen will have office hours from 2:00 – 3:00 pm on Monday Nov. 27 in 2169 FRH.

Reading: Ashcroft and Mermin (AM) Chapter 28

Problems:

1. AM 28.1
2. AM 28.4
3. Using the data given in AM Ch. 28, calculate the number of positive and negative carriers per cm^3 present at 300 K in (a) pure Ge. (b) Ge doped with 10^{16} As impurities per cm^3 . (Note: It is crucial to count the various pockets and bands correctly. For the purposes of the problem, you may ignore the third hole band shown in AM Fig. 28.8, which since it is ~ 0.3 eV below the other two will not contribute appreciably. Treat the two hole bands as spherical with the effective masses given in AM.)