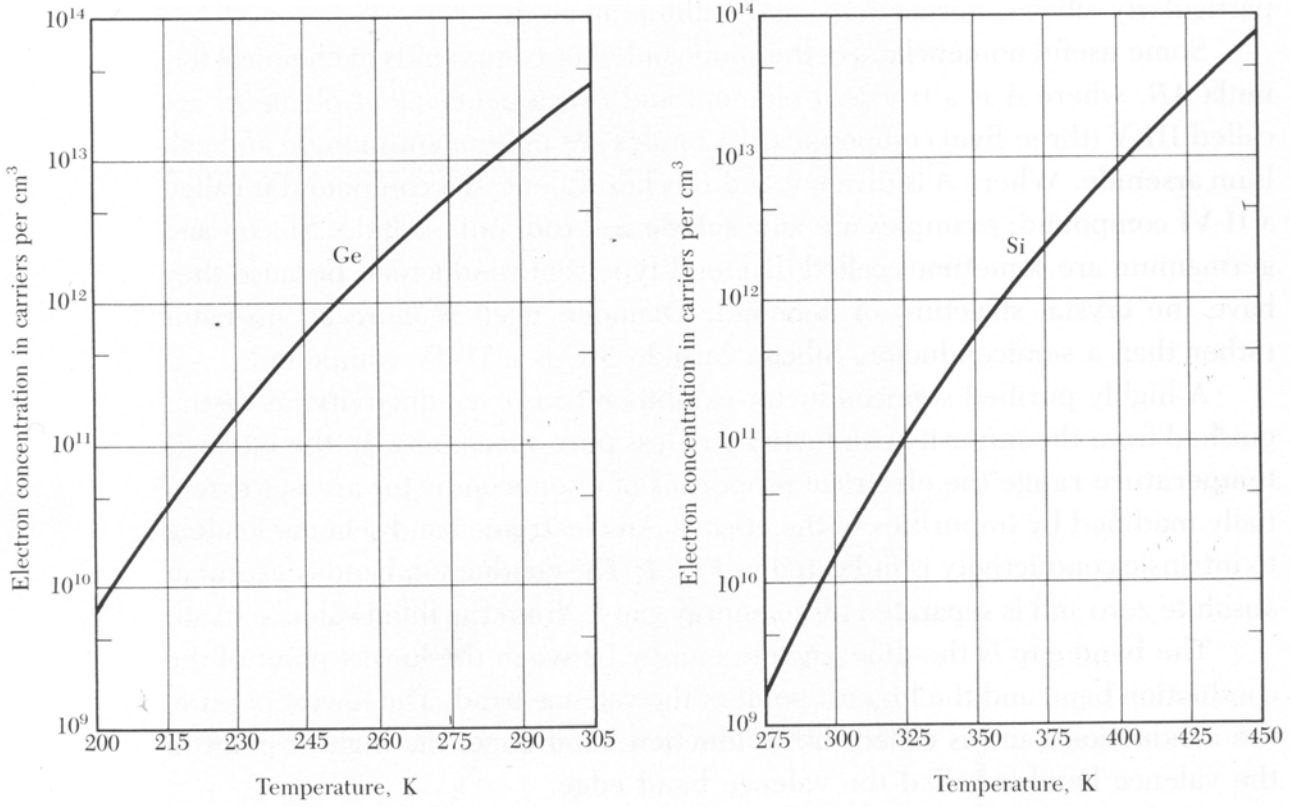
Halbleiter

Temperaturabhängigkeit der Elektronenkonzentration

Germanium *Silizium*



(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

Halbleiter

typische Bandlücken

Table 1 Energy gap between the valence and conduction bands

(i = indirect gap; d = direct gap)

Crystal	Gap	E_g, eV 0 K	E_g, eV 300 K	Crystal	Gap	E_g, eV 0 K	E_g, eV 300 K
Diamond	i	5.4		HgTe[a]	d	−0.30	
Si	i	1.17	1.11	PbS	d	0.286	0.34–0.37
Ge	i	0.744	0.66	PbSe	i	0.165	0.27
αSn	d	0.00	0.00	PbTe	i	0.190	0.29
InSb	d	0.23	0.17	CdS	d	2.582	2.42
InAs	d	0.43	0.36	CdSe	d	1.840	1.74
InP	d	1.42	1.27	CdTe	d	1.607	1.44
GaP	i	2.32	2.25	ZnO		3.436	3.2
GaAs	d	1.52	1.43	ZnS		3.91	3.6
GaSb	d	0.81	0.68	SnTe	d	0.3	0.18
AlSb	i	1.65	1.6	AgCl		—	3.2
SiC(hex)	i	3.0	—	AgI		—	2.8
Te	d	0.33	—	Cu_2O	d	2.172	—
ZnSb		0.56	0.56	TiO_2		3.03	—

[a]HgTe is a semimetal; the bands overlap.

