

Index

- ab initio* atomistic thermodynamics 122
- ab initio* molecular dynamics 431
- absorbing Markov chain Monte Carlo (MCAMC) 153
- acceptance probability 311, 312
- adsorbed monolayers 22, 246
- adsorbed polymers 261
- adsorption isotherm 221
- alloys 48, 118, 125, 168, 169, 179
- amorphous solids 183
- amphiphilic molecules 116
- anisotropic critical phenomena 196, 197
- anisotropic finite size scaling 198, 379, 380
- anisotropic Heisenberg chain 332
- annealed averaging 169
- ANNNI model 112, 196
- antiferromagnet 24, 125, 164, 335, 354, 375, 384
 - quantum 320, 333, 354
- anti-phase domain 64
- argon 425
- Asakura–Oosawa model 215, 223, 272
- aspect ratio 196, 198
 - generalized 198
- astrophysics 447
- attrition problem 66, 137
- ballistic deposition 394
- Baxter model 113
- Baxter–Wu model 113
- bead-spring model 256, 261, 265
- Bethe ansatz 336
- biased estimation 95, 105, 267
- biased particle insertions 235
- bicritical point 165, 368
- binary mixture 125, 222, 231, 257, 270, 437
- biology 442, 454, 472
- biopolymers 139
- blockspins 368, 371
- Blume–Emery–Griffiths (BEG) model 116
- Blume–Capel model 105, 198, 205, 294, 375
- bond fluctuation model 126, 184, 257, 262
- bond orientational order 226, 227
- Bose statistics 327
- bottle-brush polymers 138
- boundary conditions 76
 - antiperiodic 71, 91, 195
 - antisymmetric 78
 - free edge 78
 - hydrodynamic 437
 - hyperspherical 79
 - mean-field 79
 - periodic 76, 82
 - screw periodic 77, 102
- boundary value problems 54
- branched polymers 128
- broad histogram method (BHMC) 296
- broken symmetry 27
- Brownian dynamics algorithm 269, 437
- Brownian motion 261, 262
- canonical ensemble 10, 11, 123, 169, 199, 272, 276, 282, 297, 308
- capillary condensation 152, 193
- capillary waves 92, 192, 277
- Car–Parinello method 431
- carbohydrates 472
- carbon nanotube 63
- Casimir effect 195, 302
- catalysts 449
- cell dynamics method 436
- cell sorting 453, 460
- cellular automata 124, 392, 439

