1. Record Nr. UNINA9910144734303321 Perspectives in quantum Hall effects [[electronic resource]]: novel **Titolo** quantum liquids in low-dimensional semiconductor structures // edited by Sankar Das Sarma, Aron Pinczuk New York, : Wiley, c1997 Pubbl/distr/stampa **ISBN** 1-281-76433-7 9786611764333 3-527-61725-6 3-527-61726-4 Descrizione fisica 1 online resource (446 p.) Altri autori (Persone) SarmaSankar Das <1953-> PinczukAron Disciplina 537.6226 539.721 Soggetti Quantum Hall effect Hall effect devices Electronic books. Lingua di pubblicazione Inglese **Formato** Materiale a stampa Livello bibliografico Monografia Description based upon print version of record. Note generali Nota di bibliografia Includes bibliographical references and index. PERSPECTIVES IN QUANTUM HALL EFFECTS: CONTENTS: Contributors: Nota di contenuto Preface; 1 Localization, Metal-Insulator Transitions, and Quantum Hall Effect; 1.1. Introduction; 1.1.1. Background; 1.1.2. Overview; 1.1.3. Prospectus; 1.2. Two-Dimensional Localization: Concepts; 1.2.1. Two-

Preface; 1 Localization, Metal-Insulator Transitions, and Quantum Hall Effect; 1.1. Introduction; 1.1.1. Background; 1.1.2. Overview; 1.1.3. Prospectus; 1.2. Two-Dimensional Localization: Concepts; 1.2.1. Two-Dimensional Scaling Localization; 1.2.2. Strong-Field Situation; 1.2.3. Quantum Hall Effect and Extended States; 1.2.4. Scaling Theory for the Plateau Transition; 1.2.5. Disorder-Tuned Field-Induced Metal-Insulator Transition; 1.3. Strong-Field Localization: Phenomenology; 1.3.1. Plateau Transitions: Integer Effect 1.3.2. Plateau Transitions: Fractional Effect1.3.3. Spin Effects; 1.3.4. Frequency-Domain Experiments; 1.3.5. Magnetic-Field-Induced Metal-Insulator Transitions; 1.4. Related Topics; 1.4.1. Universality; 1.4.2. Random Flux Localization; References; 2 Experimental Studies of Multicomponent Quantum Hall Systems; 2.1. Introduction; 2.2. Spin and the FQHE; 2.2.1. Tilted Field Technique; 2.2.2. Phase Transition at

v = 8/5; 2.2.3. The v = 5/2 Enigma; 2.3. FQHE in Double-Layer 2D Systems; 2.3.1. Double-Layer Samples; 2.3.2. The v = 1/2 FQHE; 2.3.3. Collapse of the Odd Integers

2.3.4. Many-Body v = 1 State2.4. Summary; References; 3 Properties of the Electron Solid; 3.1. Introduction; 3.1.1. Realizations of the Wigner Crystal; 3.1.2. Wigner Crystal in a Magnetic Field; 3.2. Some Intriguing Experiments; 3.2.1. Early Experiments: Fractional Quantum Hall Effects; 3.2.2. Insulating State at Low Filling Factors: A Wigner Crystal?; 3.2.3. Photoluminescence Experiments; 3.3. Disorder Effects on the Electron Solid: Classical Studies; 3.3.1. Defects and the State of the Solid; 3.3.2. Molecular Dynamics Simulations; 3.3.3. Continuum Elasticity Theory Analysis

3.3.4. Effect of Finite Temperatures 3.4. Quantum Effects on Interstitial Electrons; 3.4.1. Correlation Effects on Interstitials: A Trial Wavefunction; 3.4.2. Interstitials and the Hall Effect; 3.5.

Photoluminescence as a Probe of the Wigner Crystal; 3.5.1. Formalism; 3.5.2. Mean-Field Theory; 3.5.3. Beyond Mean-Field Theory: Shakeup Effects; 3.5.4. Hofstadter Spectrum: Can It Be Seen?; 3.6. Conclusion: Some Open Questions; References; 4 Edge-State Transport; 4.1 Introduction; 4.2. Edge States; 4.2.1. IQHE; 4.2.2. FQHE; 4.3. Randomness and Hierarchical Edge States; 4.3.1. The v = 2 Random Edge

4.3.2. Fractional Quantum Hall Random Edge4.3.3. Finite-Temperature Effects; 4.4. Tunneling as a Probe of Edge-State Structure; 4.4.1. Tunneling at a Point Contact; 4.4.2. Resonant Tunneling; 4.4.3. Generalization to Hierarchical States; 4.4.4. Shot Noise; 4.5. Summary; Appendix: Renormalization Group Analysis; References; 5 Multicomponent Quantum Hall Systems: The Sum of Their Parts and More; 5.1. Introduction; 5.2 Multicomponent Wavefunctions; 5.3. Chern-Simons Effective Field Theory; 5.4. Fractional Charges in Double-Layer Systems; 5.5. Collective Modes in Double-Layer Quantum Hall Systems

5.6. Broken Symmetries

Sommario/riassunto

The discovery of the quantized and fractional Quantum Hall Effect phenomena is among the most important physics findings in the latter half of this century. The precise quantization of the electrical resistance involved in the quantized Hall effect phenomena has led to the new definition of the resistance standard and has metrologically affected all of science and technology. This resource consists of contributions from the top researchers in the field who present recent experimental and theoretical developments. Each chapter is self-contained and includes its own set of references guiding rea