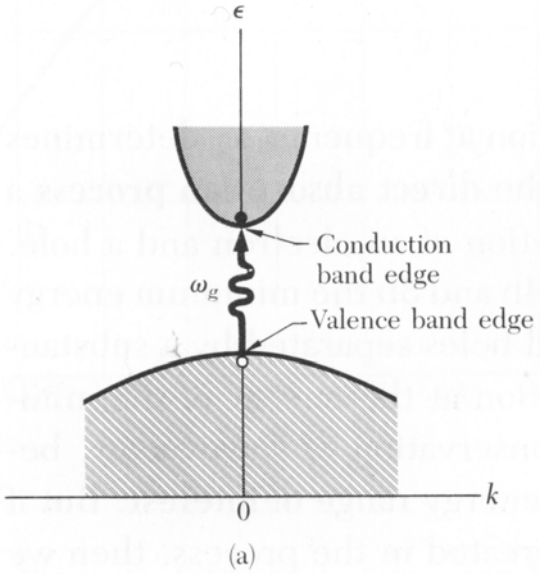
(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

Halbleiter

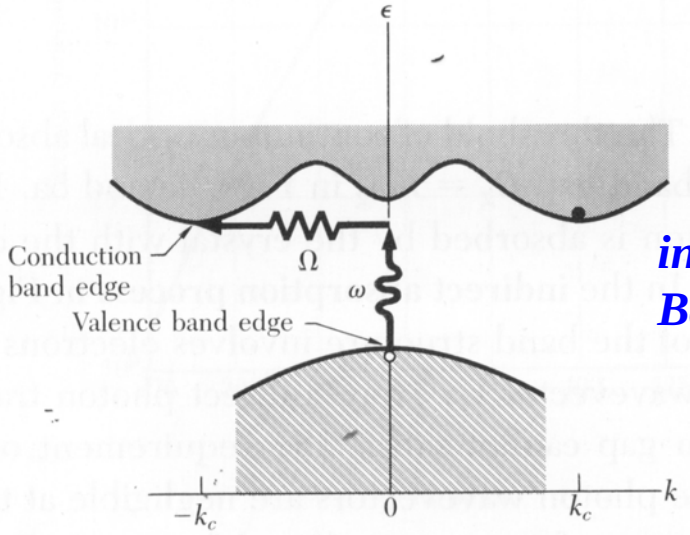
direkter Halbleiter

indirekter Halbleiter

direkte Bandlücke



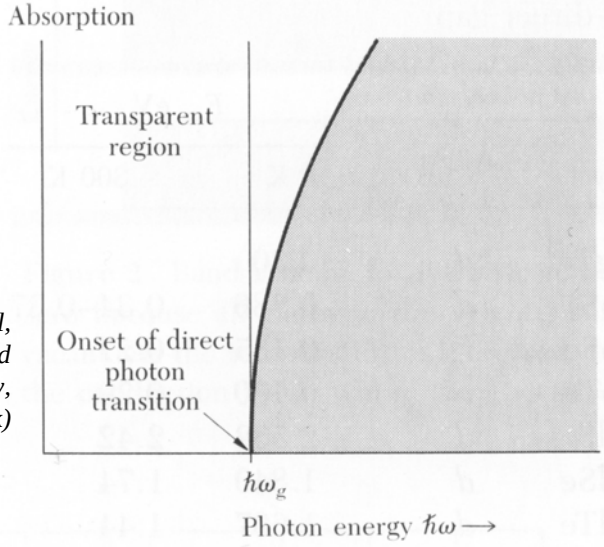
(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)