- central limit theorem 31
- checkerboard decomposition 76, 108, 118, 151, 156
- chemical kinetics 184
- chemical potential 120, 125, 180, 188, 220, 234, 271, 275, 283
- chemical reactions 449
- chemistry 355, 449
- chiral symmetry 415
- classical spin models 149, 157, 319
- clock model 114
- cluster 59, 119, 144, 147, 150, 152, 181, 389
 - aggregation 392
 - counting 62
 - flipping 38, 144, 148, 162, 342
 - size distribution 60, 119, 388
- coarse-graining 248, 252, 255, 257, 364
- coarsening 46, 264
- coexisting phases 90, 118, 125, 216, 231
- collapse transition 129
- collective diffusion 122
- colloidal dispersions 247
- colloids 216, 272, 443, 444
- commensurate superstructures 245, 246
- commutator 164, 325, 329
- competing interactions 108
- complex fluids 116, 232, 247
- compressible Ising model 386
- compressibility 214, 228, 229
- computer speed 207
- concave intruder 12
- condensation 270, 314
- configurational bias Monte Carlo (CBMC) method 133, 233, 267
- congruential method 96, 204
- conservation laws 43, 120, 384
- contact angle 270, 273, 276
- continuity equation 120, 122
- corrections to scaling 80, 83, 252, 288, 289, 292, 293
- correlation energy 355
- correlation function 19, 103, 112, 149, 170, 373, 375
- correlation length 18, 47, 71, 80, 105, 176, 191, 196, 197, 202, 228, 261, 294, 364
- correlation time 33, 47, 94, 106
- corrugation potentials 247
- cost function 177, 188
- Coulomb interaction 244, 252
- crack propagation 426
- critical endpoint 308
- critical exponents 18, 59, 65, 72, 80, 111, 173, 192, 198, 288, 292, 295, 307, 347, 371, 372
- critical micelle concentration (cmc) 250
- critical relaxation 100
- critical slowing down 46, 96, 100, 148, 152
- critical temperature 16, 44, 80, 96, 106, 133, 162, 168, 180, 189, 197, 225, 261, 285, 289, 347, 365, 334, 416
- crosslinks 252, 327, 387
- crossover 22, 24, 295, 306
- crystal growth 381
- crystallization 216
- crystals 212, 236, 253, 324
- cumulants 81, 83, 87, 111, 175, 181, 198, 230, 288, 293, 410
- cutoffs of potentials 242, 275, 426
- damage spreading 198, 392
- Debye law 326
- de Broglie wavelength 217, 323
 - thermal 217, 323
- decimation 368
- deconfinement transition 415
- decoupled cell method 345
- demon algorithm 123
- density functional theory 359
- density of states 12, 282, 303, 308, 312, 314, 420
- deposition 382
- detailed balance 73, 124, 311
- diatomic molecules 247
- diffusion 42, 117, 120, 262, 263, 382, 395, 396
 - limited aggregation 389
 - Monte Carlo (DMC) 355
- direct simulation Monte Carlo 58
- disorder average 168
- dissipative particle dynamics 438
- distributed array processor (DAP) 175
- domain growth 45, 384, 444
- domain wall 64, 91
- driven lattice gas 198, 378
- droplet 270
- drying 271
- Dulong–Petit law 319
- dynamic critical exponent 47, 96, 101, 102, 146, 375
- dynamic ensemble 123
- dynamic finite size scaling 106, 394, 398
- dynamic MCRG 375

- econophysics 177, 456
- Eden model 389
- Edwards–Anderson model 115
- Edwards–Anderson order parameter 116
- Edwards–Wilkinson model 395
- Einstein relation 254
- elastic interactions 180
- energy cumulant 87
- energy landscape 174, 298
- entanglements 261
- entropy 9, 12, 186, 277, 299, 308, 319
- epsilon expansion 367
- equal weight rule 87, 259
- equations of motion 11, 163, 184, 423, 433
- equilibrium polymers 183
- equipartition theorem 323
- ergodicity 27, 76, 98
- ergodic time 107
- errors 32, 33, 183, 202, 295
 - statistical 33, 83, 202, 268, 287
 - systematic 95, 203, 204, 287, 347
- evaporation 314, 382
- event chain algorithm 241
- event-driven Monte Carlo 57, 152
- Ewald interaction 356
- Ewald summation 244
- excluded volume interaction 128, 131, 252
- expanded ensemble method 151
- fast multipole method 245
- fatty acid molecule 248
- fermions 320, 328, 336, 340, 355
- fermion determinants 349
- Fermi statistics 327
- ferromagnet 71, 80, 85, 147, 282, 286
- field mixing 89
- film growth 393
- finance 461
- finite size effects 79, 81, 84, 88, 97, 169, 175, 181, 196, 202, 225, 226, 261, 289, 305, 315, 326, 343, 412, 417
- finite size scaling 79, 81, 84, 88, 97, 105, 169, 173, 175, 181, 196, 198, 202, 225, 226, 261, 289, 292, 293, 294, 302, 326, 380
- fixed point 365, 371
- Flory–Huggins theory 258
- Flory model 133
- flow diagram 365
- fluctuation dissipation relation 269
- fluctuation relations 13, 14, 84, 100, 160, 174, 228, 326
- fluctuations 13, 27, 74, 169, 171, 194, 226, 233, 271
- fluid flow 58, 439
- fluids 89, 90, 116, 191, 212
- fluid–solid transition 226, 236
- force bias sampling 268
- force versus extension relation 402
- Fortuin–Kasteleyn theorem 144
- Fourier Monte Carlo 182
- fractal dimension 390
- fracture 426
- free energy 9, 10, 17, 21, 24, 25, 80, 186, 195, 218, 234, 264, 270, 272, 283, 285, 367, 403
 - barrier 184
 - landscape 64, 182, 183, 311
- Frenkel–Ladd method 188
- friction 197
- friction coefficient 269, 436
- frustration 115, 173
- full configuration interaction (FCI)
 - method 355
- gas–liquid transition 224, 231, 314
- Gaussian distribution 14, 32, 85, 100, 227
- Gaussian ensemble 125, 199
- gelation 196, 387
- gels 174
- genetic algorithm 188
- geometric parallelization 156
- Gibbs ensemble 231
- Ginzburg criterion 27, 43
- Glashow–Weinberg–Salam (GWS)
 - theory 412
- glasses 174, 177
- glass transition 183
- Glauber dynamics 75, 161
- globular proteins 196, 469
- grand canonical ensemble 11, 124, 133, 169, 216, 231, 275, 276
- graphene 63, 449
- graphics processing units (GPUs) 30
- Green’s function Monte Carlo (GFMC)
 - 320, 353
- Griffiths singularities 170
- groundstate 63, 109, 113, 187, 300, 314, 319, 324, 353, 355
- growing walks 68
- growth algorithms 206
- hadrons 418, 420
- Hamming distance 199

