

SUBJECT INDEX

- B**
- BCS theory in terms of the "pseudospin" model, 123 ff.
- C**
- Condensed states, general many-body theory, 132-135
- Correlation function
- approach to electron-phonon interactions, 77-88
 - and macroscopic equations, 247-285
 - procedures, 248-249
 - homogeneous electron systems, 63-75
- Crystal, polar, additional electrons in, 5-6
- D**
- Damping
- Landau, 35-36
 - of plasmon-like modes, 175-176
 - of plasma waves, 35-36
- Density
- density response function, 42-47
 - retarded, 44-46
 - at temperature T , 58
- fluctuation
- collective mode, neutral fermion system, 36-38
 - excitations in many-particle systems, 15-76
 - spectrum in the random phase approximation, 25-29
- matrix in Liouville representation, 218-220
- of states of electrons in disordered systems, 160
- Dielectric**
- constant
 - analytic behavior, 67-68
 - static, in the long-wavelength region, 68-70
- response functions, 63-68
- Dispersion relation of classical plasma oscillations, 33
- d-wave pairing, 154-158
- E**
- Electron(s)
- in disordered systems, 159-168
 - three-dimensional problem, 167-168
 - tight-binding case, 166-167
- gas, collective motion, 173-177
- interactions with longitudinal phonons, 91 ff.
- phonon interactions in metals, 77-112
- generalization to a superconductor, 105-112
 - matrix element, 8
- in polycrystalline materials, 163-164
- system without a lattice, 8
- tunneling, 80 ff.
- rate, 81-82, 110-111
- Energy
- of a particle-hole pair, 20
 - potential, of a nonconducting solid, 2
 - of a "quasi-particle", 4
- Excitations, density fluctuation, in many-particle systems, 15-76
- Excitons, 5
- F**
- Fermion system
- collective modes in, 15-42

- dynamic form factor, 20-25
 second quantization for, 241-246
 superfluid, dynamic form factor, 56
- Ferromagnet, Heisenberg
 approximations concerning, 181-184
 Curie temperature, 192, 195
 Dyson formulation, 180
 equations of motion for, 184-186
 high temperature results, 190-194
 low temperature properties, 186-190
 spin-wave approximation, 182-184
 temperature dependent random phase approximation, 179-201
- Ferromagnetism, 8-9
 Heisenberg-Frenckel model, 181
- Fluctuation-dissipation theorem, 60-61
- Fluids, one-component, 259-285
 correlation function, 268-275
 dissipative coefficients, 277-285
 hydrodynamic description, 259-268
 sum rules, 275-277
- Flux quantum, magnetic, 120-121
- Form factor, dynamic
 liquid He II, 52-56, 62-63
 plasma oscillations in superconductors, 75
 response functions at finite temperatures, 57-58
 sum rules, 47-51
 for superfluid systems, 51-56
- G**
- Gorkov and Galitskii method, 155-157
- Green's function
 approach to electron-phonon interactions, 89-100
 electronic, equation of motion, 92-94
- H**
- He II, liquid
 dynamic form factor, 52-56, 62-63
 superconductivity with $I \neq 0$, 148-149
- Hilbert space
 of N-fermion wave functions, 243-244
 representation of quantum mechanics, 225-226
- I**
- Interaction of a system with a reservoir, 228-239
 diagonalization of the resolvent, 235-236
 initial state, 232-233
 low density approximation, 237
 Rayleigh-Schrödinger approximation, 236-237
 short-memory expansion, 237-239
 transition operator, 229-231
- J**
- Josephson tunneling effect, 115-135
 observation, 129-131
 self-field effect, 131
- K**
- Kronig-Penny model, 165
- L**
- Liouville representation of quantum mechanics, 217-239
- M**
- Many-particle systems, density fluctuations in, 15-76
- Metal, electron system energy, 6-7
- Modes, collective, 24, 29-40
 in fermion systems, 15-42
 random phase approximation dispersion relation, 27-28
- Multiplication, interior, of two ordered normalized elements, 245

O

- Oscillations
 - plasma, 30-36, 71-75
 - of a quantum electron gas in a uniform magnetic field, 169-177

P

- Phonon collisions, 3
- Plasma oscillations
 - classical, 32-36
 - in electron systems, 71-75
 - quantum, 30-32
 - in superconductors, 75
- Plasmon(s), 30-32
 - damping, 74, 175-176
 - energy, 31
 - mode in an insulating crystal, 5
- Potentials
 - strong, 164-165
 - weak, 161-163
- p-wave pairing, 149-154

R

- Random phase approximation
 - calculation of the resonances in a quantum electron gas, 170-177
 - density fluctuation spectrum, 25-29
 - dispersion relation for collective modes of a fermion system, 27-28
 - and high density expansion, 195-200
 - temperature dependent for a Heisenberg ferromagnet, 179-201
- Relaxation processes, Liouville representation, 217-239
- Renormalization
 - in equilibrium statistical mechanics, 203-215
 - mass, 204, 206-208
 - in normal systems, 203-211
 - in superfluid systems, 211-215
 - vertex, 208-209
- Response
 - functions
 - dielectric, 63-68, 70, 71

- electron finite temperature, 70-71
 - at finite temperatures, 56-63
 - homogeneous electron systems, 63-75

S

- Scattering, inelastic particle, 17-20
- Screening in electron systems, 71-75
- Semiconductors, 4
- Simplex, 226
- Solid
 - non conducting, electronic ground state, 1-3
 - state physics, 1-9
- Spin diffusion in a liquid, 250-259
 - correlation function, 251-257
- Statistical mechanics, equilibrium, renormalization in, 203-215
- Sum rules
 - compressibility, 49-50
 - dynamic form factor, 47-51
 - f-, current conservation, 47-49
 - one-component fluids, 275-277
- Superconductivity
 - with $1 \neq 0$, 148-149
 - with p and d-wave pairing, 147-158
 - weak, 115-135
- Superconductors
 - electron-phonon interactions in, 77-112
 - plasma oscillations in, 75
- Superfluid systems
 - dynamic form factor, 51-56
 - renormalization, 211-215

T

- Tunneling
 - effective density of states, 111-112
 - electron, 80 ff.
 - Josephson, 115 ff.
 - AC supercurrent, 121-122, 128-129
 - critical magnetic field, 120-121
 - noise in, 129
 - second order energy perturbation, 117-120

thermal fluctuations, 127
zero-point energy effect, 127
from a many-particle point of view,
137-146
as a transition process between nearly
stationary states, 138-139
rate, 81-82, 110-111

V

Velocities, drift, of ions in He, 11-14

Z

Zero sound, 36-38
vs first sound, 38-40