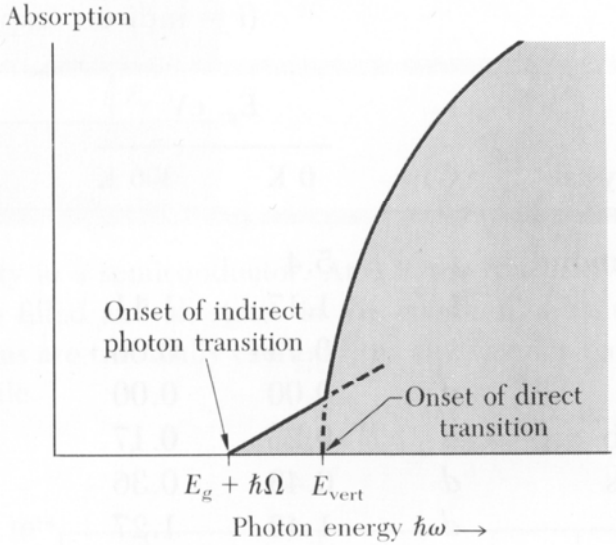
indirekte Bandlücke

(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

direkte Absorption



(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

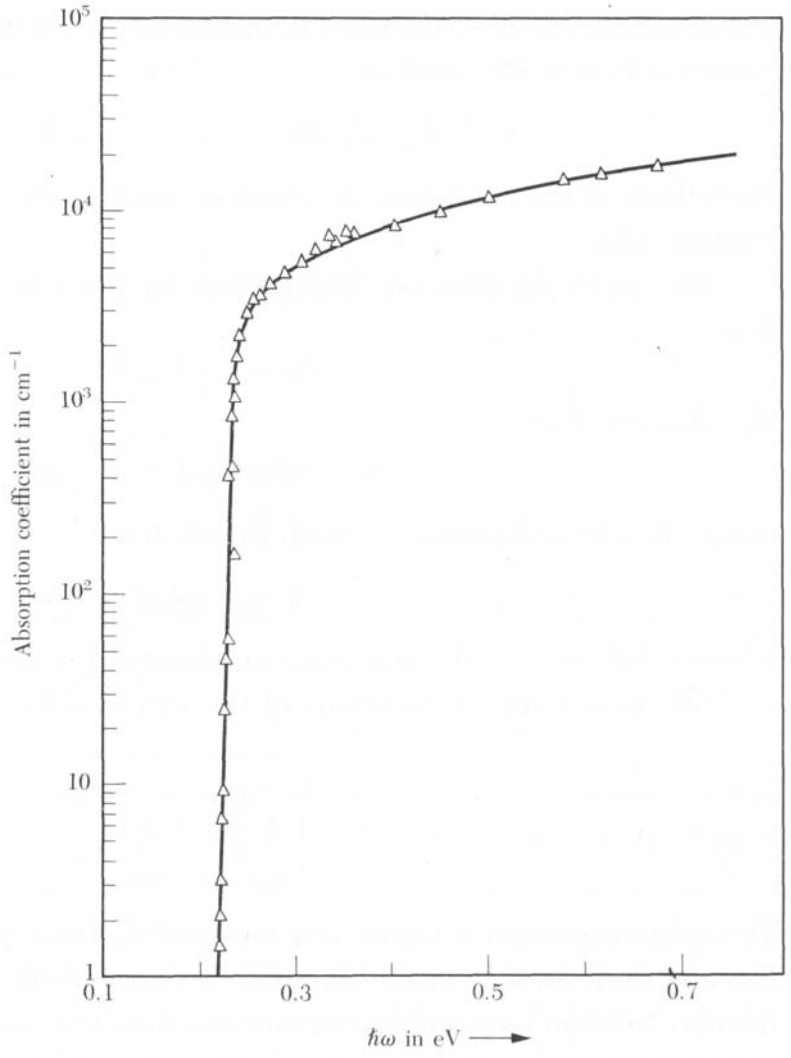


indirekte Absorption

(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

Halbleiter

optische Absorption von InSb

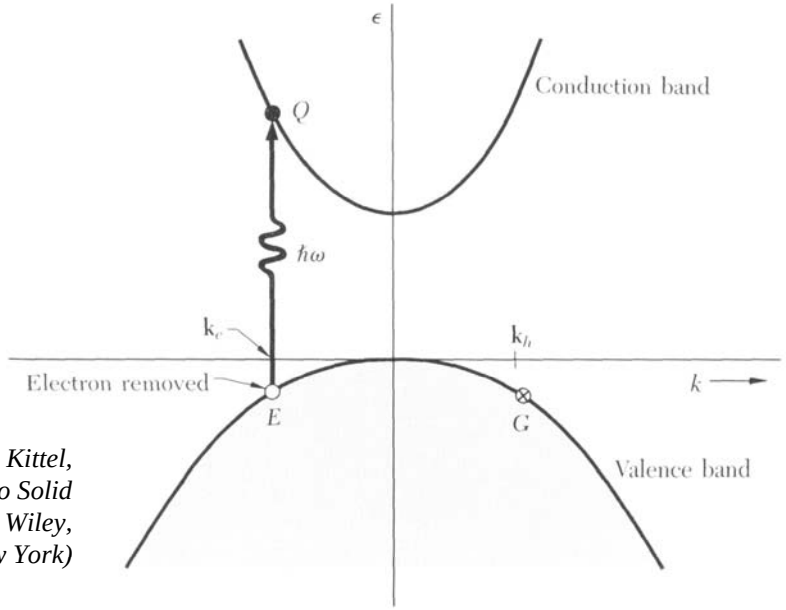


