Preprint typeset in JHEP style - HYPER VERSION

Michaelmas Term, 2017

Statistical Field Theory

University of Cambridge Part III Mathematical Tripos

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Recommended Books and Resources

There are a large number of books which cover this material, although often from very different perspectives. They have titles like "Critical Phenomena", "Phase Transitions", "Renormalisation Group" or, less helpfully, "Advanced Statistical Mechanics". Here are some that I particularly like

- Nigel Goldenfeld, *Phase Transitions and the Renormalization Group*

A great book, covering the basic material that we'll need and delving deeper in places.

- Mehran Kardar, *Statistical Physics of Fields*

The second of two volumes on statistical mechanics. It cuts a concise path through the subject, although at the expense of being a little telegraphic in places. It is based on lecture notes which you can find on the web; a link is given on the course website.

- John Cardy, *Scaling and Renormalisation in Statistical Physics*

A beautiful little book from one of the masters of conformal field theory. It covers the material from a slightly different perspective than these lectures, with more focus on renormalisation in real space.

- Chaikin and Lubensky, *Principles of Condensed Matter Physics*

- Shankar, *Quantum Field Theory and Condensed Matter*

Both of these are more all-round condensed matter books, but with substantial sections on critical phenomena and the renormalisation group. Chaikin and Lubensky is more traditional, and packed full of content. Shankar covers modern methods of QFT, with an easygoing style suitable for bedtime reading.

A number of excellent lecture notes are available on the web. Links can be found on the course webpage: http://www.damtp.cam.ac.uk/user/tong/sft.html.