

Index

- α_s
 - bag model fit, 262
 - lattice, 298, 299
 - running first order, 278
 - running second order, 281, 282
 - at low energy, 284, 285
 - scale dependence, 280, 281
 - thermal, 286
 - approximant, 286
- antimatter
 - in the Universe, 6
 - matter symmetry, 19, 153
- antiproton-to-proton ratio, 183
- from QGP, 16
- heavy ion enhancement, 19
- bag model, 258
 - action, 263
 - bag constant, 38, 69, 261, 306
 - boundary conditions, 263
 - static-cavity solutions, 264
 - strange-quark mass, 261
- baryon, 25, 26
 - barys*, 1
 - density
 - hydrodynamic expansion, 108
 - quark-gluon liquid, 310, 312, 313
- Bessel function
 - I_n , 140
 - K_ν , 195
 - $x^2 K_2$, 197
 - non-relativistic limit, 196
 - relativistic limit, 196
- big-bang, 1
 - differences from micro-bang, 4
- boson
 - condensate, 193
 - distribution function, 194
 - entropy per particle, 207
- calorimeter, 177
- canonical
 - conservation of strangeness, 223
 - ensemble, 192
 - multistrange particles, 226
 - particle enhancement, 231
 - particle suppression, 225, 232
 - hadron yield enhancement, 233
 - partition function, 224
- cascade(ssq), 33
 - $\Xi^*(1530)$ decay, 34
- center of momentum
 - accelerator energies, 72
 - coordinate system, 82
 - rapidity in asymmetric collisions, 84
- charged-hadron multiplicity
 - energy dependence, 180, 181
 - ratio, 123
- charm
 - canonical suppression, 234, 235
 - open, 23

- thermal production, 329, 333, 334
 - LHC energy, 336
- charmonium, 36
 - enhancement, 22
 - suppression, 21, 22
- chemical
 - entropy equilibration, 115
 - equilibration
 - thermal rate, 99
 - equilibrium, 90
 - elementary interactions, 234
 - failure, 171
 - strangeness in HG, 352
 - gluon equilibration, 324
 - nonequilibrium
 - entropy, 115
 - heavy quarks, 98
 - SPS results, 357
 - relaxation time for strangeness, 335
- chemical parameters
 - Pb–Pb at $\sqrt{s_{NN}} = 130$ GeV, 367
 - Pb–Pb system, 359, 360
 - S–Au/W/Pb system, 358
- chemical potential, 57, 212
 - antiparticle, 60
 - isospin asymmetry, 213
 - local, 90
- chiral condensate, 297
 - disoriented, 269
- chiral symmetry, 44
 - bag model, 258
 - breaking, 44
- color, 7
 - confinement, 38
 - current, 273
 - dynamic charge, 38
 - flux tube, 41
 - hyperfine interaction, 259
 - superconductive phase, 47
- confinement, 6, 38
 - boundary condition, 264
 - origin, 38
- correlations
 - Bose–Einstein, 171
- cross section
 - geometric, 78
 - momentum average, 317
 - thermal average, 318
- current algebra, 45
- decoherence, 15
- deconfinement at the AGS and SPS, 95
- degeneracy
 - effective, 66
 - quantum gas, 61
- degrees of freedom, 66, 67
 - electro-weak particles, 9
 - QGP, 52
- detailed balance, 316
 - antibaryon production, 350
- dileptons, 24
- Dirac equation, 262
- Doppler factor, 149
- energy density, 195
 - at the RHIC, 185
 - hadronic gas, 209, 211
 - lattice QCD, 300
 - QGP, 53, 310
 - quantum gas, 69
 - quark–gluon liquid, 310, 312–314
- ensemble
 - canonical, 192
 - grand-canonical, 192
 - micro-canonical, 191
 - statistical, 191
- enthalpy, 191
- entropy
 - Boltzmann gas, 114
 - chemical equilibration, 115
 - classical gas, 205, 206
 - conservation
 - ideal flow, 106
 - scaling solution, 128
 - content
 - phase-space distribution, 113
 - Fermi gas, 113
 - glue fireball, 116, 117
 - hadronization, 126
 - initial state, 129
 - isolated system, 114

