

CONTENTS

	PAGE
	V
PREFACE	
INTRODUCTORY REMARKS	
G. A. P. WYLLIE	
1	
THE FLUCTUATION-DISSIPATION THEOREM	
AND IRREVERSIBLE THERMODYNAMICS	
H. B. CALLEN	
15	
A STOCHASTIC THEORY OF LINE-SHAPE AND RELAXATION	
RYOGO KUBO	
23	
FERROMAGNETIC RELAXATION	
H. B. CALLEN	
69	
SOME NOTES ON PARAMAGNETIC RELAXATION	
C. J. GORTER	
1. Paramagnetic Relaxation and Resonance	87
2. Spin-Lattice Relaxation: General Introduction	92
3. Spin-Lattice Relaxation: Experimental Methods and Data	97
4. Spin-Spin Relaxation	103
THE DENSITY MATRIX	
D. TER HAAR	
1. Introduction	109
2. General Properties of the Density Matrix	110
3. Polarisation of a Beam of Spin- $\frac{1}{2}$ Particles	112
4. Response to an Oscillating Field	113
5. Bloch's Nuclear Induction Equation	114
ON THE USE OF GREEN FUNCTIONS IN	
STATISTICAL MECHANICS	
D. TER HAAR	
1. Introduction	119
2. The Response to an Oscillating Field	124
3. Perfect Quantum Gases	125
4. The Scattering of Neutrons by Liquid Helium	126
5. Ferromagnetism; Magnetisation	129
6. Ferromagnetic Resonance	132
STATISTICAL MECHANICS OF FERROMAGNETISM	
H. B. CALLEN	
1. Introduction	137
2. Semi-Invariants or Cumulants of a Single Variable	139
3. Multi-Variate Cumulant Expansion of $-\beta F'$	141

	PAGE
4. Rearrangement of the Cluster Expansion	146
5. The Rearranged Expansion	147
6. Classification of Diagrams	150
7. Zero-Order Diagrams: The Molecular Field	151
8. Summation of First-Order Diagrams	153
9. Renormalisation; Elimination of \tilde{S} -Reducible Diagrams	156
10. Renormalisation; Elimination of Reducible Diagrams to First Order	159
11. Results and Discussion	163
 SPACE AND TIME CORRELATIONS IN CRYSTALS	
R. O. DAVIES	
1. Introduction	169
2. Symmetry, Meaning and History of the Space-Correlation Tensors	172
3. Estimates of the Space-Correlation Tensor	175
4. Estimates of the Anharmonic Specific Heat	182
5. Some Remarks on Time-Correlations in Crystals	188
Appendix	190
 PHOTON FLUCTUATIONS AND THE MASTER EQUATION	
C. W. McCOMBIE	
 NEUTRON SCATTERING AND CORRELATIONS IN LIQUIDS	
P. SCHOFIELD	
 SPIN-LATTICE RELAXATION IN SOLIDS	
R. ORBACH	
1. Introduction	219
2. The One-Phonon Process	222
3. Two-Phonon Processes	224
4. Conclusion	228
 NUCLEAR FREE PRECESSION IN METALS AT VERY	
LOW TEMPERATURES	
C. FROIDEVAUX	
 NUCLEAR DOUBLE RESONANCE IN THE ROTATING FRAME	
247	
S. HARTMANN AND E. L. HAHN	
 STUDY OF RATE PROCESSES BY THE NUCLEAR MAGNETIC	
261	
RESONANCE TECHNIQUE	
A. LOEWENSTEIN	
 ON NUCLEAR RELAXATION IN ALKALI HALIDES	
269	
J. GRUNZWEIG	
 NON-LINEAR RELAXATION AND IRREVERSIBLE THERMODYNAMICS	
U. UHLHORN	
1. Preliminary Considerations	275
2. Statistical Basis of the Non-linear Theory	285
3. Deterministic Approximation	310
 INDEX	
319	