

PX2512 - Bibliography of further references

Re-iterating the note in the course introduction, there are many books on cosmology, astronomy and modern physics on the shelves in floor 5 of the new library. The following books are well worth a look at. There are also plenty of other books, some of which go into the subject in more theoretical detail than our course does. The list is in alphabetical order of first author's surnames in each section, with the addition of the library's Dewey reference number after the word "Lib.". I've added short comments on each book.

COSMOLOGY – 523.1

Donald Goldsmith *Einstein's greatest blunder: the cosmological constant and other fudge factors in the physics of the universe* [Harvard University Press, 1995; Lib. 523.1 Gol]. A better book than its title might suggest, by an astrophysicist not a newspaper journalist. Well informed and engagingly written.

Stephen Hawking *The universe in a nutshell* [Bantam Press, 2001; Lib. 523.1 Haw]. A personal account of cosmology by one of today's most famous contributors. More readable than *A brief history of time* and imaginatively illustrated.

John F. Hawley & Katherine A. Holcomb *Foundations of modern cosmology* [OUP, 1998; Lib. 523.1 Haw]. This is a well-written book that explains the subject clearly at an appropriate level. It expands on many course topics in relativity, cosmology and astronomy.

Andrew Liddle *An introduction to modern astronomy* [John Wiley & Sons, 2nd edition 2003; Lib. 523.1 Lid]. Based on an undergraduate course, this text shows at a modest level some of the mathematical argument behind the descriptions given in the previous references. The subject is taken further than we do in our course.

Malcolm S. Longair *Our evolving universe* [CUP, 1996; Lib. 523.1 Lon]. Enthusiastically written by one of Britain's leading astronomers who is not afraid to add his own personal touches throughout. The cosmology and astronomy in our course is well illustrated and clearly explained.

Martin Rees *Before the beginning* [Simon & Schuster, London, 1997; Lib. 523.1 Ree]. Readable from cover to cover, this personal account by the Astronomer Royal is informed by a lifetime's career in astronomy. Several of Rees's predictions for the way cosmology is moving have come true in the few years since he wrote this book.

Michael Rowan-Robinson *Cosmology* [Clarendon Press, Oxford, third edition, 1996; Lib 523.1 Row]. This textbook by a well-known British cosmologist has been around for more than 30 years now. It gives an account of cosmology at a slightly deeper level of theoretical development than our course but is a good source of extra detail.

Joseph Silk *A short history of the universe* [Scientific American Library, New York, 1997; Lib. 523.1 Sil]. An authoritative book, well illustrated and well explained by a well-known cosmologist.

Joseph Silk *The big bang: the creation and evolution of the universe* [W. H. Freeman, San Francisco, 1980; Lib. 523.18 Sil]. The pre-cursor to Silk's book above but Silk illustrates his

story well and takes time to explain clearly the concepts he introduces. He also discusses the synthesis of elements in stars and the formation of planetary systems.

Steven Weinberg *The first three minutes: a modern view of the origin of the universe* [Andre Deutsch, 1st ed'n 1977, 2nd ed'n, 1994. Lib. 523.12 Wei]. A 'classic' text by a particle physics Nobel Prize winner, with added comments in the later edition but the thrust of the argument remains unchanged.

ASTRONOMY - 520

Eric Chaisson & Steve McMillan *Astronomy today* [Pearson, 5th ed'n 2005; Lib. 520 Cha]. Up-to-date, clearly written and well illustrated account of modern astronomy.

Roger A. Freedman & William J. Kaufmann III *Universe* [W. H. Freeman & Co., 7th edition, 2005; Lib. 520 Fre]. Another up-to-date and comprehensive general astronomy book with good specialist pieces by notable guest contributors.

Keith Holliday *Introductory astronomy* [Wiley, Chichester, 1999; Lib. 520 Hol]. Based on a course given at a Scottish University, this is a good explanatory text that blends description with basic physics.

Theo Koupelis & Karl F. Kuhn *In quest of the universe* [Jones & Bartlett, 5th ed'n 2007, earlier editions; Lib. 523.1 Kuh]. Our level 1 astronomy textbook. It discusses the astronomy in this course in later chapters than are referred to at level 1. The final section of our course is illustrated with diagrams from this text.

Jay M. Pasachoff *Astronomy: from the earth to the universe* [Saunders College Publishing, 6th ed'n 2002; Lib. 520 Pas]. Alternative text to that of Kuhn and Koupelis by a highly respected astronomy teacher and writer.

GENERAL

John D. Barrow *The Constants of Nature; from alpha to omega* [Vintage, Random House, 2003, paperback ISBN 0-099-28647-5; Lib. 523.1 Bar]. John Barrow has written several accessible books on astronomical and cosmological subjects. This one is about how the universe on all scales is influenced by the constants of physics and what we know about why these constants have the sizes they do. The discussions include the influence of the constants on biology and whether life could exist if the constants were different.

Nigel Calder *Einstein's Universe: a guide to the theory of relativity* [Penguin Books, London, 1979; Lib. 530.11 Cal]. Written to mark the centenary of Einstein's birth, this book sets out to 'make relativity plain' for the intelligent layman. Nigel Calder was a well-known populariser of science who liked to keep close to the underlying science. Later chapters, in particular, cover cosmology and aspects of general relativity.

Paul Davies *The Goldilocks Enigma* [Penguin Books, London, 2006]. One reason for suggesting this paperback is because it's intelligible to someone following our course. Paul Davies addresses a question that I believe is one of those questions that sounds quite deep but in fact can't be answered within the boundaries of science, namely "Why is the Universe just right for life?". Near the end, on p 292, the author says: "So how come existence? At the end

of the day, all the approaches I have discussed are likely to prove unsatisfactory". That mightn't sound like a recommendation to read but Davies does summarise quite complex issues covered in our course very clearly and explores various answers that have been given to his central question. He also says quite a lot in the book about the multiverse, a topic that doesn't come into our course because in my view it's not established science. However, read Davies book and you may find it inspiring.

Martinus J. G. Veltman *Facts and mysteries in elementary particle physics* [World Scientific, London, 2003; Lib 539.72 Vel]. Written by a Nobel Prize winner in particle physics, this book has had rave reviews from other Nobel Prize winners and from a much wider audience for the insight it gives into subjects relating to particle physics, from Einstein to the Higgs boson.