- measurement, 121, 122
- nonequilibrium, 115
- particle production, 112
- per baryon, 206
- per particle, 114, 207
- pion gas
 - super-saturated, 124
- entropy density, 187
 - quark–gluon liquid, 310, 312–314
 - quark–gluon plasma, 315
- equation of state
 - effect of particle mass, 199
 - finite-volume correction, 209
 - quark–gluon plasma, 303
 - relativistic ideal gas, 199
- equilibrium
 - absolute chemical, 90
 - chemical, 90
 - local, 90, 95
 - kinetic, 96
 - relative chemical, 90
 - thermal, 90
 - explanation, 97
 - local, 96
- eta function, 201
- Euclidian space, 288
- expansion
 - cooling, 112
 - decrease in temperature, 11
 - Hubble, 11
- exponential mass spectrum
 - phase transition, 238
- extensive variables, 187
- Faddeev–Popov ghosts, 275
- fermion
 - degeneracy factor, 201
 - distribution function, 194, 203
 - domain wall, 292
 - entropy per particle, 207
 - ideal-gas quark density, 204
 - lattice doubling, 291
- fireball, 2, 95
 - entropy, 115
 - expanding, 137
 - thermal particle spectra, 141
 - expansion, 50
 - explosion, 51
 - flow of matter, 138
 - life span, 91
 - mass, 80
 - stages of evolution, 93
 - super-cooling, 51
- fireball static
 - particle spectra, 131
- first law of thermodynamics, 187
- flavor
 - conservation, 214
 - symmetry, 269
- free energy, 187, 188
 - lowest order in α_s , 304
 - perturbative expansion, 303
- freeze-out
 - chemical and thermal, 158
 - Cooper–Frye formula, 141
 - surface
 - 1 + 1 dimensions, 109, 110
 - velocity, 142
- FRITIOF model, 103
- fugacity, 56, 57, 213
 - antiparticle, 60
 - time dependence, 214
 - valence quark, 212
- gauge invariance, 268
 - covariant derivative, 272
 - minimal coupling, 268
- Gibbs condition
 - chemical potential, 50
 - temperature, 48
- Gibbs' condition
 - pressure, 48
- Gibbs–Duham relation, 107, 190
- gluon, 6, 24, 38
 - current, 273
 - degeneracy, 53
 - density, 63
 - equilibration, 324
 - field, 271
 - field condensate, 39
 - field correlator, 39
 - spectra, 120

- thermal mass, 305
 - yield of strangeness, 340
- Goldstone boson, 44
- grand-canonical ensemble, 57
- hadron
 - abundances, 169
 - RHIC, 366
 - theoretical yield error, 240
 - finite-volume cluster, 247
 - in modification of a medium, 345
 - mass
 - bag model, 259
 - multiplicity of h^- at SPS, 166
 - ratios in A–A collisions at 14A GeV, 170
 - ratios in A–A collisions at 200A GeV, 169
 - size, 260
- hadronic
 - hadros*, 1
 - cascade, 102
 - mass spectrum, 217
 - exponential growth, 235–237
 - resonance interactions, 243
- hadronic gas, 48
 - ϵ/P , 210
 - asymmetry of strangeness, 215
 - energy density, 210
 - excluded volume, 251
 - consistency, 250
 - correction, 248
 - finite size EoS, 209
 - overheated, 51
 - phase space for strangeness, 217
 - pressure, 210
 - properties, 65
 - relativistic limit, 66
 - relaxation time for strangeness, 350
 - scattering phase shifts, 243
- hadronization
 - deconfined matter, 350
 - in a volume, 141
 - statistical, 352
 - sudden, 126
 - entropy content, 126
 - surface emission, 142
- Hagedorn gas, 236
 - critical temperature, 240
- Hagedorn temperature, 53
- HBT, 171, 172
 - correlations, 174, 175
 - kaon, 174
 - resonances, 174
 - transverse mass, 176
- heat function, 191
- heavy ion
 - baryon stopping, 74
 - collision
 - axis, 81
 - event generators, 102
 - interaction vertex, 81
 - participants, 78
 - spectators, 79
 - systems, 72
 - transport models, 102
 - experimental program
 - BNL–RHIC, 76
 - CERN–SPS, 75
 - rapidity gap, 73
- hydrodynamics, 104
 - equations of motion, 105
 - Euler relation, 104
 - flow forces, 210
 - one-dimensional solution, 111
- hyperon, 28
 - lambda decay, 28
 - lambda resonances, 28
 - number, 25
 - resonance, 31
 - sigma–baryon, 30
 - yield, 32, 33
- ideal gas
 - clusters in bootstrap model, 256
 - energy per particle, 201, 202
 - entropy, 205
 - entropy per baryon, 206
 - quark partition function, 203
- impact parameter, 79
- isospin, 25

