



Outline

X-Ray Binaries

- 16 Apr Introduction, History
- 23 Apr Accretion in X-Ray Binaries
- 30 Apr Accretion in X-Ray Binaries, cont'd

Neutron Star X-Ray Binaries

- 7 May LMXBs
- 14 May **no lecture**
- 21 May Aperiodic Variability, QPOs
- 28 May **no lecture** – Pentecost
- 4 Jun X-Ray Bursts
- 11 Jun X-Ray Pulsars, Accretion Column, Magnetic Fields

Black Hole X-Ray Binaries

- 18 Jun Black Hole X-ray Binaries
- 25 Jun Microquasars
- 2 Jul X-Ray Transients

XRB statistics

- 9 Jul Formation and Evolution of XRBs
- 16 Jul XRBs in other Galaxies



Outline

Why are X-ray binaries interesting?

- access to **exotic end-points of stellar evolution**
- studies of **accretion and accretion disks** on long timescales
with respect to the dynamic timescale
- probe **physical processes** close to **surface of neutron star** or **BH event horizon**
- some are galactic micro-scale **analogues of active galactic nuclei**
- they allow **mass/size constraints**, or even accurate measurements, of their fundamental properties
- they allow **to constrain evolution of binary star systems**

After P.A. Charles



Textbooks on XRB

LEWIN, W.H.G., VAN DER KLIS, M., 2006, Compact Stellar X-Ray Sources, Cambridge: Cambridge Univ. Press, 706pp., €155.90

Graduate level summary of all aspects of X-ray binary research. Overpriced. The articles are also available on <http://www.arxiv.org>.

LEWIN, W.H.H., VAN PARADIJS, J., VAN DEN HEUVEL, E.P.J., 1995, X-Ray Binaries, Cambridge: Cambridge Univ. Press, 662pp., €58.90

Predecessor to Lewin & van der Klis, summarizes the knowledge before the launch of the current satellites. Many of the general overview articles in this reference are still worthwhile reading.

CHARLES, P.A., SEWARD, F.D., 1995, Exploring the X-Ray Universe, Cambridge: Cambridge Univ. Press, 398+xvipp., out of print

The only more or less recent textbook on X-ray astronomy. Does not cover the past 20 years, however, still a good summary of the basic physics.



Other Textbooks

FRANK, J., KING, A., RAINE, D., 2002, *Accretion Power in Astrophysics*, 3rd edition, Cambridge: Cambridge Univ. Press, 398pp., €55.90

The standard textbook on accretion, covering all relevant areas of the field, including X-ray binaries.

PADMANABHAN, T., 2000, *Theoretical Astrophysics: Volumes 1–3*, Cambridge: Cambridge Univ. Press, ~ 500pp. each, ~€60 per volume

Introduction to the (theoretical) physics of astrophysics. Short, concise, great. Graduate level, but understandable, although not for the faint hearted. . .

BRADT, H., 2003, *Astronomy Methods: A Physical Approach to Astronomical Observations*, Cambridge: Cambridge Univ. Press, 458pp., €57.50

Summary of many technical details that are useful to know if you want to become a professional astronomer. Detectors, radiation processes, etc.

History: What are X-ray Binaries?