

Contents

Preface	v
Introduction	xi
List of Notations	xxi
1 Nematic Liquid Crystals	1
1.1 Thermodynamics of Nematics	1
1.2 The Poisson Brackets Method	4
1.3 Equations of Hydrodynamics for Nematics	7
1.4 Eigenmode Spectrum of Nematics	10
2 Smectic Liquid Crystals	16
2.1 Static Properties of Smectics	16
2.2 Equations of Hydrodynamics for Smectics	22
2.3 Linear Eigenmode Spectrum of Smectics	28
3 Fluctuation Effects in Smectic Liquid Crystals	36
3.1 Static Fluctuations	36
3.2 Diagram Technique for Dynamic Effects	43
3.3 Effective Action for Smectics	50
3.4 Renormalization of the Effective Action	55
3.5 Fluctuation Corrections to the Spectrum	59
4 Columnar Phases of Liquid Crystals	66
4.1 Static Properties of Columnar Phases	66
4.2 Hydrodynamic Equations for Columnar Phases	71
4.3 Linear Spectrum of Columnar Phases	74
4.4 Fluctuation Effects in Columnar Phases	80
5 Chiral Liquid Crystals	87
5.1 Peculiarities of Static Properties of Cholesterics	87
5.2 Macroscopic Dynamics of Cholesterics	93
5.3 Static Properties of Chiral Smectics	99

5.4	Dynamics of Chiral Smectics	103
5.5	Dynamics of Compensated Cholesterics	106
6	Freely Suspended Films	110
6.1	Static Properties of the Films	110
6.2	Dynamical Equations of the Films	116
6.3	Dynamical Fluctuational Effects of the Films	121
6.4	Spectrum of Eigenmodes of the Films	127
7	Langmuir Films and Membranes	133
7.1	Thermodynamics of Langmuir Films	133
7.2	Dynamic Equations of Langmuir Films	139
7.3	The Spectrum of Surface Modes	145
7.4	Membranes	152
	Conclusion	161
	References	163
	Index	169