- particle counting, 214
 - quark current, 43
- jet quenching, 23
- kaon, 35
- latent heat, 38, 69, 258, 261
- lattice
 - cell size, 294
 - continuum limit, 294
 - critical temperature, 301
 - domain-wall fermions, 292
 - dynamic quarks, 289
 - energy density, 300
 - infrared cutoff, 289
 - mass of strange hadrons, 299
 - mass of strange quarks, 299
 - naive quark action, 291
 - plaquette, 290
 - pressure, 301
 - with staggered fermions, 302
 - procedure for simulations, 294, 295
 - QCD action, 289
 - quark mass, 298
 - quenched quarks, 289, 296
 - running coupling constant, 298, 299
 - scaling violation, 294
 - staggered quark action, 292
 - ultraviolet cutoff, 289
 - Wilson action, 290, 291
- lepton, 6
 - leptos* , 1
- level density
 - N -particle, 241
 - scattering phase shift, 242
 - single-particle, 61
- LHC
 - charge multiplicity, 181
- Lorentz
 - boosts, 83
 - contraction, 82
 - covariant gauge, 275
 - invariant spectra, 132, 139
- Mandelstam variables, 319
- mass thermal, 305
- matter–antimatter, 182
 - symmetry, 4
- Maxwell construction, 49
- meson, 26, 27
 - ϕ , 36
 - mesos* , 1
 - strange, 25
- omega, 34
 - chemical equilibration, 349
 - freeze-out temperature, 361
 - production of decay in strangelets, 223
- OSCAR, 100
- pair production
 - perturbative, 326
 - Schwinger mechanism, 40
- particle
 - density, 194
 - glue fireball, 119
 - phase-space distribution, 317
 - energy per particle, 198
 - ensemble, 192
 - indistinguishable, 55
 - momentum, 81
 - production, 95
 - $\propto e^{-2m/T}$, $\propto e^{-m/T}$, 228
 - secondaries, 81
 - spectra, 62
 - pseudorapidity, 137
 - scaling solution, 128
 - thermal, 135
 - surface emission, 143
 - temperature, 152
- particle ratios
 - antiproton to proton, 182
 - chemical fugacities, 218
 - in A–A collisions at 14A GeV, 170
 - in A–A collisions at 200A GeV, 169
 - in Pb–Pb collisions at $\sqrt{s_{NN}} = 130$ GeV, 367
 - in Pb–Pb collisions at 158A GeV, 359

