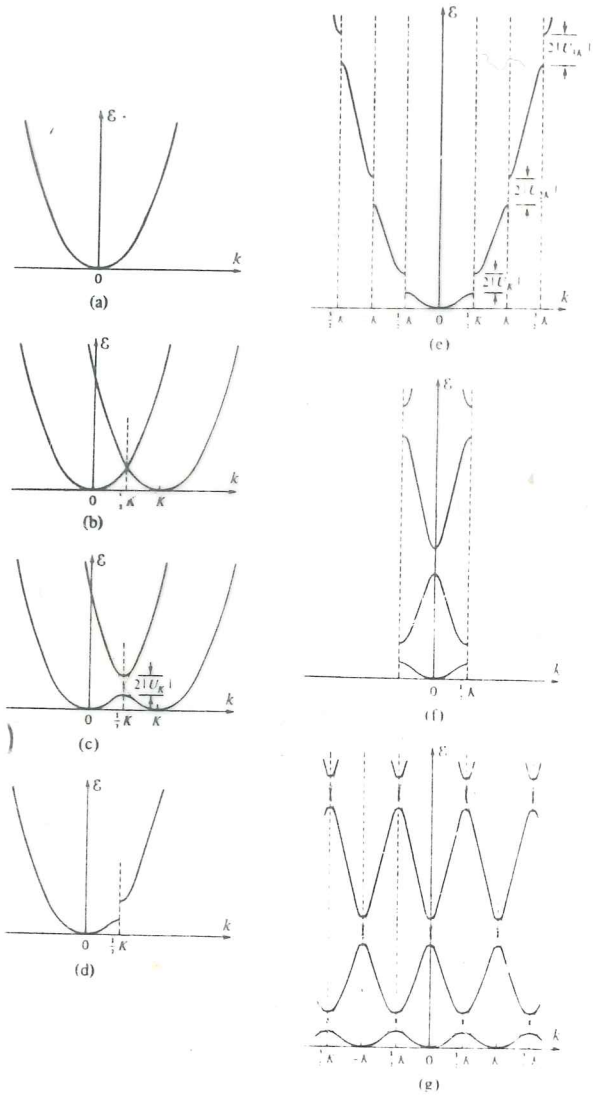
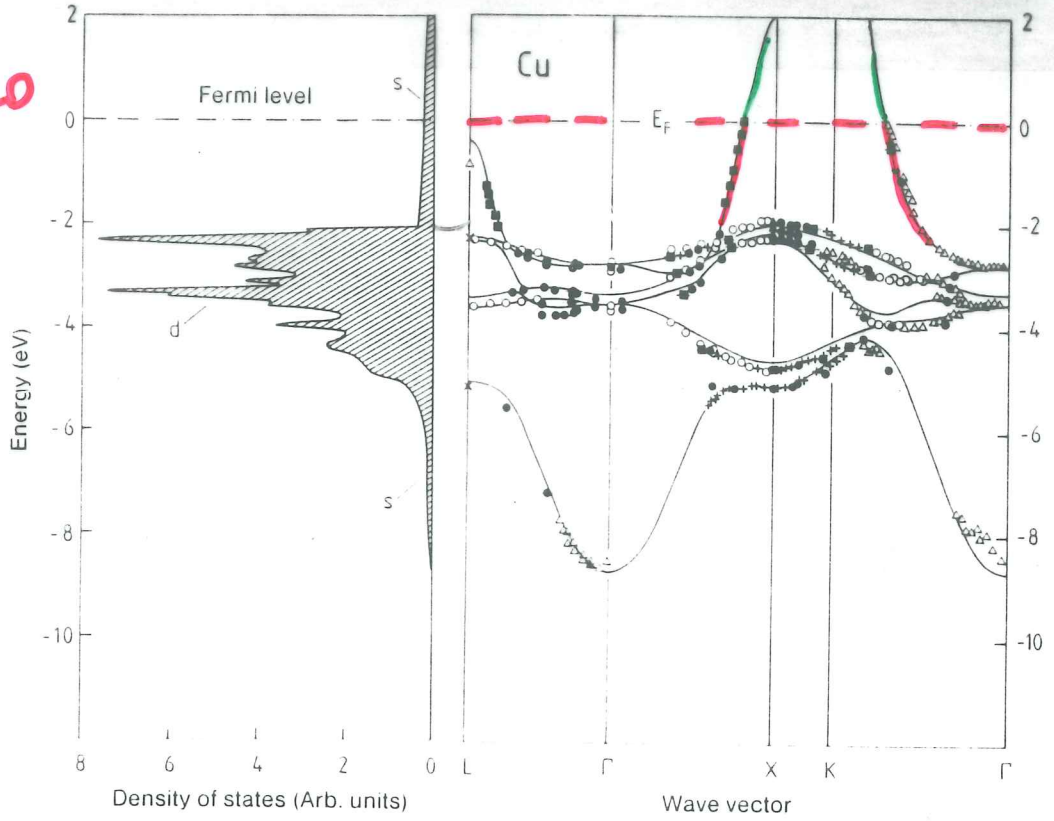


