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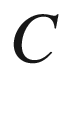
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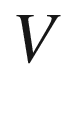
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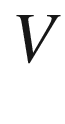
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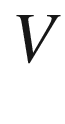
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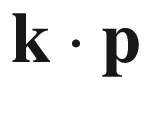
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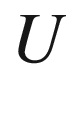
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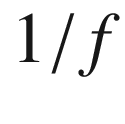
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average temperature

Bose-Einstein model

broadening

dispersion

emission

energy

infrared active

LA

LO

long wavelength

optical

emission

replica

soft

TA

TO

phonon-drag

phosphor

phosphorescence

photocatalysis

photoconductivity

persistent

photoconductor

photodetector

FIR

quantum well intersubband

traveling wave

photodiode

array

avalanche

bipolar

metal-semiconductor-metal

pin

stacking

photometry

photon

counting

photoresistor

piezoelectricity

pinch-off

planar technology

Planck's law

plane

high index

plasma

frequency

plasmon

plastic flow

pnictide

point

critical

crossover

defect, *see* defect, point

Dirac

F

$$\Gamma  $$

group, *see* group, point

K

L

M

saddle

X

Poisson

equation

ratio

statistics

polariton

lower branch

surface plasmon

polarizability

polarization

circular

electric

ferroelectric

light

p

s

spin

spontaneous

TE

time-dependent

TM

polaron

small

poling

periodic

polyhedra

polymer

chain

polymorphism

polytypism

Poole–Frenkel effect, *see* effect, Poole--Frenkel

population

inverted

position sensing detector

potential

asymmetric

atomic interaction

built-in

chemical

confinement

Coulomb

crystal

distribution

double well

external

fluctuation

hard wall

harmonic

hydrostatic deformation

inversion surface

ion core

lateral

$$\sim  $$

well

Lennard–Jones

long-range Coulomb

minimum

optical deformation

periodic

piezoelectric

pure Coulomb

screened Coulomb

short range

triangular

two-dimensional well

well

three-dimensional

power

maximum

noise

output

spectral

thermoelectric

total

pre-breakdown

precipitate

precursor

pressure

high

hydrostatic

partial

vapor

process

activation

causal

processing temperature

propagation

direction

punch-through

Purcell effect

purity

pyroelectricity

pyrolysis

Q

quadrupole

quality factor, *see* factor, quality

quantum

box, *see* quantum, dot

dot

charge tunable

cleaved-edge overgrowth

cubic

lens-shape

pyramidal

self-assembled

spherical

stack

efficiency, *see* efficiency, quantum

electrodynamics

magnetic flux

well

coupled

energy level

multiple

sidewall

vertical

wire

cleaved-edge overgrowth

T-shaped

V-groove

quantum defect, *see* defect, quantum

quantum dot, *see* quantum, dot

quantum Hall effect, *see* Hall, effect

quantum statistics

quantum wire, *see* quantum, wire

quarter-wave stack

quasi-Fermi level, *see* Fermi, level

quasicrystal

R

Rabi frequency

radiance

radiometry

radius

self-limited

random bit pattern

random walk

Rashba effect

rate

Auger recombination

capture

emission

escape

generation

growth

net recombination

pulling

recombination

thermal Auger generation

thermal generation

tunneling

recombination

Auger

band–band

band–impurity

bimolecular

bound-exciton

center

current

donor–acceptor pair

dynamics

excitons

free-exciton

lineshape

nonradiative

quantum well

radiative

rate, *see* rate, recombination

spectrum

spontaneous

surface

velocity

rectification

rectifier

metal–semiconductor

point contact

reflectance

reflection

anisotropy spectroscopy

distributed

low

total

region

space-charge

relaxation

carrier

plastic

time-constant, *see* time-constant, relaxation

resharpening

resistance

negative differential

