Index

absorption, 97
resonance, 111
accelerators
Albarez, 169
Cockcroft–Walton, 168
Videroé, 168
accumulation ring, 169
Alfvén limit, 143
ambipolar diffusion, 114
angle of deflection, 45, 46
annealing effect, 195
back current, 143
banana path, 64
region, 64
baseball field, 77
beta value, 43
Bethe equation, 163
blanket (gas) see diverter
blistering, 180
Blumlein line, 138
Bohm diffusion, 61
Bohm–Gross wave see electron plasma wave
Boltzmann constant, 13
bremsstrahlung, 19, 182
inverse, 97
bumpy torus, 78
burn fraction, 177
burning time, 173
cannonball target, 135
central plasma, 175
Child–Langmuir current, 142
coefficient
classical, 59
diffusion, 58
nonclassical, 63
collector, 206
collision
cross-sectional area, 14
current, 15
rate, 16
compact torus, 78
confinement time, 22, 60

Coulomb logarithm, 49
critical number density, 97
surface, 97
cusp field, 74
cyclotron motion, 25
frequency, 26
radiation, 182

Debye radius, 47
deflagration wave, 117
degeneracies, 124
dielectric constant, 6
ratio of, 95
dispersion relation, 67, 69
displacement current, 34
diverter, 174, 183–4
Doppler shift, 105
drift frequency, 67
motion, 27–30
D–T reaction, 187
eigenvalue problem, 69
electric charge, 5
electrode, 6
beams, 136
plasma wave, 100
elementary particles, 6
energy
atomic, 6
driver, 86
heat, 4
kinetic, 4
pay rate, 3
potential, 4
renewable, 1
rest, 6
total, 4
turbine, 206

first wall, 174, 178
fusion, nuclear, 9
flux jump, 192
Index

fuel
fossil, non-renewable, 2
resources, 218
supply, 175

guiding centre, 27
gyrofrequency see cyclotron frequency

heat of reaction, 5
heating
alpha particle, 175
internal, 175
neutral-beam, 50
primary, 50
secondary, 51
wave, 52
heavy-ion beam, 167
heliotron, 72
hydrodynamic efficiency, 86

implosion, 90, 113ff
induced radio-activities, 187, 220
induction equation, 34
inertial confinement, 85
instability
absolute, 104
backward-scattering, 106
decay, 100
drift-wave, 66
exchange, 77
flute, 65
ion sound wave, 158
kink, 38
macro, 65
micro, 65
oscillatory two-stream, 104
parametric, 100
Rayleigh-Taylor, 117
sausage, 37
spiral (screw), 42
trapped-particle, 68
two-stream, 145
Weibel, 146
inertial confinement 85ff
inverse population, 123
ion cyclotron resonance, 52
isotopes, 5

Kruskal–Shafranov limit, 43, 72
KDP, 112

large signal gain, 125
Larmor frequency see cyclotron frequency
radius, 27

lasers, 121ff
carbon dioxide, 128
eexcimer, 132
free-electron, 133
hydrogen fluoride, 131
iodine, 130
Lawson criterion, 22, 88
light-ion beam, 147
limiter, 183
Lorentz force, 33
loss cone, 74
lower hybrid wave, 52

magnetic confinement, 25
surface, 56
magnetic insulation
transmission line, 150
diode, 152
major radius, 43
Marx generator, 137
mass deficiency, 9
Maxwell stress, 33
equations, 33
Maxwellian distribution, 15
MHD generator, 205
mean collision time, 49
mean free path, 15
minimum-B field, 77

negative entropy, 2
neodymium, 125
neutron multiplication, 188
nonlinear optical crystal, 113
number density, 13

Ohm’s law, 33

P-polarised, 108
particle balance, 177
Pfirsch–Schlütter factor, 63
pinch effect, 36
Planck’s constant, 21
plasma, 13
channel, 155
erosion opening switch, 139
focus, 84
oscillation, 92
poloidal field, 44
ponderomotive force, 103
power density, 197
primary knock-on atom, 185
principal axis, 45
probabilities, transition, 122
projectile, 167, 169
pulse operation, 194
forming line, 139
pusher, 89
quasi-neutral field, 34
radiation damage, 194
Raman scattering, 107
Rankin–Hugoniot relation, 83
rational surface, 57
reactors
D–T, 172
fast breeder, 10
hybrid, 203
laser fusion, 208
light water, 9
mirror, 202
open-end, 172
prototype, 201
proving, 201
pulsed, 173
quasi-steady, 173
steady, 173
solase, 210
test, 201
torus, 172
waterfall, 212
remote handling, 195
resonance conditions, 100
resource materials, 219
rest mass, 6
rotational transfer angle, 56
S-polarised, 108
safety, 219
factor, 56
problems, 220
scaling laws, 196
scattering
Brillouin, 101
Raman, 101
stimulated, 108
self-heating, 21
self-ignition temperature, 21
separator, 206
shear, 57
shield layer, 174
small signal gain, 124
coefficient, 124
spattering, 179
stellarator, 72
stimulated emission, 124
stopping power, 144
storage ring, 169
superconducting magnet, 191, 223
suprathermal electrons, 112
surface, rational, 57
irrational, 56
susceptibility, 33
swelling, 186
T-breeding, 188
tamper, 89
target gain, 166
temperature, 13
thermal-pinch machine, 80
theta-pinch machine, 80
threshold, 105
Tokomak, 43, 196ff
toroidal field, 44
magnet, 199
transformer coils, 197
tunnel effect, 14
under-density plasma, 95
velocity distribution functions, 13
Vlasov equations, 67
wall loading, 178
Yin-Yang coil, 203
z-pinch machine, 84