
INDEX

Abrikosov vortex	1
Bean model (<i>see also</i> Critical state)	18, 24, 129
Boiling	
film	14
nucleate	14, 208
Composites	39
conductivity	47, 61
critical parameters	45, 55, 159, 313
current carrying capacity	181
deformation	53
filaments	40, 44, 61, 63, 76
<i>in situ</i> formed	40, 43 – 45, 62 – 64 115
liquid-nitrogen temperatures	312
heat capacity	51
losses	91, 102, 111, 115
mechanical properties	53

346 THE PHYSICS OF COMPOSITE SUPERCONDUCTORS

multifilament	40, 48, 60, 75, 114
nonuniform	171
percolation threshold	62
physical properties	57
plastic flow instability	186, 195
plastic strain jumps	187
plastically strained	194, 204
proximity effect	64
saturated zone	78
slab	40, 43
thermal conductivity	50, 208
twisted	94, 96
weak spot	201
Conductivity	47
Critical state	15
Bean model	18, 24, 129
Bean-London	16
criterion	162
Kim-Anderson model	22
stability	26, 125, 137, 155, 163, 165, 175, 182, 196
Current	
critical	10, 11, 14, 46, 47
transport	3, 8, 86, 207, 258
Drude resistivity formula	7
Energy dissipation	4, 5, 6, 8, 67, 120
Faraday effect	143
Fluctuations	
thermal	30
Flux	
diffusion length	142
jumping	127, 135, 139, 143, 143, 154, 156, 160-161, 176, 180
penetration depth	18
quantum	1
Gibbs free energy	9
Ginzburg-Landau equations	1
Hysteresis loop	20

Instability	
plastic flow	186
thermomagnetic	125, 135, 139, 141, 144, 153, 157, 174, 186 – 188, 193 – 199
Interface	
normal to superconducting	216
Joule heat	5, 13, 27, 205, 292
Kim-Anderson model	22, 23
Lorentz force	3, 4, 7, 8, 10, 24, 30
Magnetic field	
critical	1, 45
flux	3
Magnetic flux (<i>see also</i> Flux)	
creep	30, 31, 32
frozen-in	167
leakage	35
viscous flow	13, 34
Magnetic moment	20, 107
Maxwell's equations	19, 72, 81, 95, 163, 176, 208
Peak effect	13
Peltier effect	272
Percolation threshold	62
Pinning	3, 9, 10, 32
Plastic flow	186 – 189
Plastic strain jump	187 – 193
Proximity effect	64
Resistance	
differential	7
Resistivity	5, 7, 8, 47
alloys	49
aluminum	48
copper	48
Shubnikov phase	1
Steckly parameter	26, 207, 212, 241, 259, 291, 296
Strain hardening	204
Strain, total	55
Superconductor	
anisotropic	60

boundary with normal state	215
composite	39
conductivity	47, 91
contact resistance	287, 294
dynamic phenomena	271
equation of motion	9
hard	1, 3, 10, 15, 24, 29, 46, 54, 143, 176
heat equilibrium	206
heat release	207
heat transfer	276
high-temperature	303
hysteretic loss	70, 73 - 75, 81, 83 - 90
inhomogeneous	254, 266, 277
losses	67, 91
magnetic field distribution	21
microscopic theory	7
resistive domain	228, 236, 257, 265, 298
stability of superconducting state	186
switching wave	218
training	193, 199
type II	1, 2, 5, 6, 29, 36
vortex structure	6
Temperature, critical	4, 14
Thermoelectric constant	271
Thomson effect	272
Training	193, 199 - 204
(<i>see also</i> Superconductor)	
Transition,	205
superconducting to normal	
Viscosity	8
Vortex,	2
Abrikosov	1
core	5
lattice	4, 8
velocity	5
Wiedemann-Franz law	263