- strange baryon–antibaryon, 160, 164
- partition function
 - Boltzmann, 61
 - canonical, 56, 224
 - generating function, 58
 - grand-canonical, 57
 - quantum, 61
 - multicomponent system, 193
 - pressure ensemble, 190
 - quantum, 59
 - strange particles, 217
 - vacuum, 69
- parton
 - cascade, 102
 - thermalization, 23
- path integral, 288
 - Fermi determinant, 293
- phase
 - crossover, 53
 - diagram, 46, 47, 49, 50
 - metastable, 51
 - mixed, 49
 - transition, 53
 - change in g , 9
 - quark-mass dependence, 53, 54
- phase space
 - N -particle volume element, 242
 - Coulomb distortion, 215
 - entropy content
 - single-particle, 113
 - integral, 197
 - Lorentz-invariant, 139
 - occupancy
 - kinetic evolution, 323
 - quantum particle, 193
- phase transition
 - early Universe, 9, 14
 - finite-volume, 238
 - fluctuations, 126
- photon
 - density, 63
 - direct from QGP, 23
 - production, 24
- pion
 - excess, 167, 168
- gas, 124
 - properties, 125–127
- production
 - enhancement, 127
 - suppression, 167
- yield
 - charge asymmetry, 90
- plasma
 - electron–ion, 54
- Podolanski–Armenteros analysis, 29, 30
- pressure, 188
 - critical
 - early Universe, 10
 - effect of particle mass, 68, 199
 - hadronic gas, 209, 211
 - thermal, 306
- pseudorapidity, 85
 - error, 87, 89
 - particle emission angle, 85
 - particle energy and momentum, 136
 - rapidity, 86–88
- QCD, 267
 - K -factor
 - flavor production, 330
 - Λ parameter, 283
 - asymptotic freedom, 278
 - charge definition, 279
 - color-magnetic instability, 40
 - critical temperature, 301
 - Feynman diagrams, 277, 326
 - Lagrangian, 273
 - lattice action, 289
 - lattice formulation, 287
 - lattice pressure, 301
 - perturbative, 38, 274
 - Polyakov loop, 296, 297
 - renormalization, 278
 - group, 280
 - particle spin, 279
 - running, 282
 - β and γ functions, 281
 - running α_s
 - initial conditions, 284

- sum rules, 39, 45
- temperature dependence of α_s , 286
- thermal Feynman diagrams, 304
- transmutation of scales, 279
- two-loop α_s , 286
- value of Λ , 283
- QED instability, 40
- QGP
 - energy density, 315
 - entropy density, 315
 - pressure, 307
- quark, 6, 24, 38
 - bag model, 38, 262
 - cavity state, 260
 - charge, 6
 - chiral condensate, 297
 - chiral symmetry, 44
 - cold quark matter, 47
 - confinement, 38
 - degeneracy, 53
 - energy in the bag, 266
 - flavors, 6
 - free, 53, 54
 - ideal-gas density, 204
 - Lagrangian, 273
 - lattice action, 291
 - mass, 7
 - massless limit, 45
 - phase structure, 53, 54
 - running, 282, 283, 328
 - sum rules, 46
 - pairing, 47
 - production
 - running threshold, 284
 - strange, 8
 - sum rules, 45
 - thermal mass, 305
- quark density
 - statistical equilibrium density, 325
- quark–gluon liquid, 70, 306
- quark–gluon plasma
 - B_c formation, 37
 - comparison of signatures, 24
 - critical temperature, 10
 - degeneracy, 53
 - degrees of freedom, 52
 - energy density, 53, 310
 - equation of state, 303
 - equations of state, 310, 312, 313
 - evidence, 162
 - phase-space enhancement, 363–365
 - formation, 153
 - hadronization at the RHIC, 367
 - in the early Universe, 5
 - negative pressure, 52
 - observability, 15, 16
 - partition function, 70, 304
 - perturbative QCD interactions, 70, 304
 - phase diagram, 48
 - strange-antibaryon signature, 351
 - strange-particle signature, 18
 - sudden hadronization, 52
 - super-cooling
 - mechanical instability, 52
 - thermodynamic potential, 310
 - undercooled, 51
 - yield of strangeness, 362, 363
 - quasi-particle, 59, 305
 - quasirapidity distribution
 - protons and kaons, 89
 - rapidity, 82
 - $\bar{\Lambda}$ and Λ spectra in S–S collisions, 144
 - asymmetric systems, 84
 - baryon-poor region, 184
 - CM reflection, 144
 - fragmentation region, 145
 - gap, 72, 73
 - negative-hadron distribution, 165
 - particle spectra, 83
 - scaling solution, 128
 - pseudorapidity, 86–88
 - velocity relation, 82
 - reference frame
 - center of momentum, 79
 - relaxation time, 98
 - electro-weak interactions, 92