serial

shunt

resistivity

high

negative differential

transverse

resonator

deformed

microscopic

spiral

responsivity

reststrahlenbande

richardson constant, *see* constant, Richardson

rocksalt structure, *see* structure

rotation

general

improper

roughness

S

saturation

electron density

scalar

scattering

deformation potential

elastic

$$\sim  $$

process

grain boundary

hot-carrier

impurity

inelastic

intervalley

ionized impurity

matrix

microscopic process

phonon

piezoelectric potential

polar optical

process

Rutherford

spin

theory

time

Schönfließ notation

Schottky

barrier, *see* barrier, Schottky

Schottky effect

Schrödinger equation

scintillation detector

scintillator

scrolling

direction

second-harmonic generation

Seebeck effect

selection rule

optical

polarization

self-assembly

self-consistent

semiconductor

alloy

amorphous

compound

diluted magnetic

doped

elemental

ferroelectric

history

II–VI

III–V

indirect

inhomogeneous

intrinsic

lead salts

magnetic

nonpolar

organic

oxide

polarized

polycrystalline

properties

semi-insulating

small band gap

small-gap

wide band gap

wide-gap

semipolar

Shell structure, *see* structure, shell

Shockley—Queisser limit

Shockley—Read—Hall kinetics

Shubnikov-de Haas effect

side-mode suppression ratio

signal-to-noise ratio

singularity

Fermi-edge

van-Hove

snapback time

Snell's law

sol-gel process

solar

cell

spectrum

solid-state multiplier

solubility

source

space group, *see* group, space

space-charge limited current

space-charge region

capacitance

spectroscopy

deep level transient

Mössbauer

Raman

spectrum

noise

spin

alignment

glass

LED

nuclear

polarization

rotation

splitting, *see* splitting, spin

total

transistor

spin-orbit interaction

spinodal

decomposition

spintronics

spliting

spin

splitting

crystal field

Rabi

spin

valley-orbit

Zeeman

stacking

Bernal

vertical

stacking fault

energy

extrinsic

intrinsic

Stark effect

quantum confined

second-order

state

dark

edge

macroscopic quantum

midgap surface

triplet

step

bunch

monoatomic

surface

Stirling's formula

stoichiometry

Stokes shift

Stoney's formula

strain

bending

biaxial

compressive

distribution

energy

homogeneous

hydrostatic

in-plane

inhomogeneous

large

management

microscopic

misfit

plastic relaxation

random

relaxation

shear

small

tensile

tensile surface

tensor

three-dimensional

streaming motion

stress

–strain relation

biaxial

external

superposition

three-dimensional

uniaxial

structure

band, *see* band structure

chalcopyrite

CsCl

delafossite

diamond

dielectric

field-ring

fluorite

hexagonally close packed

interdigitated

NiAs

orthorhombic

periodically poled

perovskite

pseudomorphic

rocksalt

shell

spinel

tetragonal

wurtzite

zincblende

subband

edge

sublattice

anion

cation

substrate

bending

compliant

curved

hetero-

homo-

patterned

polished

rotation

transparent

sun

superconductivity

superlattice

buffer layer

isotope

surface

cracks

energy

index

isoenergy

isofrequency

passiviation

phonon

plasmon

reconstruction

resonance

state

vicinal

surface state

susceptibility

electric

magnetic

nonlinear third-order electric dipole

switch

symmetry

chiral

inversion

mirror

parity

reduction

surface

tetrahedral

time reversal

trigonal

T

tail

carrier distribution

exponential

states

Urbach, *see* Urbach tail

Taylor series

temperature

blackbody

characteristic

Curie

Curie–Weiss

Debye

difference

electron

gradient

lattice

local

tensor

conductivity

dielectric

magneto-optic

dielectric function

effective mass

effective-mass

nonlinear third-order electric dipole susceptibility

resistivity

terrace

theory

Drude, *see* Drude theory

effective mass, *see* effective mass, theory

Laughlin, *see* Laughlin theory

perturbation

time-dependent perturbation

thermal instability

thermalization

incomplete

thermopower

thickness

barrier

critical