- Handscorn method 346
- hard-core bosons 351, 352
- hard-core potential 213
- hard-core square well fluid 224
- hard disks 212, 226, 241
- hard particles 215, 270
- hard walls 216
- harmonic approximation 323, 324
- Hartree–Fock determinat 356
- heatbath algorithm 160, 168
- Heisenberg chain 332, 335, 346
- Heisenberg model 20, 23, 79, 158, 162, 163, 178, 291, 332, 345, 346, 354
- Heisenberg uncertainty principle 319, 323
- Hele–Shaw cell 390, 391
- ³helium 327
- ⁴helium 327
- herringbone structure 330
- Hexatic 241
- Higgs mechanism 412
- histogram 180, 185, 283, 285, 295, 296, 311, 420
 - broad histogram method (BHMC) 296
 - single histogram method 285
 - multihistogram method 295
- Hoshen–Kopelman algorithm 62, 144
- HP model 314
- Hubbard model 340, 350
- hybrid algorithms 155, 163, 430
- hybrid Monte Carlo 155, 163, 420
- hydrodynamic interactions 443
- hydrodynamic slowing down 48, 122
- hyperdynamics 432
- hyperscaling 21, 197
- hysteresis 186, 217, 410
- ideal gas 212, 215, 218, 234, 284
- identity switch 125, 222
- importance sampling 35, 54, 71, 144
- improved estimators 149
- incommensurate order 112, 246
- initial configurations 74, 98, 420
- interdiffusion 42, 120, 121
- interface flipping algorithm 196
- interface roughening 195
- interfaces 77, 190, 217, 231, 270, 274, 275, 301, 418
- interface unbinding 197
- interfacial free energy 270, 273, 275, 301, 418
- internal energy 8, 9, 13, 74, 87, 182, 185, 186, 214, 282, 334, 411
- invaded cluster algorithm 149
- inverse Monte Carlo 200
- inverse MCRG 376
- inverse power law potential 213
- irreversible processes 378
- Ising model 9, 17, 24, 28, 38, 71, 72, 81, 82, 86, 89, 91, 95, 97, 104, 107, 108, 115, 123, 147, 148, 150, 152, 160, 172, 181, 182, 186, 190, 192, 196, 197, 204, 282, 286, 292, 308, 331, 369, 370, 373, 378, 381, 410, 418
 - in transverse field 331
- Ising spin glass 115, 173, 175
- isotope effects 325
- jackknife method 203
- jamming coverage 404
- Jordan–Wigner transformation 336
- Kardar–Parisi–Zhang (KPZ) equation 395
- Kauffman model 383
- Kawasaki model 117
- Keating potential 180
- kinetic energy 11, 356
- kinetic Monte Carlo 122, 378, 396
- Kosterlitz–Thouless transition 20, 23, 115, 163, 165, 241, 434
- Kuhn length 138
- lagged Fibonacci generator 38
- lamellar phases 116, 247
- Landau theory 25, 27
- Langevin equation 261, 269, 436, 443
- Langmuir–Hinshelwood mechanism 450
- Langmuir monolayers 248
- Laplace’s equation 54
- large cell renormalization 369
- Lattice animal 138
- lattice Boltzmann equation 440, 443
- lattice gas cellular automata 439
- lattice gas model 23, 28, 188, 246
- lattice gauge model 163, 408
- layering 274
- leapfrog algorithm 434
- Lee–Kosterlitz method 189
- Legendre transformation 12, 275, 309
- Lennard–Jones fluid 89, 211, 213, 217, 242, 272, 275
- Lennard–Jones interaction 89, 131, 213, 242, 247, 257, 425, 469
- lever rule 12
- Lifshitz line 135

