

## INDEX

- Accelerated coordinates, 323  
Anomalies, 421  
Asymptotic behaviour, 23  
Asymptotic freedom, 33, 180, 267  
Auxiliary fields, 367, 372, 404
- Background quantization, 57  
Baryon asymmetry, 74, 192, 210, 231, 260, 262, 315  
Benzinians, 357  
 $\beta$ -function, 42  
Big bang, 9, 87, 213, 231, 266, 294  
Black hole, 4, 12, 20, 131, 156, 231, 253, 255, 259, 274, 294, 303, 337  
B.R.S. construction, 426, 477
- Canonical transformation, 475, 477  
Cauchy problem, 276  
Causally disconnected regions, 232  
Closed universe, 225  
Cohomology, 527  
Complex superspace, 368, 372  
Composite models, 51  
Conformal anomaly, 285, 304  
Conformal Lagrangian, 215, 262, 270, 509, 523  
Conformal supergravity, 38, 371  
Cosmic ray, 354  
Cosmological constant, 233  
Cosmological singularity, 71, 104, 117, 173, 197  
Counterterms, 415  
Covariant quantization, 58
- CP violation, 192, 238, 273  
CPT theorem, 5  
Critical density, 73
- de Sitter universe, 10, 75, 125, 161, 173, 202  
Dirac equation, 456  
Domain structure, 200, 242
- Effective action, 87, 268, 303, 470  
Effective potential, 57, 182, 187, 215, 233, 243  
Einstein, 1, 175, 252  
Entropy, 19, 74, 176, 213, 225, 232, 250, 291  
Equipartition hypothesis, 148  
Euclidean path integral, 22  
Expansion in  $1/N$ , 94  
Extended supergravity, 417
- False vacuum, 190  
Fine tuning, 225  
Finiteness, 396  
Friedman universe, 16, 80, 103, 127, 151, 161, 219, 339, 343
- Galaxy, 73, 81, 143, 161  
formation, 161  
Gauge algebra, 464  
Gell-Mann low equation, 185, 227  
Ghost, 421  
Gibbs free energy, 176  
Grand unification, 31, 187, 231
- Heat kernel, 437

- Hierachy, 234  
 Higgs field, 192  
 High frequency approximation, 62  
 Higher derivative gravity, 29, 65, 267  
 Holonomy group, 540  
 Homogeneity, 72, 107  
 Horizon problem, 81  
 Hubble constant, 213, 232  
  
 Inflationary universe, 185  
 Inhomogeneity, 143, 291  
 Isotropy, 74, 124  
  
 Jean's length, 338  
  
 Kaluza-Klein theories, 431  
 Keir-Newman metric, 305  
  
 Mach principle, 13  
 Massless field, 523  
 Microwave background, 72, 161  
 Mini black holes, 253  
 Monopole, 185, 233, 263  
  
 $N = 4$  Yang-Mills, 396  
 Newtonian potential, 255  
 Notoph, 385  
 Nucleosynthesis, 356  
  
 Open algebra, 419, 464, 482  
 Oscillating universe, 10  
  
 Particle creation, 87, 129, 173, 200  
 Phase transition, 155, 185, 231, 257  
 Photon, 347  
 Point splitting, 307  
 Positron, 352  
 Prepotential, 379  
 Proton decay, 27  
 Pure state, 20  
  
 Quantum coherence, 19  
 Quantum detectors, 323  
  
 Renormalization, 484  
 Renormalization group, 32  
 Rindler frame, 324  
  
 Sakharov, 47  
 Scalar electrodynamics, 220  
 Scalar field, 209, 215  
 Second law of thermodynamics, 5, 252, 329  
 Self energy, 2  
 Singularity, 303  
 S-matrix, 29, 199  
 Spontaneous symmetry breaking, 213, 231  
 Superclusters, 143  
 Superconformal anomalies, 381, 417  
 Superconformal group, 392  
 Supergravity, 29, 367, 404  
 Superspin, 370  
 Supersymmetric currents, 389  
 Super Yang-Mills theory, 419  
 SU(5), 187, 213, 227, 235  
  
 Thermodynamic equilibrium, 173  
 Thermodynamic potential, 176  
 Trace anomaly, 99, 271  
 Tunnelling, 177, 219, 233  
 Twisted particles, 547  
 Twistor theory, 504  
  
 Uncertainty relations, 68  
  
 Vacuum energy, 203  
 Vacuum polarization, 74, 167, 200, 214, 303, 315  
 Vortex perturbations, 149  
  
 W boson, 133  
 Wess Zumino model, 383, 392  
 Weyl, 34  
 Weyl curvature, 297  
  
 Yang-Mills theory, 482  
  
 Zeta function, 431, 437