

CONTENTS

VOLUME VII A

Preface ix

Contents xi

Ch. 1. Further experimental properties of superfluid ^3He , J.C. Wheatley 1

1. Experiments on orbitally related dynamic phenomena in superfluid ^3He 3
2. Experiments on spin dynamics 34
3. Experiments of thermodynamic significance 75
4. Recent developments 96
- References 101

Ch. 2. Spin and orbital dynamics of superfluid ^3He , W.F. Brinkman and M.C. Cross 105

1. Introduction 107
2. Energetics and superflow 110
3. Singularities and textures 134
4. Spin dynamics 148
5. Orbital dynamics 163
- Appendix 184
- References 188

Ch. 3. Sound propagation and kinetic coefficients in superfluid ^3He , P. Wölfle 191

1. Introduction 193
2. Normal Fermi liquid 195
3. Sound propagation in superfluid ^3He 209
4. Kinetic coefficients of superfluid ^3He 256
5. Conclusion 278
- References 279

Ch. 4. The free surface of liquid helium, D.O. Edwards and W.F. Saam 283

1. Introduction 285
- Part 1. Experimental survey 286
2. Surface tension measurements 286
3. The surface tension of pure ^3He and ^4He 287
4. The surface tension of mixtures of ^3He and ^4He 297
5. Capillary waves. Light scattering at the surface 308

6. Surface second sound. ^3He surface currents	310
7. Evaporation and condensation	314
8. The scattering of free atoms at the surface	318
Part II. Theoretical survey	324
9. The ^4He ground state	324
10. ^4He excited states	330
11. Theory for dilute solutions of ^3He in ^4He	347
12. Surface tension of ^3He and dilute solutions of ^4He in ^3He	361
Appendix	363
Notes added in proof	362
References	365
<i>Author index</i>	xv
<i>Subject index</i>	xxix

VOLUME VII B

Preface ix

Contents xi

Ch. 5. Two-dimensional physics, J.M. Kosterlitz and D.J. Thouless 371

1. Introduction	373
2. Examples of two-dimensional systems	378
3. Phase transitions in two dimensions	389
4. Metal-insulator transitions	420
References	429

Ch. 6. First and second order phase transitions of moderately small superconductors in a magnetic field, H.J. Fink, D.S. McLachlan and B. Rothberg Bibby 435

1. Introduction	437
2. Theoretical results	443
3. Experimental techniques	474
4. Second order phase transitions and the Landau critical point	479
5. First order transitions – superheating and supercooling	489
Appendix	511
List of symbols	512
References	513

Ch. 7. Properties of the A-15 compounds and one-dimensionality, L.P. Gor'kov 517

1. Short survey of the properties of the A-15 compounds. Some basic theoretical ideas	519
2. The choice of the electronic term for the linear chain. Instability of the spectrum	529
3. Interactions. Connection between structural and superconductive fluctuations in the linear chain. The role of the 'three-dimensional effects'	533
4. Peculiarities of the three-dimensional electron spectrum in the A-15 lattice due to the interchain tunnelling. Fine structure of the density of states	544

5. Structure properties of the A-15 compounds in the simplest model. Phonon spectrum	552
6. Some results concerning the superconductivity of A-15 compounds	568
7. Discussion	579
8. Summary. Some concluding remarks	584
References	588

Ch. 8. Low temperature properties of Kondo alloys, G. Grüner and A. Zawadowski 591

1. Introduction	593
2. Basic models	595
3. The Kondo effect	604
4. Properties below the Kondo temperature	615
5. Phenomenological approaches to the general case	638
6. Conclusions	644
References	645

Ch. 9. Application of low temperature nuclear orientation to metals with magnetic impurities, J. Flouquet 649

Introduction	651
1. Comments on nuclear orientation	652
2. Magnetism of an impurity: Kondo effect	669
3. The hyperfine field. The origin of magnetism	689
4. Single impurity effects	698
5. Interaction effects	713
6. Other applications	731
7. Conclusion	734
Appendix	737
References	741

Author index xv

Subject index xxix