- Lifshitz point 136
- Lifshitz–Slyozov theory 45
- linear response 122
- line tension 271
- liquid crystalline systems 158, 248
- Liouville equation 42
- Liu–Luijten algorithm 240, 250, 251
- living polymers 133, 135
- long range forces 181, 243

- macromolecular structure 474
- macromolecules 66, 191, 251
- magnetization 15, 19, 43, 74, 79, 82, 84, 187, 197, 280, 285, 299
- Markov chain 33, 151, 153
- Ma’s MCRG 371
- master equation 33, 41, 46, 73, 184, 357
- materials science 448
- mean-square displacement 254, 323
- medicine 459
- melting 228, 230, 241
- membrane proteins 470, 471
- membranes 182
- Mersenne twister algorithm 295
- mesophases 250
- metadynamics 432
- metastable states 16, 44, 85, 410
- Metropolis algorithm 73, 74, 95, 117, 130, 158, 160, 193, 212, 214, 269, 339, 409, 451, 455, 469, 473
- Metropolis–Hastings algorithm 456
- micelles 248, 249, 250
- microcanonical algorithm 123, 162, 425
- microcanonical ensemble 10, 11, 199, 423
- microemulsions 116
- micromagnetics 437
- microstates 136, 271, 272, 403
- minimum image convention 243
- minus sign problem 320, 328, 338, 340
- Modeling term 356
- modulated order 112, 196
- molecular beam epitaxy (MBE) 396, 397
- molecular dynamics (MD) 11, 155, 242, 246, 255, 257, 423, 426, 428, 429, 430, 441, 443, 467
 - steered 404
- Monte Carlo phase switch 236, 239
- Monte Carlo renormalization group (MCRG) 287, 290, 364, 369, 372, 374
- Monte Carlo time 73, 93, 148

- Morse potential 257
- multicanonical method 285, 297, 298, 299, 301, 312, 452, 467, 468
- multicritical transitions 24, 196, 366, 375
- multigrid methods 155
- multihistogram method 295
- multilattice method 152, 199
- multiparticle collision dynamics (MPC) 442
- multiscale simulation 440, 441
- multispin coding 151, 194

