

tidal forces near, 264–5
see also Kerr black hole; Schwarzschild black hole; supermassive black hole; white hole; wormhole

blackbody
 energy spectrum, 276
 radiation, 298–9
 temperature, 277
 bounce model, 398

Boyer-Lindquist coordinates, 318, 319, 320, 322, 344, 347

Boyce-Lindquist form, 318
 Brans-Dicke theory, 191–2, 235, 236
 Buchdahl's theorem, 260
 bug, two-dimensional, 266
 two-dimensional

comoving coordinates, 443, 467a
 and fundamental observers, 356–9
 Hubble distance, 421
 mass coordinate, 481–3, 507–8
 Schwarzschild function, acoustic contamination, 254

components
 metric, 83–4
 mixed, 94–9

tensor, 93–4, 100, 102, 103–4
 vector field, 73

see also contravariant components; covariant components

Compton effect, 124
 Compton scattering, and relativistic collisions, 123

Bibliography

- Abramowitz, M. & Stegun, I. A., *Handbook of Mathematical Physics*, Dover, 1972.
- Chandrasekhar, S., *An Introduction to the Study of Stellar Structure*, Dover, 1958.
- Chandrasekhar, S., *The Mathematical Theory of Black Holes*, Oxford University Press, 1983.
- Clarke, C., On the global isometric embedding of pseudo-Riemannian manifolds, *Proceedings of the Royal Society A* **314**, 417–28, 1970.
- d'Inverno, R., *An Introduction to Einstein's Relativity*, Oxford University Press, 1992.
- Princeton University Press, 1996.
- Feynman, R. P., Morinigo, F. B. & Wagner, W. G., *Feynman Lectures on Gravitation*, Addison-Wesley, 1995.
- Foster, J. & Nightingale, J. D., *A Short Course in General Relativity*, Springer-Verlag, 1995.
- Islam, J. N., *An Introduction to Mathematical Cosmology*, Cambridge University Press, 1992.
- Liddle, A. & Lyth, D., *Cosmological Inflation and Large-Scale Structure*, Cambridge University Press, 2000.
- Misner, C. W., Thorne, K. S. and Wheeler, J. A., *Gravitation*, Freeman, 1973.
- Mukhanov, V. F., Feldman, H. A. & Brandenberger, R. H., Theory of cosmological perturbations, *Physics Reports* **215**, 203–333, 1992.
- Nash, J., The imbedding problem for Riemannian manifolds, *Annals of Mathematics* **63**, 20–63, 1956.
- Padmanabhan, T., *Structure Formation in the Universe*, Cambridge University Press, 1993.
- Padmanabhan, T., *From Gravitons to Gravity: Myths and Reality*, abs/grqc/0409089.
- Peacock, J., *Cosmological Physics*, Cambridge University Press, 1999.
- Rindler, W., *Relativity: Special, General and Cosmological*, Oxford University Press, 2001.
- Ryder, R. H., *Quantum Field Theory*, Cambridge University Press, 1985.
- Schutz, B. F., *Geometrical Methods of Mathematical Physics*, Cambridge University Press, 1980.
- Schutz, B. F., *A First Course in General Relativity*, Cambridge University Press, 1985.
- Tanaka, Y. et al., *Nature* **375**, 659, 1995.
- Wald, R. M., *General Relativity*, University of Chicago Press, 1984.
- Weinberg, S., *Gravitation and Cosmology*, Wiley, 1972.
- Will, C., *Theory and Experiment in Gravitational Physics*, Cambridge University Press, 1981.