Figure 9.4
(a) The free electron ε vs. k parabola in one dimension. (b) Step 1 in the construction to determine the distortion in the free electron parabola in the neighborhood of a Bragg "plane," due to a weak periodic potential. If the Bragg "plane" is that determined by K, a second free electron parabola is drawn, centered on K. (c) Step 2 in the construction to determine the distortion in the free electron parabola in the neighborhood of a Bragg "plane." The degeneracy of the two parabolas at $K/2$ is split. (d) Those portions of part (c) corresponding to the original free electron parabola given in (a). (e) Effect of all additional Bragg "planes" on the free electron parabola. This particular way of displaying the electronic levels in a periodic potential is known as the *extended-zone scheme*. (f) The levels of (e), displayed in a *reduced-zone scheme*. (g) Free electron levels of (e) or (f) in *a repeated-zone scheme*.

STRUTTURE A BANDE

METALLO



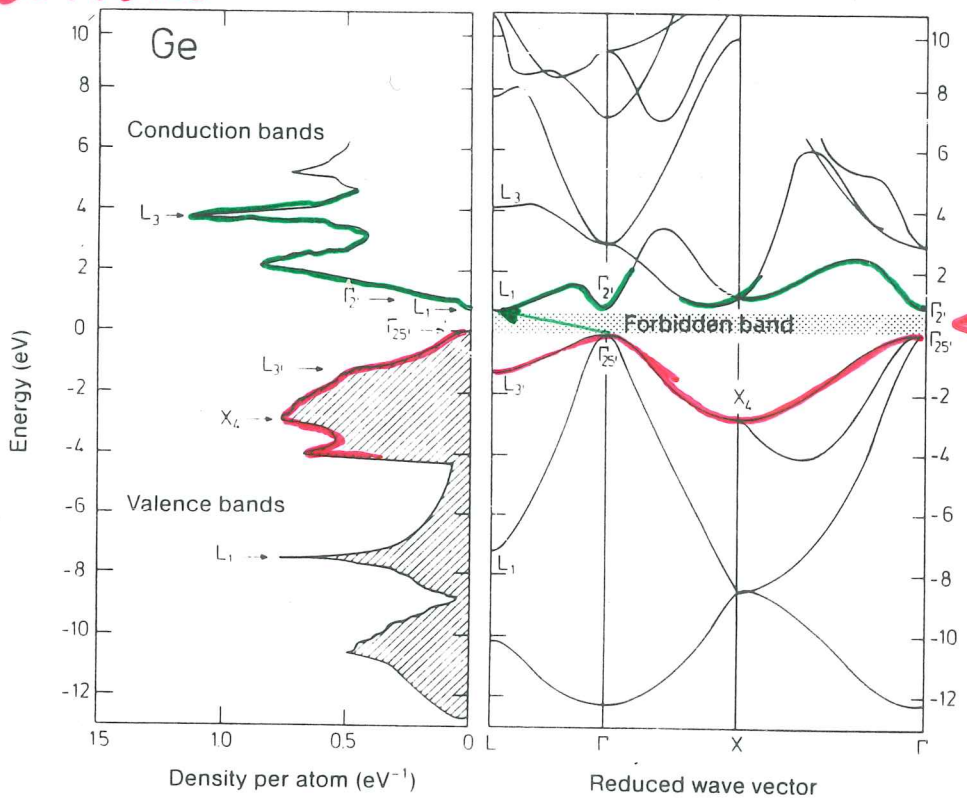
— Vuoti
E_F
— Pieni

Fig. 7.12. Bandstructure $E(k)$ for copper along directions of high crystal symmetry (*right*). The experimental data were measured by various authors and were presented collectively by Courths and Hufner [7.4]. The full lines showing the calculated energy bands and the density of states (*left*) are from [7.5]. The experimental data agree very well, not only among themselves, but also with the calculation

