SUGGESTED READING

I aim to give you a coherent set of lectures that would be self-contained. The reading suggestions below are not obligatory, they are given simply so that you know where to look for an alternative (and in many cases much more extensive) account of the material discussed in class. As we move along, I will give you more references to articles, reviews etc. These, as well as specific reading suggestions for individual lectures will be posted in the Course Blog: see http://www.damtp.cam.ac.uk/user/as629/part3.html.

I. Turbulence

   — A lucid account of Kolmogorov’s theory is given in §§33-34.

   — A book that is now a standard reference. It presents Kolmogorov’s theory very thoroughly (if in a somewhat formalistic way). Also contains a long chapter reviewing the literature and the modern (as of 1995) state of the subject.

3. P. A. Davidson, Turbulence — An Introduction for Scientists and Engineers (OUP 2004)
   — A compendium of knowledge on turbulence. Everything you ever wanted to know about it but were afraid to ask. Very well written.

   — A classic essay on turbulence.


   — An engineering-style monograph.

   — A good monograph on closure schemes, if you must know about them.

II. Magnetohydrodynamics

   — A new book by a renowned plasma astrophysicist. I learned MHD from his lectures, so I expect you may find some similarities between my presentation and his.

   — A (mostly) sensible introduction to plasma physics. MHD is covered in Chapters 11-17.

   — A brand new and very thorough and meticulous presentation of the subject. Also written by plasma physicists with applications to astrophysics and to fusion devices in mind.

4. P. A. Davidson, An Introduction to Magnetohydrodynamics (CUP 2001)
   — A very good text written from a non-plasma perspective. A lot of fun to read. The second half of the book is an extensive introduction to engineering/metallurgical applications.

Here are a few books for further reading on MHD and plasma physics (these go well beyond the course material).

   — The bible of MHD instabilities.
   — A classic account of the mean-field dynamo theory. Out of print.
3. E. N. Parker, *Cosmical Magnetic Fields: Their Origin and Activity* (Clarendon 1979)
   — A monograph by one of the founders of the subject. Out of print.
   — An oft-cited monograph by one of the gurus of the numerical simulations of MHD.
   — A classic of plasma physics by the founder of the US fusion program.
   — The bible of laboratory plasma physics. Review articles by the leading scientists. Quality varies, but the book as a whole is a good resource.

### III. MHD Turbulence

We do not know very much about MHD turbulence. Close examination shows that we know even less than we think we do. Consequently there is no standard textbook account of the subject. Here are some books that more or less pertain to what I will talk about.

   — A review of (the author’s understanding of) the present state of the subject.
   — A somewhat loosely assembled book, which, nevertheless, is worth reading for the wealth of physical insights it contains. It is a book on the physics of randomness rather than exclusively on MHD turbulence. Small-scale dynamo is treated in Chapter 9.
   — A book on stochastic methods, not on MHD. However, these are very useful things to know for someone interested in the subject. A very thorough and systematic treatment. This is for further reading, not for the course material.

There are also sections on MHD turbulence in both P. A. Davidson’s books listed above.

If you wish to investigate the origins of my views on MHD turbulence, see links to my papers on [http://www.damtp.cam.ac.uk/user/as629/publist.html](http://www.damtp.cam.ac.uk/user/as629/publist.html).