- Navier–Stokes equation 439
- Néel state 320
- neighbor lists 242, 426
- Nelson–Halperin theory 228
- neon 325, 326
- networks 460
- neutron transport 57
- Newton’s equations 11, 184, 404
- N -fold way 152, 153, 154
- nitrogen (N_2) 329, 330
- nodal surface 355
- noise reduction 149
- non-equilibrium molecular dynamics (NEMD) 197, 430
- non-equilibrium Monte Carlo (NEMC) 400
- non-equilibrium processes 122, 378, 403
- non-linear relaxation 47, 99, 101, 102
- non-linear σ -model 149
- non-reversal random walk (NRRW) 66
- non-universal exponents 111, 113
- normal pressure 215
- NpT ensemble 216, 231, 428
- nuclear matter 413
- nucleation 44, 45, 154
- numerical integration 51, 52, 53, 54, 309, 310
- NVT ensemble 212, 217, 234, 427, 428

- off-diagonal long range order (ODLRO) 352
- off-lattice models 212, 214
- Onsager coefficients 121
- optimization 173, 177, 188
- order parameter 15, 24, 25, 80, 135, 147, 149, 160, 174, 238, 260, 273, 306, 330, 354, 384
- ordering kinetics 384
- orientational bias 267
- orientational ordering 241, 246

- overlapping distribution method 282
- over-relaxation 161
- pair distribution function 200, 214
- parallel computers 156, 207, 311, 313, 426
- parallel tempering 152, 171, 176, 347, 467, 468, 470
- partition function 7, 12, 65, 67, 73, 136, 185, 188, 217, 218, 232, 282, 303, 321, 322, 327, 329, 331, 332, 338, 346, 347, 349, 409
- path integral 320, 321, 328
- path integral Monte Carlo (PIMC) 320, 324, 325, 328, 330
- pearl-necklace model 256
- percolation 58, 144
 - bond percolation 61, 63
 - conductivity 63
 - continuum percolation 63
 - invasion percolation 63, 150
 - probability 59, 147
 - site percolation 59, 60, 62
- periodic boundary condition (p.b.c) 76, 77, 82, 91, 114, 121, 191, 193, 194, 197, 216, 271, 287, 331, 333
- periodic potentials 246
- PERM algorithm 127, 130, 136, 139, 452
- persistence length 138, 252, 257
- Petaflop computers 157
- phase coexistence 12, 13, 196, 271
- phase diagram 16, 17, 23, 24, 44, 110, 125, 135, 166, 187, 308, 416, 419
- phase separation 45, 118, 133, 197, 216, 270, 384, 386
- phase space 12
- phase transition 15
 - first order 12, 16, 17, 23, 24, 25, 26, 28, 43, 124, 135, 172, 186, 187, 202, 298, 306, 309, 410, 416, 419
 - irreversible 450
 - second order 16, 17, 23, 28, 71, 80, 135, 173, 409, 416
- phonon spectrum 326
- pivot algorithm 126
- Planck's constant 12
- plaquette 421
- Poisson's equations 164
- polyelectrolytes 252
- polyethylene 252, 253, 254, 263, 323, 324
- polymer crystallization 184
- polymer growth 387
- polymer melts 247, 255, 430
- polymer mixtures 196, 231, 257
- polymer solution 130, 248, 251
- polymer translocation 399, 401
- polymerization 450
- polymers 222, 251, 261, 309, 322, 323, 327, 437
- population control 137
- Potts model 23, 86, 88, 112, 144, 145, 146, 184, 189, 298, 303, 304, 305, 312, 313, 384
- predictor–corrector methods 424, 434
- preferential site selection 192, 269
- pressure 213, 214, 215, 217, 220
- pressure tensor 264
- prewetting 275
- probability changing algorithm 150
- probability distributions 14, 31, 32, 85, 87
- probability theory 30
 - central limit theorem 31, 32
- projector Monte Carlo (PMC) 320
- protein folding 125, 183, 252, 307, 314, 452, 453, 465, 466, 467, 469
- proteins 183
- pruned enriched Rosenbluth method (PERM) 136
- QM/MM method 442
- quantum chromodynamics (QCD) 349, 413, 415, 416
- quantum dynamics 360
- quantum fluids 293
- quantum liquid 352
- quantum mechanics 217, 352
- quantum Monte Carlo 319
- quantum spins 286
- quark–gluon plasma 415, 417, 419
- quarks 414, 415, 416, 418, 420
- quasi-classical limit 217
- quasi-harmonic approximation 324, 330
- quasi-Monte Carlo method 69
- quenched approximation 414
- quenched averaging 166, 170
- quenched randomness 166, 170, 171, 174
- quenching experiment 385, 386
- Q2R cellular automaton 124, 393
- radioactive decay 56
- radius of gyration 132, 254, 323
- Rayleigh–Benard convection 58, 428, 429
- random bond model 172
- random fields 172

