



Quantum Hall Effects:Recent Theoretical and Experimental Developments

Zyun Francis Ezawa

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Enthusiasm for research on the quantum Hall effect (QHE) is unbounded. The QHE is one of the most fascinating and beautiful phenomena in all branches of physics. Tremendous theoretical and experimental developments are still being made in this sphere. Composite bosons, composite fermions and anyons were among distinguishing ideas in the original edition.

In the 2nd edition, fantastic phenomena associated with the interlayer phase coherence in the bilayer system were extensively described. The microscopic theory of the QHE was formulated based on the noncommutative geometry. Furthermore, the unconventional QHE in graphene was reviewed, where the electron dynamics can be treated as relativistic Dirac fermions and even the supersymmetric quantum mechanics plays a key role.

In this 3rd edition, all chapters are carefully reexamined and updated. A highlight is the new chapter on topological insulators. Indeed, the concept of topological insulator stems from the QHE. Other new topics are recent prominent experimental discoveries in the QHE, provided by the experimentalists themselves in Part V. This new edition presents an instructive and comprehensive overview of the QHE. It is also suitable for an introduction to quantum field theory with vividly described applications. Only knowledge of quantum mechanics is assumed. This book is ideal for students and researchers in condensed matter physics, particle physics, theoretical physics and mathematical physics.

Contents:

- ***Quantum Field Theory:***
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- Stripes and Bubbles in Higher Landau Levels
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 - Superfluid Properties of Electron Bilayers
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Readership: Advanced undergraduates, graduates and researchers in condensed matter physics and particle physics.

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