SEMICONDUTTORE

Vuoti

Pieni



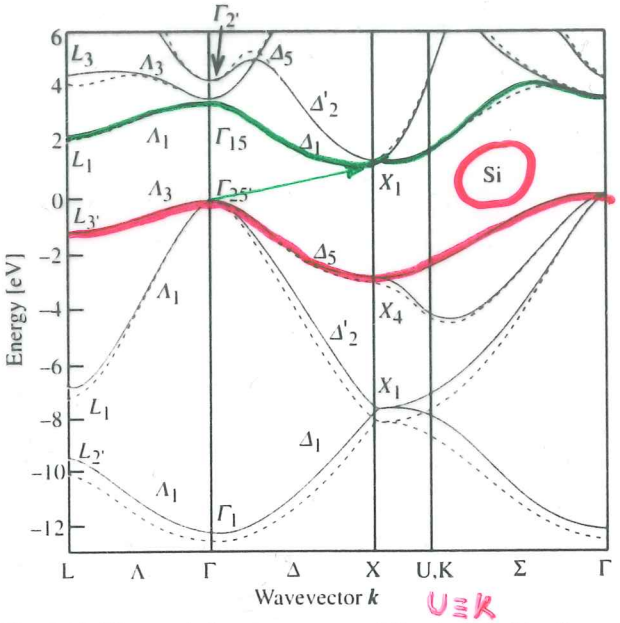
— Vuoti
← GAP
— PIENI

GAP INDIRETTA

$k_c(min) \neq k_v(max)$

Fig. 7.13. Theoretically derived bandstructure $E(k)$ for germanium along directions of high symmetry (*right*), and the corresponding electronic density of states (*left*). A number of critical points, denoted according to their position in the Brillouin zone (Γ, X, L), can be seen to be associated with regions of the bandstructure where $E(k)$ has a horizontal tangent. The shaded region of the density of states corresponds to the states occupied by electrons [7.6]

ESEMPIO di STRUTTURA A BANDE



Vuoti = Conduzione

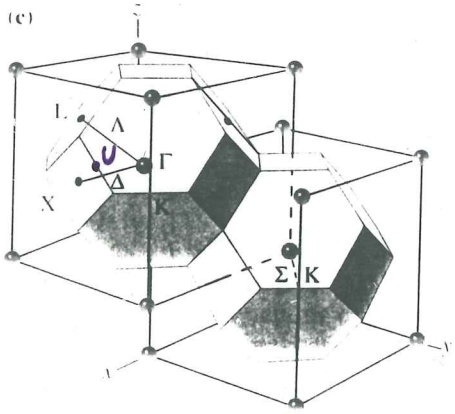
← GAP

Pieni = Valenza

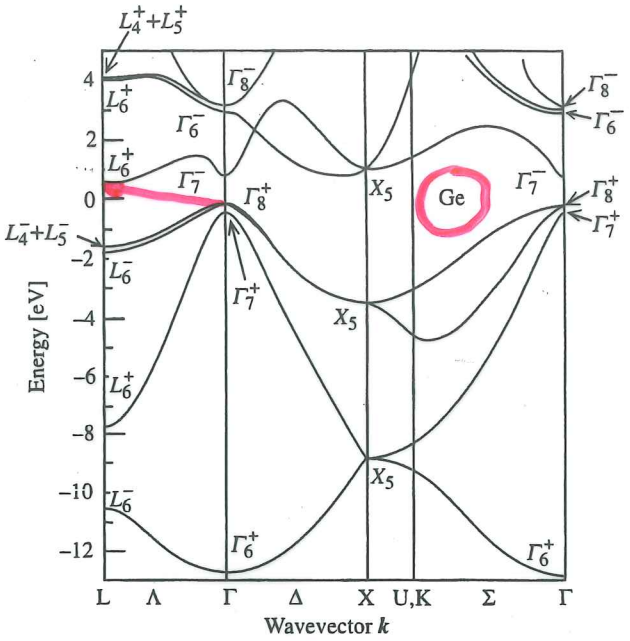
Gap indiretta

k_c (min) ≠ k_v (max)

