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**Figures**

Cover image: A multi-wavelength composite NASA image of the spiral galaxy M81, with X-ray data from the Chandra X-ray Observatory (blue), optical data from the Hubble Space Telescope (green), infrared data from the Spitzer Space Telescope (pink) and ultraviolet data from GALEX (purple). (Credit: X-ray: NASA/CXC/Wisconsin/D.Pooley & CfA/A.Zezas; Optical: NASA/ESA/CfA/A.Zezas; UV: NASA/JPL-Caltech/CfA/J.Huchra et al.; IR: NASA/JPL-Caltech/CfA). Superimposed is an artist's representation of M33 X-7, a black hole binary with a high-mass companion star. Credit: NASA/CXC/M.Weiss;

Figure 1.1: National Optical Astronomy Observatory; Figure 1.5: Source Unknown; Figure 1.9: adapted from Pringle, J. E. and Wade, R. A. (1985) 'Introduction', *Interacting Binary Stars*, Cambridge Astrophysics Series, CUP; Figure 1.11: Courtesy of Dan Rolfe, University of Leicester; Figure 1.12: Adapted from a figure created by Jerry Orosz, University of Utrecht; Figure 1.13: adapted from Ferrarese, L. Ford, H. (1996), *Space Science Reviews*, **116**, 523–624; Figure 1.14: Jun-Hui Zhao and W. M. Goss/AOC/NRAO; Figure 1.15: European Southern Observatory; Figures 1.17 and 1.18: Rob Hynes, University of Southampton; Figure 2.5: LISA International Science Team; Figure 2.8: Bulik, T. (2007) 'Black holes go extragalactic', *Nature*, **449**, 799, *Nature* Publishing Group; Figure 2.9: Bruce Balick (University of Washington), Vincent Icke (Leiden University, The Netherlands), Garrelt Mellema (Stockholm University), and NASA/ESA; Figure 2.10: courtesy of Bart Willems; Figure 2.11: adapted from Hobbs, G. et al. (2005) 'A statistical study of 233 pulsar proper motions', *Monthly Notices of The Royal Astronomical Society*, **360**, 974, Blackwell Science Limited; Figure 2.12: adapted from Danzmann K, Rüdiger A. (2003), *Class. Quantum Grav.* **20**, S1–S9; Figure 4.5: Constructed from observations made by the AAVSO, courtesy of John Cannizzo; Figures 5.1 and 5.4: Courtesy of Dan Rolfe, University of Leicester; Figure 5.2: adapted from Gilliland, R. L. et al. (1986) 'WZ Sagittae: time-resolved spectroscopy during quiescence', *Astrophysical Journal*, **301**, 252, The American Astrophysical Society; Figure 5.3: adapted from Horne, K. and Marsh, T. R. (1986) 'Emission line formation in accretion discs', *Monthly Notices of the Royal Astronomical Society*, **218**, 761, Blackwell Science Limited; Figure 5.5: adapted from Frank, J., King, A. and Raine, D. (2002) *Accretion Power in Astrophysics*, 3rd ed. CUP; Figure 5.6: adapted from Schoembs, R. et al. (1987) 'Simultaneous multicolour photometry of OY Carinae during quiescence', *Astronomy and Astrophysics*, **181**, 50, Springer–Verlag GmBH & Co; Figure 5.7: Courtesy of Raymundo Baptista, UFSC, Brazil; Figure 5.8: adapted from Tom Marsh, University of Southampton; Figure 5.9: adapted from Steeghs, D. (1999) Ph.D. thesis from University of St Andrews: 'Spiral waves in accretion discs', Danny Steeghs, University of Warwick; Figures 5.11 and 5.12: Danny Steeghs, University of Warwick; Figures 5.17: The Anglo–Australian Observatory/David Malin; Figure 6.1: Image courtesy of ESA; Figure 6.2: Josef Pöpsel; Figure 6.3: Barnard, R. Shaw-Greening, L. and Kolb, U. (2008) 'A multicoloured survey of NGC253 with XMM-Newton: testing the methods used for creating luminosity functions from low-count data', *Monthly*