(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

Halbleiter

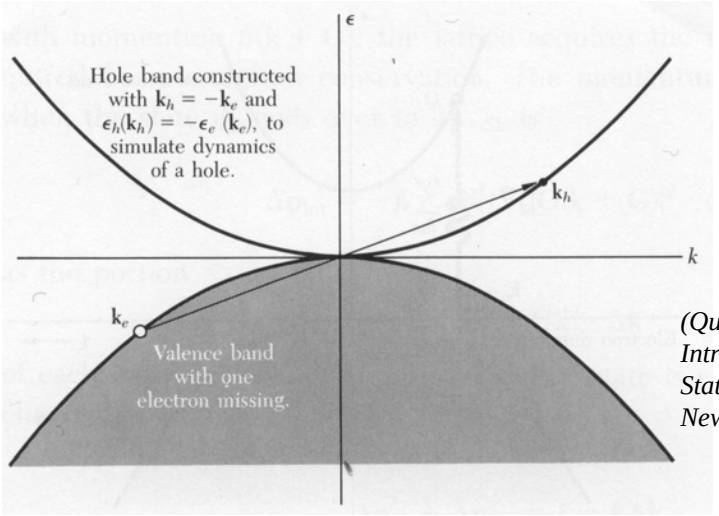
Loch-Zustand

Loch-Wellenvektor



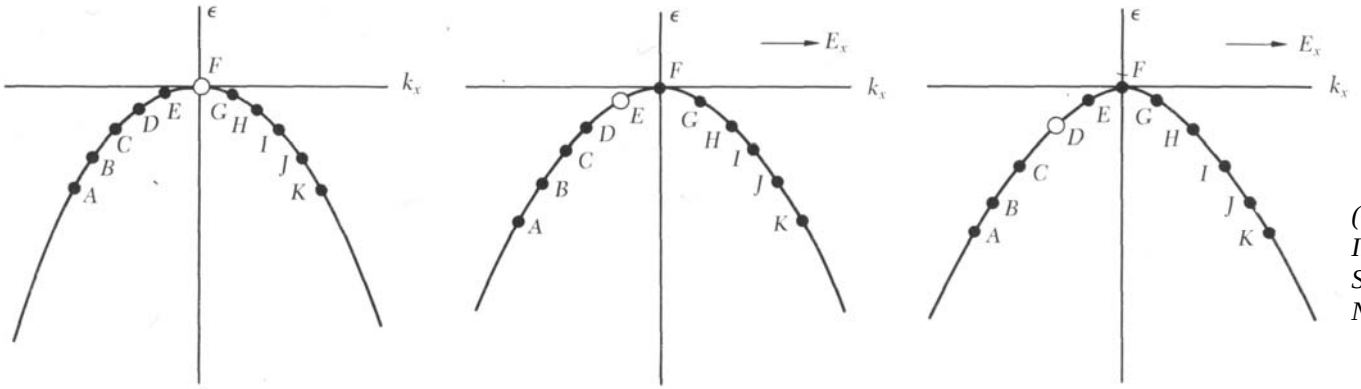
(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

Loch-Energie



(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)

Loch-Strom



(Quelle: Ch. Kittel, Introduction to Solid State Physics, Wiley, New York)