Fig. 2.10. Electronic band structure of Si calculated by the pseudopotential technique. The *solid* and the *doted lines* represent calculations with a **nonlocal** and a **local pseudopotential**, respectively. [Ref. 2.6, p. 81]



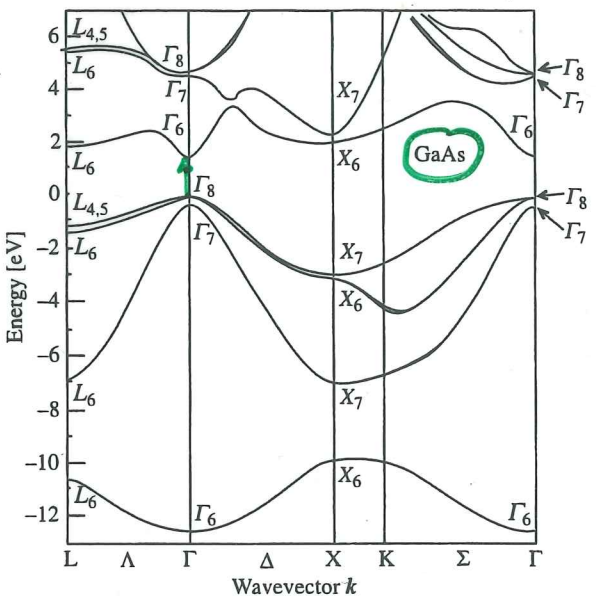
Γ, Λ, Σ sono nomi dovuti alle proprietà di simmetria dei punti nel reticolo reciproco — o simmetria nelle funzioni d'onda.



GAP INDIRETTA

Diamante
Si
Ge
SiC
GaP
AlAs
AlSb

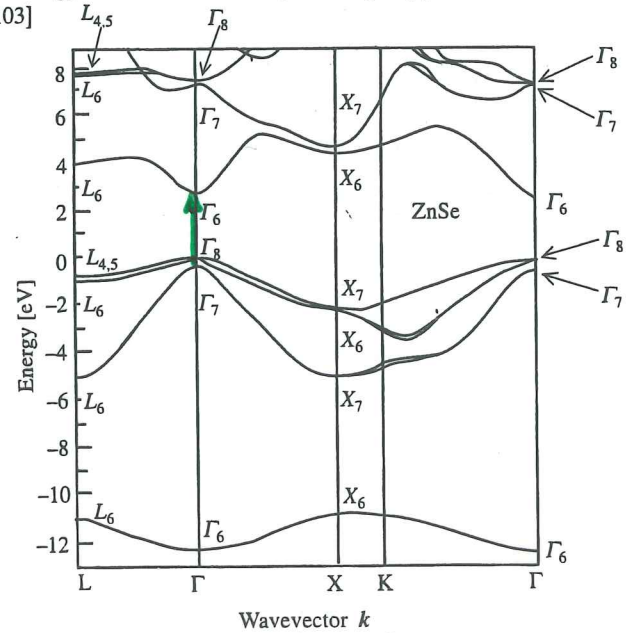
Fig. 2.13. Electronic band structure of Ge calculated by the pseudopotential technique. The energy at the top of the filled valence bands has been taken to be zero. Note that, unlike in Fig. 2.10, the double group symmetry notation is used [Ref. 2.6, p. 92]



GAP DIRETTA

GaAs
GaN
GaSb
InP
InAs
InSb

Fig. 2.14. Electronic band structure of GaAs calculated by the pseudopotential technique. The energy scale and notation (double group) are similar to those for Fig. 2.13 [Ref. 2.6, p. 103]



GAP DIRETTA

II – VI

CdTe

Fig. 2.15. Electronic band structure of ZnSe calculated by the pseudopotential technique. The energy scale and notation (double group) are similar to those for Fig. 2.13 [Ref. 2.6,