- random hopping algorithm 259
- random number generator 35, 36, 37, 40, 41, 140, 148, 204, 205, 206, 207, 288, 386
 - quality tests 39, 40
- random resistor network 63
- random sequential adsorption 404
- random walk 64, 252, 262, 303, 306, 311, 347, 355, 389
- ratio method 67
- reaction coordinate 399, 400
- reaction field method 243
- reactor criticality 58
- real space renormalization group 368, 372
- red blood cells 442
- relaxation function 46, 47, 94, 99, 104
- relaxation time 94, 95, 96, 97, 99, 102, 104, 184, 262, 348
- renormalization group (RG) 20, 290, 293, 295, 364
- replica exchange 171, 182, 183, 310, 311, 312
- replica exchange Molecular Dynamics (REMD) 183
- reptation 256, 262
- resonant valence bond (RVB) 352
- restricted primitive model 224, 225
- reverse mapping 442
- reverse Monte Carlo 200, 201
- reweighting 287, 288, 419
- ring polymers 322, 323
- RNA 472
- Rosenbluth algorithm 137, 268
- rotational degrees of freedom 328
- rotational isomeric states 134
- Rouse model 261, 262, 266, 443
- rubber 174
- Ruderman–Kittel interaction 173
- sample-to-sample fluctuation 169, 170
- scaling 20, 21, 80, 380, 470
 - field 24, 89, 225
 - function 21, 24, 80
 - law 21, 80
- Schrödinger equation 355
- sedimentation 395
- self-averaging 100, 168, 169, 386
- self-avoiding walk (SAW) 66, 67, 68, 126, 131, 137, 197, 252, 254, 262
- self-diffusion 122, 263
- semiconductor 180
- semidilute polymer solution 132
- semiflexible polymers 138
- semi-grand canonical ensemble 125, 169, 180, 222, 259, 273
- series expansion extrapolation 20, 290, 293
- shearing step 197
- shear rate 197
- shift register algorithm 37
- Si–Ge mixture 179, 180, 181
- simple sampling 33, 51, 71, 131, 136
- simulated annealing 173, 177, 188
- simulated tempering 172, 183, 185, 347
- single-ion anisotropy 158, 164, 205, 433
- SiO₂ 430
- Slater determinat 355
- slithering snake algorithm 126, 259
- smart Monte Carlo 267
- sociophysics 456
- soft spheres 213
- solidification 270
- solid-on-solid model 196, 381, 382
- solitons 164, 165
- special purpose processor 175
- special transition 293
- specific heat 13, 14, 18, 19, 71, 80, 87, 90, 186, 289, 319, 326, 421
- speedup 313
- spin dynamics method 432, 433, 435, 436
- spin exchange 46, 117, 118, 379, 385
- spin-flip 46, 72, 108, 134, 144, 146, 158, 385
- spin glasses 115, 173, 175, 176, 178, 179, 183, 196, 307
- spinless fermions 336, 340
- spinodal decomposition 44, 45, 46, 119, 444
- spinodal points 43, 44
- spin wave 165, 435, 436
- spiral growth 382, 383
- sponge phases 116, 248
- spreading coefficient 276
- staggered fermions 349
- star polymer 68, 132, 138
- statistical errors 33, 93, 95, 140, 149, 203, 205, 287, 289
- statistical inefficiency 95
- stiff rods 133
- Stillinger–Weber potential 181
- stochastic cutoff 182
- stochastic rotation algorithm 444
- stochastic series expansions 346, 347, 348
- Stokes law 443

