

The Theory of Black Holes

Recommended Reading

Course Web Page

- www.ap.smu.ca/~drw/teaching/craq.php

Books

- General Relativity: An introduction for physicists
M.P. Hobson, G. Efstathiou & A.N. Lasenby (Cambridge, 2006)
- High Energy Astrophysics (3rd Edition)
M.S. Longair (Cambridge, 2011)
- Introduction to Astrophysical Fluid Dynamics
C.J. Clarke & R.F. Carswell (Cambridge, 2014)

Papers

Accretion discs

- Pringle J., 1981, ARA&A 19, 1378
(review of astrophysical discs)
- Shakura N. I. & Sunyaev R. A., 1973, A&A, 24, 337
(seminal thin disc model)

Radiatively Inefficient Accretion

- Narayan R., 1998, proceedings of "The Theory of Black Hole Accretion Discs",
arXiv:9803141 (review of radiatively inefficient accretion flows)
- Narayan R. & Quataert E., 2005, Science 307, 77
(review of black hole accretion)

Magneto-rotational Instability

- Balbus S.A. & Hawley J.F., 1991, ApJ 376, 214
(simulation of MRI in accretion discs)

Magnetic Reconnection

- De Gouveia Dal Pino E.M., 2016, Proceedings of Science arXiv:1608.03173
(notes from a lecture on fast magnetic reconnection in jet-accretion disc systems)

X-ray Continuum

- Sunyaev R. A. & Trümper J., 1979, Nat, 279, 506
(formation of a power law X-ray continuum by Comptonisation)

Jet Launching

- Blandford R.D. & Payne D.G., 1982, MNRAS 199, 883
(magneto-centrifugal jets)
- Blandford R.D. & Znajek R. L., 1977, MNRAS 179, 433
(extraction of energy from black hole spin via magnetic field)
- Narayan R. & Quataert E., 2005, Science 307, 77
(review of black hole accretion)

(GR)MHD Simulations

- Gammie C.F., McKinney J.C. & Tóth, 2003, ApJ 589, 444
(review of the GRMHD equations and overview of a numerical scheme to solve)
- McKinney J.C. *et al.*, 2012, MNRAS 423, 3083
(GRMHD simulations of magnetically choked accretion flows)
- Hogg J.D. & Reynolds C.S., 2016, ApJ 826, 40
(MHD simulations of fluctuations propagating through accretion discs)

Ray Tracing

- Wilkins D.R. & Fabian A.C., 2012, MNRAS 424, 1284-1296
(GR ray tracing of X-ray reflection from accretion discs around black holes)
- Wilkins D.R. *et al.*, 2016, MNRAS 458, 200
(GR ray tracing of X-ray timing and reverberation from accretion discs)
- Reynolds C.S. *et al.*, 1999, ApJ 514, 164
(simulation of the time/energy-resolved response of accretion disc reflection to a flare)

X-ray Reflection

- Ross R.R. & Fabian A.C., 2005, MNRAS 358, 211
(models of X-ray reflection from accretion discs)
- García J. & Kallman T.R., 2010, ApJ 718, 695
(method of simulating X-ray reflection from accretion discs)

X-ray Reverberation

- Uttley P., Cackett E.M., Fabian A.C. Kara E. & Wilkins D.R., 2014, A&ARv 22, 72
(review of the techniques used to measure X-ray reverberation as well as modelling and interpretation)

Measuring the Corona & Variability

- Wilkins D.R. & Gallo L.C., 2015, MNRAS
(changes in the extent of the corona between epochs of high and low X-ray flux)
- Wilkins D.R. *et al.*, 2016, MNRAS 454, 4440
(launching of the corona during an X-ray flare)