

LB-SEARCH

LB-CONTENTS

GROUP III: Condensed Matter

VOLUME 34

Semiconductor Quantum Structures

SUBVOLUME B1

Electronic Transport. Part 1: Quantum Point Contacts and Quantum Wires

Introductory material

List of frequently used symbols

List of abbreviations

I	Survey (B. KRAMER)	1
1	Survey of mesoscopic quantum transport	1
1.1	Summary of semi-classical description of electrical transport	1
1.2	Summary of low temperature quantum transport	5
1.3	Description of the experimental observations	6
1.4	References for Section 1	17
	Reference key and author index for Part I	19
II	Quantum point contacts (D. WHARAM)	22
2	Overview of systems	22
2.1	Si-based systems	23
2.2	AlGaAs/GaAs heterostructures	24
2.3	Other III-V and metallic systems	25
2.4	Preparation and structuring	25
2.5	References for Section 2	27
3	Quantized transport	28
3.1	Overview of the theory	28
3.2	Quantization	47
3.3	Finite temperature	48
3.4	Sample geometry	49
3.5	Magnetic field	53
3.6	Impurities	57
3.7	Interactions	59
3.8	Electron spin	60
3.9	Statistical properties	61
3.10	Non-linear effects	62
3.11	Thermal transport properties	68
3.12	Coulomb blockade	69
3.13	Superconducting QPCs	70
3.14	Effect of radiation	71
3.15	References for Section 3	72

4	Frequency- and time-dependent effects	77
4.1	Overview of the theory	77
4.2	Frequency-dependent effects in quantized transport	84
4.3	Photon-assisted tunneling	85
4.4	Infrared absorption	86
4.5	Surface acoustic wave spectroscopy	87
4.6	Noise phenomena	87
4.7	References for Section 4	93
5	Applications	95
5.1	Transport applications	95
5.2	High-frequency devices	96
5.3	References for Section 5	99
	Reference key and author index for Part II	100
III	Quantum Wires (A. FECHNER)	109
6	Overview over systems	109
6.1	Si-based systems	109
6.2	AlGaAs/GaAs-heterostructures	109
6.3	Quantum wires based on other III-V and II-VI materials	110
6.4	Preparation and structuring	110
6.5	Characterization	111
6.6	References for Section 6	112
7	Single wires	115
7.1	Geometrical quantization	116
7.2	Fermi energy	124
7.3	Finite temperature	132
7.4	Sample geometry	144
7.5	Impurities	157
7.6	Interactions	162
7.7	Magnetic field	167
7.8	Electron spin	209
7.9	Non-linear effects	210
7.10	Localization	212
7.11	References for Section 7	214
8	Lateral superlattices	224
8.1	Geometrical quantization	224
8.2	Finite temperature	228
8.3	Sample geometry	232
8.4	Impurities	234
8.5	Interactions	234
8.6	Magnetic field	236
8.7	Non-linear effects	246

8.8	Localization	247
8.9	References for Section 8	249
9	Isolated rings	251
10	Connected rings	255
10.1	Quantized conductance	255
10.2	Finite temperature	255
10.3	Sample geometry	259
10.4	Impurities	262
10.5	Interactions	262
10.6	Magnetic field	262
10.7	Non-linear effects	273
10.8	Electrostatic Aharonov-Bohm effect	274
10.9	Dispersion relation	275
10.10	Indium oxide rings	275
10.11	References for Section 10	280
11	Frequency- and time-dependent effects	282
11.1	Single wires	282
11.2	Lateral superlattices	288
11.3	Isolated rings - Complex conductance	289
11.4	Connected rings	289
11.5	References for Section 11	294
12	Overview of the theory	296
12.1	Quasi-1D ideal quantum wires	296
12.2	Impurity scattering and localization	296
12.3	Electrical Transport and quantum transmission	298
12.4	Conductance fluctuations	300
12.5	Persistent currents	301
12.6	Electron-electron interaction	302
12.7	Monographs and edited volumes	303
12.8	References for Section 12	304
	Reference key and author index for Part III	307



<http://www.springer.com/978-3-540-61741-9>

Quantum Point Contacts and Quantum Wires

Kramer, B. (Ed.)

2001, XIV, 328 p., Hardcover

ISBN: 978-3-540-61741-9