- stress tensor 270
- structure factor 46, 119, 379, 435, 436
- SU(N) group 412, 414, 417, 420
- subsystems 88, 226
- superantiferromagnet 111
- superconductivity 319
- superfluidity 319, 327
- surface-bulk multicritical point 292
- surface effects 78, 190, 192, 194
- surface field 79, 91, 192, 193, 194, 293
- surface tension 215
- surface transition 293
- surfactants 247, 248, 249
- 'survival of the fittest'-algorithm 355
- susceptibility 13, 18, 71, 80, 84, 86, 96, 97, 149, 160, 174, 178, 181, 194, 198
- Swendsen's MCRG 372
- Swendsen-Wang algorithm 145, 146, 147, 150, 163, 204
- tail corrections 236
- Tausworthe algorithm 37
- ten Wolde-Frenkel model 469, 470
- thermal expansion 253, 319, 324
- thermodynamic integration 186, 187, 216, 270, 271, 272
- thermodynamic potentials 10
- thermostat 184, 444
- theta point 130, 252
- thin films 79, 192, 261, 263, 272
 - polymeric 261, 263
- third law of thermodynamics 319
- topological excitations 166, 167
- torsional potential 255
- traffic simulations 457, 458, 459
- transfer matrix Monte Carlo 291
- transition matrix Monte Carlo 276, 296
- transition path sampling 185, 398, 399, 403
- transition path theory 399
- transition probability 34, 73, 153, 213, 220, 233, 305
- transition rate 184
- transport coefficients 48
- transport simulation 57
- traveling salesman problem 177
- tricritical exponents 25
- tricritical point 24, 25, 26, 105, 125, 205, 368, 375, 413
- Trotter dimension 325
- Trotter index 322
- Trotter scaling 325
- Trotter-Suzuki transformation 221, 332
- two-state model 184
- U(1) gauge theory 411, 420
- umbrella sampling 178, 188, 272, 276, 282, 284, 303, 404
- united atom model 255
- universality 20, 253, 294, 366
 - class 22, 46, 65, 292, 368, 393
- upper critical dimension 367
- vacancy mechanism of diffusion 120
- van der Waals loop 13, 199
- vapor-liquid coexistence 270
- vapor-liquid critical point 275
- variance 31, 33, 184
- variational Monte Carlo (VMC) 351
- vector computer 151, 155
- Verdier-Stockmayer algorithm 126
- Verlet algorithm 424, 443
- Verlet table 242
- vertex models 333
- vesicles 116, 248
- virial theorem 212, 220, 225, 263
- virtual volume changes 216
- volume moves 180
- vortices 20, 23, 78, 164, 165, 167
- Wang-Landau sampling 188, 200, 272, 276, 303, 304, 305, 306, 307, 308, 320, 347, 348, 420, 452, 453, 471, 472
 - Replica exchange Wang-Landau sampling 310, 311, 312, 313, 314
- water 248
- water-oil mixtures 116, 248
- wedge filling 193, 194
- wetting 79, 152, 191, 192, 193, 194, 197, 270, 276
 - complete 270, 273
 - partial 270
- Widom particle insertion method 234, 235
- Wilson action 409
- Wilson loop 416
- winding number 329
- Wolff algorithm 148, 162, 204, 205, 206, 295
- Wolff embedding 162
- work theorem 402
- wormhole algorithm 130
- wormlike chain 139

- XY chain 332
- XY-model 20, 111, 115, 159, 163, 164,
165, 345, 435
- Youngs's equation 270, 273
- zeolites 220
- zero-point motion 319
- Ziff–Gulari–Barshad (ZGB) model
450
- $Z(N)$ lattice gauge model 410, 411