

Contents

Part I Quantum Boxes and Quantum Wires

Quantum Boxes, Quantum Wires, and In-Plane Superlattices: Their Impact in Device Physics and Required Breakthroughs in Material Science By H. Sakaki (With 8 Figures)	2
Electron Confinement in Quantum Dots By T.P. Smith, III (With 8 Figures)	10
Quantum Dot Resonant Tunneling Spectroscopy By M.A. Reed, J.N. Randall, and J.H. Luscombe (With 6 Figures) . . .	20
Field-Effect Confined Electron Dots By J.P. Kotthaus, A. Lorke, J. Alsmeyer, and U. Merkt (With 6 Figures)	29
Quantum Confinement of Excitons by Strain Gradients By K. Kash, B.P. Van der Gaag, J.M. Worlock, A.S. Gozdz, D.D. Mahoney, J.P. Harbison, and L.T. Florez (With 8 Figures)	39
Dynamic Excitations of Quantum Dots in AlGaAs-GaAs By T. Demel, D. Heitmann, P. Grambow, and K. Ploog (With 4 Figures)	51
Inelastic Light Scattering by Electrons in Microstructured Quantum Wells By G. Abstreiter and T. Egeler (With 7 Figures)	60
Localization and Confinement of Electrons in Heterostructures by Focused-Ion-Beam Insulation-Writing By A.D. Wieck (With 7 Figures)	70
Transport Through Single and Coupled Quantum Dots: The Formation of a Mini-Band Structure By L.P. Kouwenhoven, B.J. van Wees, F.W.J. Hekking, K.J.P.M. Harmans, and C.E. Timmering (With 9 Figures)	77

VII

Controllable Scattering, Fabry-Pérot States and Quantum Coupling in Ballistic Devices By C.G. Smith, R.J. Brown, M. Pepper, H. Ahmed, J.E.F. Frost, D.G. Hasko, R. Newbury, D.C. Peacock, D.A. Ritchie, and G.A.C. Jones (With 9 Figures)	88
---	----

Part II	Localization and the Metal-Insulator Transition
----------------	--

Localization and Transport of Disordered 2D Electrons in Strong Magnetic Fields By B. Huckestein, W. Apel, and B. Kramer (With 2 Figures)	100
Critical Behaviour of the Metal-Insulator Transition By A. MacKinnon (With 1 Figure)	111
Photo-induced Metal-Insulator Transition in a Semiconductor By S. Katsumoto (With 7 Figures)	117
Localization in Diluted Magnetic Semiconductors By T. Dietl, M. Sawicki, J. Jaroszyński, J. Wróbel, T. Wojtowicz, and A. Lenard (With 5 Figures)	127
Spatially Correlated Occupancy of Resonant Donors By W. Jantsch and Z. Wilamowski (With 4 Figures)	137
The High-Frequency Properties of Mesoscopic Junctions By V.I. Fal'ko and D.E. Khmel'nitskii (With 1 Figure)	147

Part III	The Integer and Fractional Quantum Hall Effects and Electron-Electron Interactions
-----------------	---

Metal-Insulator Transition in the Integer Quantum Hall Effect By H.P. Wei, D.C. Tsui, and A.M.M. Pruisken (With 4 Figures)	154
The Spatial Potential Distribution in GaAs/Al _x Ga _{1-x} As Heterostructures Under Quantum Hall Conditions Studied with the Linear Electro-Optic Effect By P.F. Fontein, J.A. Kleinen, P. Hendriks, F.A.P. Blom, J.H. Wolter, H.G.M. Lochs, F.A.J.M. Driessen, and L.J. Giling (With 2 Figures)	162
Recent Experimental Studies of the Integer and Fractional Quantum Hall Effects in Steady and Pulsed Magnetic Fields By R.G. Clark (With 17 Figures)	168
New Condensed States in the Fractional Quantum Hall Effect By J.P. Eisenstein (With 4 Figures)	183

Experiments on the Nature of the Extreme Quantum Regime of a 2-D Electron System By F.I.B. Williams, E.Y. Andrei, R.G. Clark, G. Deville, B. Etienne, C.T. Foxon, D.C. Glatli, J.J. Harris, E. Paris, and P.A. Wright (With 9 Figures)	192
Electron States of Nearly Free, Uniform-Density, Dilute Electron Systems in Wide Parabolic Wells By M. Shayegan (With 7 Figures)	207
Density of States and Kinetic Coefficients of a Two-Dimensional Electron Gas in a Strong Magnetic Field By K.B. Efetov and V.G. Marikhin	216
Part IV Tunneling and Localization in Low-Dimensional Structures and Superlattices	
Coherence and Localization in Superlattices By E.E. Mendez (With 8 Figures)	224
Tunneling Spectroscopy of Low-Dimensional States By J. Smoliner and E. Gornik (With 8 Figures)	237
Magnetoresistance in One- and Two-Dimensional Lateral Surface Superlattices By D. Weiss (With 11 Figures)	247
Extended and Localized States in Fibonacci Quasiperiodic Superlattices: A Probe of the Electronic Coherence By F. Laruelle, D. Paquet, M.C. Joncour, B. Jusserand, J. Barrau, F. Mollot, and B. Etienne (With 5 Figures)	258
Periodic Magnetic Field Induced Localization in Superlattices By J. Ma, R.A. Puechner, A.M. Krivan, and D.K. Ferry (With 7 Figures)	268
Part V Optical Properties of Confined Systems	
Isoelectronic Ultrathin Layers: A Probe for Heterostructure States By J.-Y. Marzin and J.-M. Gerard (With 6 Figures)	276
Band-Gap Renormalization in Quantum Wells Studied with High Excitation Luminescence in High Magnetic Fields By J.C. Maan, M. Potemski, K. Ploog, and G. Weimann (With 7 Figures)	285
Excitons in Doped Quantum Wells By G.E.W. Bauer (With 2 Figures)	295

Pseudomorphic $\text{In}_{0.23}\text{Ga}_{0.77}\text{As}/\text{GaAs}$ Quantum Wells: Correlation of Anisotropic Lattice Relaxation and Degradation of Optical Properties	
By M. Grundmann, U. Lienert, J. Christen, D. Bimberg, A. Fischer- Colbrie, and J.N. Miller (With 6 Figures)	304

Part VI	Impurities in Quantum Well Structures
----------------	--

Isolated Impurities, Impurity Bands and the Metal-Insulator Transition in Modulation-Doped Multiple-Quantum-Well Structures in Magnetic Fields	
By Y.-J. Wang, B.D. McCombe, and W. Schaff (With 7 Figures) . . .	314
Localized Conduction States due to Magneto-Acceptors in 2D Systems	
By M. Kubisa and W. Zawadzki (With 5 Figures)	323

Part VII	Optical and Magnetic Properties of Dilute Magnetic Semiconductor Quantum Well Structures
-----------------	---

Ultrafast Magnetic and Electronic Spectroscopy in Dilute Magnetic Semiconductor Quantum Wells	
By D.D. Awschalom, M.R. Freeman, J.M. Hong, and L.L. Chang (With 10 Figures)	332
Light-Induced Magnetization in Dilute Magnetic PbTe/PbMnTe Quantum Well Structures	
By H. Krenn (With 7 Figures)	342
Index of Contributors	353