film

oxide

quantum well

Thomson heating

threshold

tight-binding model

tilt

time constant

decay

LO phonon emission

RC

relaxation

reorientation

topological invariant

topology

transconductance

differential

transistor

bipolar

effect

field-effect

heterobipolar

high electron mobility

JFET

junction field effect

light-emitting

MESFET

MOSFET

organic

planar

point contact

spin, *see* spin, transistor

thin film

transit time

transition

band–band

dipole

direct

displacement

donor–acceptor pair

forbidden

indirect

intersubband

metal

metal–insulator

Mott

optical

probability

transmission

transparency

transport

ballistic

Boltzmann theory

charge

coupled heat and charge

diode current

heat

heat energy

high frequency

high-field

hopping

ionic

low-field

magneto-, *see* magnetotransport

trap

filled

multilevel

surface

trion

tuning range

tunneling

assisted

current

direct

Fowler–Nordheim

inelastic

phonon-assisted

photon-assisted

rate, *see* rate, tunneling

Zener

turn-on delay time

twin

boundary

lamella

twist

two-electron satellite

two-photon process

U

umklapp process

uniaxial

unit cell, *see* cell, unit

volume

Urbach tail

V

vacancy

vacuum

level

tube

ultrahigh

valence band, *see* band, valence

valley

current

L

X

van-der-Pauw geometry

van-Hove singularity, *see* singularity, van-Hove

varactor

variable range hopping

variance

Varshi's formula

vector

antiphase

Burger's, *see* Burger's vector

displacement

in-plane wave

line

potential

reciprocal lattice

translation

wave

Vegard's law

velocity

average carrier

drift saturation

effective diffusion

glide

group

light

match

maximum

maximum drift

mismatch

overshoot

phase

sound

surface recombination

thermal

Vernier effect

void

voltage

bias

breakdown

built-in

diffusion

flat-band

gain

gate, *see* gate, voltage

maximum reverse

open-circuit

pinch-off

reach-through

reference

regulator

threshold

turn-on

vortex

W

wafer

bending, *see* substrate, bending

bonding

breakage

diameter

edge

epiready

flat

Wannier's theorem

warping

wave

acoustic

compression

electromagnetic

equation

evanescent

longitudinal

plane

shear

sound

standing

transverse

traveling

vector

wavefunction

d

many-electron

overlap

strongly localized

waveguide

plasmon

weiss oscillation, *see* oscillation, Weiss

well capacity

Wiedemann–Franz law

Wiener—Khintchine theorem

work function

wurtzite structure, *see* structure

Y

Young's modulus

Z

zincblende

zincblende structure, *see* structure

zone

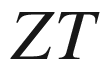
boundary

vicinity

Brillouin, *see* Brillouin zone

reduced scheme

scheme



-value

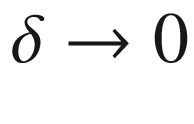
Footnotes

[1](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn1_source)

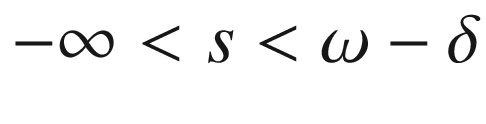
The requirements for the function *f* to which the KKR apply can be interpreted as that the function must represent the Fourier transform  of a linear and causal physical process.

[2](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn2_source)

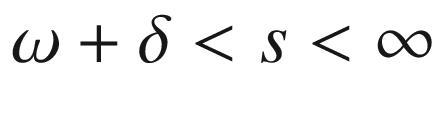
The Cauchy principal value Pr of the integral is the limit for



of the sum of the integrals over



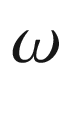
and



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[3](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn3_source)

For



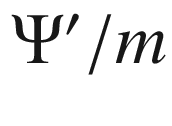
going to infinite values (beyond the X-ray regime),

$$\epsilon $$

always goes towards one.

[4](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn4_source)

Generally,



should be continuous, however, in the present example the mass is assumed constant throughout the structure.

[5](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn5_source)

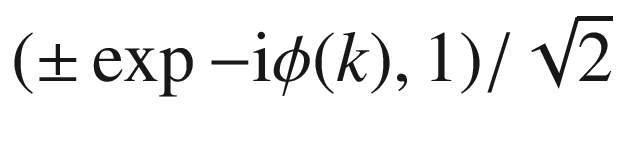
In the framework of second quantization with creation and annihilation operators the theory is more elegant but we go here ‘zu Fuß’.

