Graduate Lectures in Theoretical Physics
Quantum Theory of Condensed Matter
Bibliography

Background

N W Ashcroft and N D Mermin *Solid State Physics*, Holt-Sanders (1976). I assume familiarity with this material.

S-K Ma *Statistical Mechanics*, World Scientific (1985). Strongly recommended book at a level suitable for first year graduate students.

J-P Blaizot and G Ripka *Quantum Theory of Finite Systems*, MIT (1986). A very thorough treatment of second quantisation, canonical transformations and self-consistent field approximations.

Recent Graduate Texts

A. Altland and B. D. Simons *Quantum Field Theory in Condensed Matter Physics*, CUP (2006). An accessible introduction to the subject.

S. Sachdev *Quantum Phase Transitions*, CUP (1999).
An advanced survey of theoretical approaches to this subject.

H. Bruus and K. Flensberg *Many Body Quantum Theory in Condensed Matter Physics*, OUP (2004).
A detailed introduction to techniques and a discussion of topics of current interest, especially in connection with mesoscopic conductors and quantum dots.

X.-G. Wen *Quantum Field Theory of Many-Body Systems*, OUP (2004). An outline of basic material followed by an introduction to some advanced topics (topological order, the fractional quantum Hall effect, and spin liquids).

A. M. M. Tsvelik *Quantum Field Theory in Condensed Matter Physics*, CUP (1995). A concise survey of applications of field theory to condensed matter problems, especially in one dimension.

A. Auerbach *Interacting Electrons and Quantum Magnetism*, Springer (1994).
A reasonably gentle introduction to a range of current theoretical ideas.

General Texts

P W Anderson *Concepts in Solids*, Benjamin (1963). Perhaps the best place to start reading about quantum-mechanical aspects of solid state physics at a postgraduate level.

C Kittel *Quantum Theory of Solids*, Wiley (1963). [N.B. *not* the undergraduate text by the same author]. Includes most of the material covered in the first third of the lecture course.

D. Pines and P. Nozieres *The Theory of Quantum Liquids, Volume 1*, Addison Wesley (1989). A standard account of Fermi liquids.

P W Anderson *Basic Notions in Condensed Matter Physics*, Benjamin (1984). An advanced discussion of some of the most important ideas in the subject.

A. J. Leggett *Quantum Liquids*, OUP (2006). A clear and wide-ranging discussion of Bose condensation and Cooper pairing.

Electrons in disordered conductors.

N F Mott *Conduction in Non-Crystalline Materials* O.U.P. (1987) For a survey.

P. A. Lee and B. I. Altshuler, Physics Today **41** 36 (1988), and P.A. Lee and S-C Feng, Science **251** 633 (1991). Two accessible introductions to interference effects on transport in disordered media.

Y. Imry *Introduction to Mesoscopic Physics* O. U. P. (1997). Also an article in *Directions in Condensed Matter Physics*, Edited by G. Grinstein and G Mazenko, World Scientific (1986). A more advanced discussion, but in the same spirit as Lee and Altshuler's article.

Some consequences of electron-electron interactions.

N F Mott *Metal Insulator Transitions*, Taylor and Francis (1990), and A. C. Hewson *The Kondo Problem to Heavy Fermions* Cambridge (1993). Two complementary reviews.

The Quantum Hall Effect.

R. E. Prange and S. M. Girvin *The Quantum Hall Effect*, Springer (1990). The best introduction.

S. M. Girvin *The Quantum Hall Effect: Novel Excitations and Broken Symmetries* Lectures delivered at Ecole d'Ete Les Houches, July 1998; cond-mat/9907002
A more recent review of quantum Hall physics.

Green functions, response functions and perturbation theory

A. A. Abrikosov, L. P. Gorkov and I. E. Dzyaloshinski *Methods of quantum field theory in statistical physics*, Dover (1975). Still possibly the best starting point.

A. L. Fetter and J. D. Walecka *Quantum Theory of Many-Particle Systems*, McGraw-Hill, (1971); also available from Dover. A standard and straightforward introduction.

J. W. Negele and H. Orland *Quantum Many-Particle Systems*, Addison Wesley (1987). A modern treatment based on path integrals.

G. D. Mahan *Many-Particle Physics*, Plenum (1990).
A very detailed treatment of Green function techniques in many body theory.