*Notices of the Royal Astronomical Society*, **388**, 849, Blackwell Science Limited; Figure 6.5: D. de Chambure, XMM-Newton Project, ESA/ESTEC; Figure 6.8: adapted from Titarchuk, L, (1994) *Astrophysical Journal*, **434**, 570; Figure 6.9: adapted from Morrison, R. and McCammon, D. (1983) 'Interstellar photoelectric absorption cross sections, 0.03-10 keV', *Astrophysical Journal*, **270**, 119, The American Astronomical Society; Figure 6.15: adapted from Revnivtsev, M. et al. (2000) 'High frequencies in the power spectrum of Cyg X-1 in the hard and soft spectral states', *Astronomy and Astrophysics*, **363**, 1013, EDP Sciences; Figure 6.16: adapted from Strohmayer, T. and Bildsten, L. in Lewin, W. H. G. and van der Klis, M. (2006) Compact Stellar X-ray Sources, CUP; Figure 6.18: adapted from Boirin, L. et al. (2004) 'Discovery of X-ray absorption lines from the low-mass X-ray binaries 4U 1916-053 and X 1254-690 with XMM Newton', *Nuclear Physics*, Section B, **132**, 506, Elsevier Science; Figures 6.19 and 6.20: adapted from Church, M. J. and Balucinska-Church, M. (1995) 'A complex continuum model for the low-mass X-ray binary dipping sources: application to X 1624-49', *Astronomy and Astrophysics*, **300**, 441, EDP Sciences; Figure 6.23: Wijers, R. A. M. J. and Pringle, J. E. (1999) 'Warped accretion discs and the long periods in X-ray binaries', *Monthly Notices of the Royal Astronomical Society*, **308**, 207, Blackwell Publishers; Figure 6.25: adapted from van der Klis, M. et al. (1996) 'Discovery of submillisecond quasi-periodic oscillations in the X-ray flux of Scorpius X-1', *Astrophysical Journal*, **469**, 1, The American Astronomical Society; Figure 6.26: adapted from Done, C. and Gierlinski, M. (2003) 'Observing the effects of the event horizon in black holes', *Monthly Notices of the Royal Astronomical Society*, **342**, 1041, Blackwell Publishers; Figure 6.27: NASA Marshall Space Flight Center (NASA-MSFC); Figure 6.28: adapted from McHardy, I. (2006) 'Long timescale X-ray variability of 3C273: similarity to Seyfert galaxies and Galactic binary systems', Blazar Variability Workshop II: Entering the GLAST Era, ASP Conference Series, **350**, 94, Astronomical Society of the Pacific; Figure 6.29: adapted from Brenneman, L. W. and Reynolds, C. S. (2006) 'Constraining black hole spin via X-ray spectroscopy', *Astrophysical Journal*, **652**, 1028, The American Astronomical Society; Figures 7.1 and 7.2b: Images courtesy of NRAO/AUI; Figure 7.2a: Ann Wehrle and Steve Unwin/NASA; Figure 7.8: Marscher et al., Wolfgang Steffen, Cosmovision, NRAO/AUI/NSF; Figures 8.1 and 8.4: Courtesy of the Gamma-Ray Astronomy Team at the National Space Science and Technology Center (NSSTC), http://gammaray.nsstc.nasa.gov/batse/grb/; Figure 8.2 adapted from Schaeffer, B. et al. (1994), *The Astrophysical Journal Supplement Series*, **92**, 285, The American Astronomical Society; Figures 8.3a and 8.5: adapted from from Ph.D. thesis 'Spectral studies of gamma-ray burst prompt emission', by Y. Kaneko (2005) University of Alabama, Huntsville; Figure 8.3b: Fishman, G. J. (1999) 'Observed properties of gamma-ray bursts', *Astronomy and Astrophysics Supplement Series*, **138**, 395–398, The European Southern Observatory; Figure 8.6: adapted from Liang, E. W. et al. (2006) 'Testing the curvature effect and internal origin of gamma-ray burst prompt emissions and X-ray flare with swift data', *Astrophysical Journal*, **646**, 351, The American Astronomical Society; Figure 8.7: adapted from Stanek, K. Z. et al. (1999) 'BVRI Observations of the optical afterglow of GRB 990510', *Astrophysical Journal*, **522**, 39 The American Astronomical Society; Figure 8.8a: Taken from www.tls-tautenburg.de/research/klose/GRB030329.html; Figure 8.8b: Taken from http://www.mpe.mpg.de/∼jcg/grb030329.html; Figure 8.10: adapted from

Panaitescu, A. (2009) ‘Gamma-Ray Burst afterglows: theory and observations’, *American Institute of Physics Conference Proceedings*, **1133**, 127–138, American Institute of Physics; Figure 8.12: adapted from an original sketch by M. Ruffert and T. H. Janka; Figure 8.13: adapted from Zhang, W., Woosley, S. E. and MacFadyen, A. I. (2003) ‘Relativistic jets in collapsars’, *Astrophysical Journal*, **586**, 356, American Astronomical Society; Figure 8.14a: adapted from the original produced by Edo Berger (Harvard-Smithsonian CfA).

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