CHAPTER OVERVIEW

8: Quantum Statistical Mechanics

One of the important lessons of quantum mechanics is that there is no a priori meaning to qualities of any system, no independent reality, aside from what can be defined operationally in terms of observations. Thus we cannot speak of this electron (or photon, or any other particle) versus that electron (or photon, or any other particle). We can only say that there is one particle with a certain set of values for observables and there is another, perhaps with a different set of values for observables. This basic identity of particles affects the counting of states and hence leads to distributions different from the Maxwell-Boltzmann distribution we have discussed. This is the essential refinement due to quantum statistics.