

FIGURE 2.1

Born and Oppenheimer. (a) Max Born (1862–1970) played a key role in developing quantum mechanics and is known for many contributions. He was awarded the Nobel Prize in 1954. (b) J. R. Oppenheimer (1904–1967) is known for many contributions including the Born–Oppenheimer approximation. He headed the Manhattan project and is considered as the “father of the atomic bomb.” (Oppenheimer photo courtesy of Los Alamos Scientific Laboratory, *Los Alamos: Beginning of an Era*, 1943–1945, LASL, Los Alamos, 1986.)

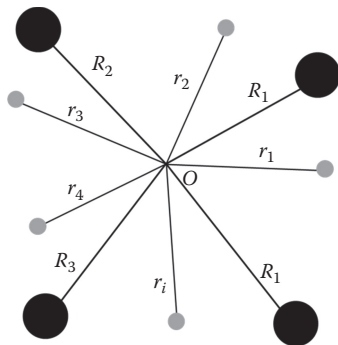


Figure 2.2

Filled circles and dots denote ions and electrons, respectively.  $O$  denotes the origin.

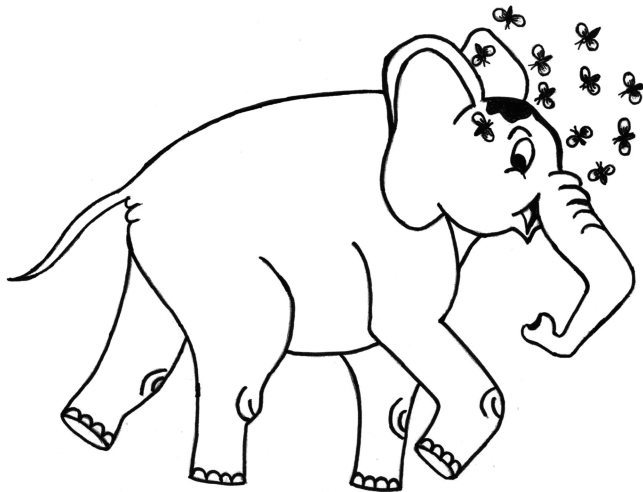


Figure 2.3  
An elephant and bees.

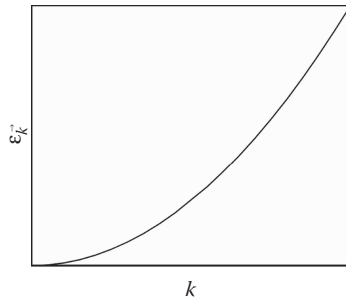


Figure 2.4  
Free electron energy dispersion.

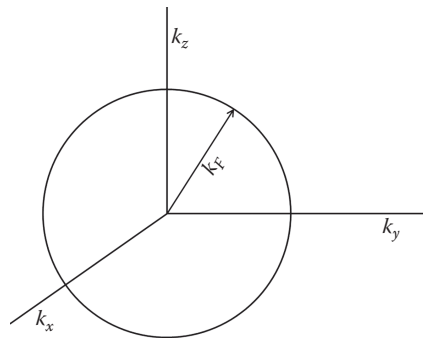


Figure 2.5  
Free electron Fermi surface.

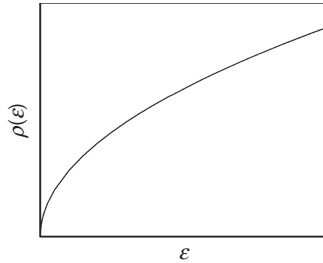


Figure 2.6  
Free electron DOS.

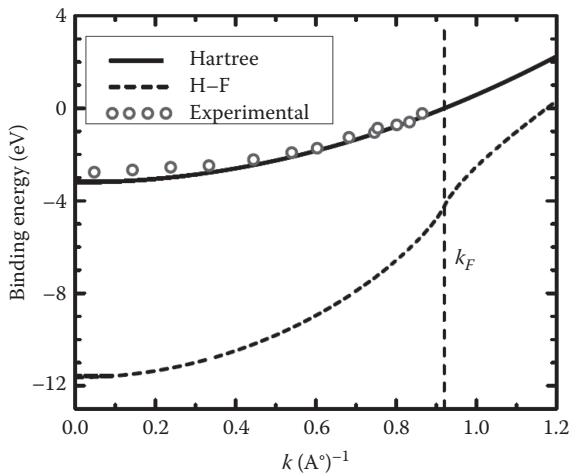


Figure 2.7

Hartree (solid line) and H-F (dashed line) bands corresponding to parameters for Na (lattice constant  $a = 4.225 \text{ \AA}$ ). Also shown are experimental bands using ARPES. (Adapted from Lyo I. W. and Plummer E. W. 1988. *Phys. Rev. Lett.* 60: 158, 1561.)

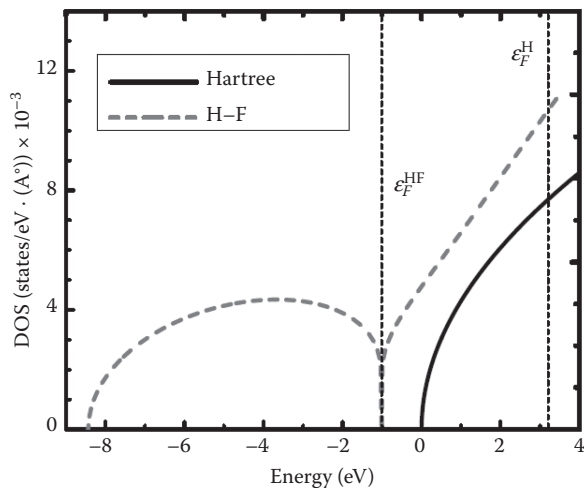


Figure 2.8

DOS using Hartree (solid line) and H-F (dashed line) approximations using parameters corresponding to Na (lattice constant  $a = 4.225 \text{ \AA}$ ). Note that the Hartree DOS has been scaled down by a factor of 3.