- production of strangeness, 336
- thermal production of charm, 337
- RHIC
 - charged-hadron production, 180, 182
 - first results, 178
- Riemann eta and zeta functions, 200
- search for strangelets, 223
- spectra
 - inverse transverse slope
 - system size, 152
 - Lorentz-invariant, 139
 - pseudorapidity, 136, 138
 - rapidity
 - 'net' baryons, 146
 - massless QGP quanta, 145
 - schematic representation, 147
 - three-fluid model, 146
 - rapidity window, 133
 - strange hadron
 - inverse transverse slope, 153
 - thermal, 135
 - thermal fit
 - statistical parameters, 157
 - transverse mass, 148
 - Λ , $\Omega + \bar{\Omega}$, 155
 - π^0 and η , 151
 - strange particles, 149, 150
 - strange-particle analysis, 154, 155
- spin–spin interaction, 40
- statistical bootstrap, 244
 - cluster formation, 256
 - critical behavior, 254
 - critical curve, 255
 - hypothesis, 243
 - idea, 244
 - model, 247, 252
 - physical interpretation, 257
 - singularity, 246
- statistical ensemble, 191
- statistical hadronization, 352
 - enhancement of occupancy of phase space, 363
 - excess of omega, 360
 - RHIC, 366
- statistical mechanics
 - covariant formulation, 248
- statistical significance, 358
- Stefan–Boltzmann law, 52, 69
- strange antibaryons
 - signature of deconfinement, 160, 164, 351
- strange hadron
 - inverse transverse slope, 153
- strange particle
 - non-statistical yield, 157
 - spectra, 19
- strangeness
 - ϕ , 153
 - abundance at the RHIC, 184
 - chemical equilibrium, 98
 - chemical-relaxation time, 335, 336
 - conservation, 222
 - canonical, 223
 - canonical QGP and HG, 229
 - distillation, 222
 - enhancement, 19, 160, 163, 164
 - exchange reaction, 344, 345
 - excitation function, 16, 17
 - hyperon yield, 31, 32
 - in baryons and mesons, 25
 - kinetic evolution at the RHIC, 338
 - lattice quark mass, 299
 - negative chemical potential, 221, 222
 - observables, 171
 - Okubo–Zweig–Izuka rule, 344
 - particle decays, 81
 - partition function, 217
 - phase-space occupancy, 339, 364, 365
 - enhancement, 363
 - production, 299, 326, 327
 - glue equilibration, 340
 - SPS rapidity distribution, 159
 - production in HG, 343, 344, 348, 351
 - QGP signature, 18

- quark mass, 8, 258
- relative equilibrium, 91
- signature of QGP, 15, 24, 160, 164
- symmetry in QGP, 214
- thermal production, 332, 334
- Wróblewski factor, 340, 341
- yield at SPS, 159
- yield at the RHIC, 369
- yield in QGP, 98, 362, 363
- streamer chamber, 81
- $SU(3)$
 - adjoint representation, 270
 - Gell-Mann representation, 269
- temperature, 188
 - evolution, 94
 - glue fireball, 118
 - Hagedorn, 53
 - inverse slope, 56
 - local, 90
 - transverse slope, 152
- thermal
 - collision frequency, 320, 331
 - equilibration, 93
 - equilibrium, 90
 - Feynman diagrams, 304
 - particle spectra, 135
 - expanding fireball, 141
 - pressure, 306
 - QCD energy scale, 285
 - reaction rate, 318
 - reactivity, 318
- thermal mass, 305, 308
- thermalization
 - transport models, 104
- thermodynamic potential
 - quark–gluon liquid, 310
- three-body reactions, 349
- transverse energy, 177
 - distribution, 177, 178
 - per charged particle, 179
 - pseudorapidity density, 180
 - scaling with A , 178
- transverse mass, 82, 148
- transverse-momentum acceptance, 134
- upsilononium, 37
- vacuum
 - energy, 41
 - density, 42
 - zero-point, 41
 - instability, 41
 - latent heat, 38, 261
 - partition function, 69
 - perturbative, 38
 - polarization, 277
 - restoration of symmetry, 46
 - structure, 258
 - true, 38
- velocity
 - cylindrical representation, 139
 - relative, 319
 - sound, 11, 107
- Wall Street, 63
- Wilson action, 291
- Yang–Mills fields, 271
- zeta function, 200

