

# Contents

CONTRIBUTORS . . . . .	v
PREFACE . . . . .	vii

## Chapter I

### Fluctuations in Magnetic and Dielectric Solids

James Brophy

1. Introduction . . . . .	1
2. Magnetic Noise . . . . .	2
3. Critical Fluctuations . . . . .	12
4. Barkhausen Noise . . . . .	21
5. Noise in Magnetic and Electrostatic Recording . . . . .	27
6. Summary . . . . .	33
References . . . . .	34

## Chapter II

### The Theory of Thermal and Imperfection Fluctuations in Ferromagnetic Solids

William Fuller Brown, Jr.

1. Introduction . . . . .	37
2. Temporal Fluctuations (Thermal Agitation) . . . . .	38
3. Spatial Fluctuations (Inhomogeneities) . . . . .	60
4. Joint Effect of Temporal and Spatial Fluctuations . . . . .	72
5. Conclusions . . . . .	76
References . . . . .	76

## Chapter III

### Rotational Brownian Motion

L. Dale Favro

1. Introduction . . . . .	79
2. Free Rotational Diffusion . . . . .	82
3. Hindered Diffusion . . . . .	91
4. Use of the Green's Function in Physical Applications . . . . .	97
5. Note on the Quantum Mechanical Case . . . . .	100
References . . . . .	100

## Chapter IV

## Instabilities in Solid-State Plasmas

Setsuo Ichimaru

1. Introduction . . . . .	103
2. Dielectric Response Function of Plasmas . . . . .	105
3. Plasma Wave Instabilities . . . . .	116
4. Fluctuations in Plasmas . . . . .	122
5. Concluding Remarks . . . . .	134
References . . . . .	136

## Chapter V

## Fluctuations in Nonlinear Systems

N. G. van Kampen

1. Introductory Section . . . . .	139
2. The Diode Model . . . . .	150
3. General Theory . . . . .	156
4. Microscopic Theories . . . . .	167
References . . . . .	175

## Chapter VI

## Critical Fluctuations

A. Münster

1. Introduction . . . . .	180
2. Basic Concepts . . . . .	181
3. Critical Fluctuations . . . . .	209
4. Critical Opalescence . . . . .	231
5. Related Phenomena . . . . .	247
References . . . . .	264

## Chapter VII

## Fluctuations Due to Electronic Transitions and Transport in Solids

K. M. van Vliet and J. R. Fassett

1. Introduction . . . . .	268
2. Analytical Approaches to Noise Processes Not Involving Spatial Coordinates . . . . .	270
3. Thermodynamic Approach . . . . .	287
4. Generation-Recombination Noise . . . . .	293
5. Noise Problems Involving Transport Processes . . . . .	320
6. Applications to "Transport Noise" . . . . .	332
Appendix. Remarks on the Multivariate Wiener-Khintchine Theorem . . . . .	348
References . . . . .	351

## Chapter VIII

## Fluctuations of Hot Electrons

P. J. Price

1. Introduction . . . . .	355
2. Simple Model . . . . .	359
3. Exact Theory . . . . .	361
4. Evaluation . . . . .	365
5. Anisotropy . . . . .	368
6. Experimental. . . . .	371
7. Further Considerations . . . . .	373
Appendix . . . . .	375
References . . . . .	379
Author Index . . . . .	381
Subject Index . . . . .	386