[6](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn6_source)

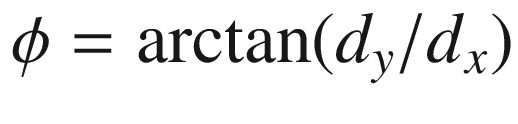
Often this is a s-type state but, e.g., for graphene the important bands around the Fermi level are formed by p-type states.

[7](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn7_source)

The eigenvectors are



with



([G.31](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Equ116)).

[8](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn8_source)

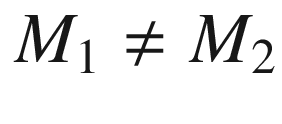
This choice is not limiting the generality since other phases or signs can be moved into the wave functions.

[9](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn9_source)

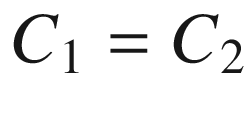
This means that the Hamiltonian does not induce any transitions from a site on one sublattice (i.e. the A-sites or B-sites) to any site on the *same* sublattice. Refer to [[370](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-CR370)] for further details.

[10](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn10_source)

This is similar to the trivial gap in the diatomic linear chain model opening for



when



, cf. Sect. [5.​2.​3](The_Physics_of_Semiconductors00002.docx#u116076_4_En_5_Chapter).

[11](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn11_source)

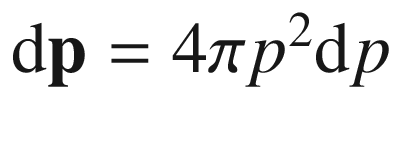
apart from the spin degeneracy.

[12](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn12_source)

This might be incorrect e.g. for piezoelectric scattering.

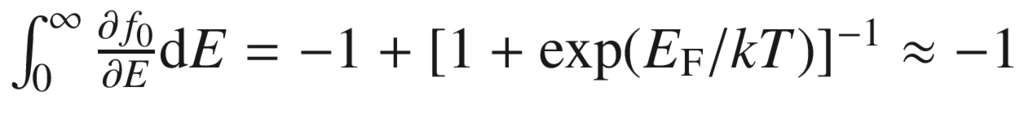
[13](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn13_source)

using

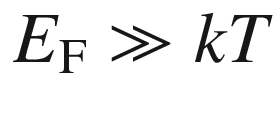


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[14](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn14_source)



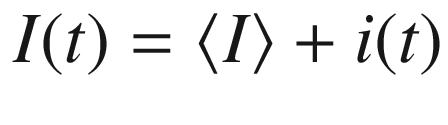
for



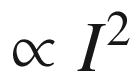
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[15](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn15_source)

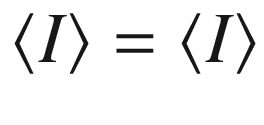
Imagine a fluctuating current



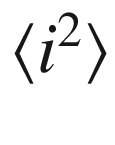
leading to Joule heating (



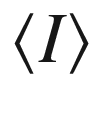
) at a resistor. Comparing the heating from *I* and



(from a low noise current source) can yield the noise power. Also



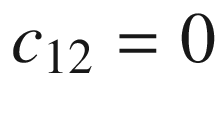
could be determined by first compensating *I* with



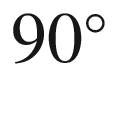
(from a low noise current source) and then measuring the temperature increase at the resistor.

[16](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn16_source)

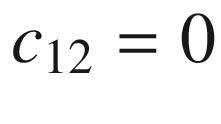
A simply example of correlated noise sources with



are the voltages at a resistor and a capacitance in series; the fact that they are



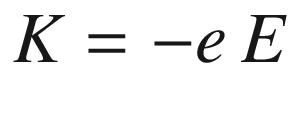
out of phase makes



although the fluctuations of the voltages, due to fluctuations of the driving current, are obviously correlated.

[17](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn17_source)

In the Langevin theory the mobility is the ratio of velocity *v* and the force *K*, here the mobility is the ratio of *v* and the field *E* with



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[18](The_Physics_of_Semiconductors00010.docx#u116076_4_En_BookBackmatter_OnlinePDF-Fn18_source)

A metal exhibits a constant carrier density.