



# Condensed Matter Field Theory

By Alexander Altland, Ben D. Simons

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Modern experimental developments in condensed matter and ultracold atom physics present formidable challenges to theorists. This book provides a pedagogical introduction to quantum field theory in many-particle physics, emphasizing the applicability of the formalism to concrete problems. This second edition contains two new chapters developing path integral approaches to classical and quantum nonequilibrium phenomena. Other chapters cover a range of topics, from the introduction of many-body techniques and functional integration, to renormalization group methods, the theory of response functions, and topology. Conceptual aspects and formal methodology are emphasized, but the discussion focuses on practical experimental applications drawn largely from condensed matter physics and neighboring fields. Extended and challenging problems with fully worked solutions provide a bridge between formal manipulations and research-oriented thinking. Aimed at elevating graduate students to a level where they can engage in independent research, this book complements graduate level courses on many-particle theory.

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## Condensed Matter Field Theory By Alexander Altland, Ben D. Simons Bibliography

- Sales Rank: #779991 in Books
- Brand: Brand: Cambridge University Press
- Published on: 2010-04-30
- Original language: English
- Number of items: 1
- Dimensions: 9.72" h x 1.61" w x 6.85" l, 3.65 pounds
- Binding: Hardcover
- 786 pages

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#### Review

'... this work is so well written that it succeeds in making even the most intricate and abstruse models admirably clear ... it is timely in that it brings the reader completely up to date on most of the newer approaches currently in vogue ... eminently suitable for researchers in the field ... could also be read with interest by advanced students because the numerous info sections elucidate and expand upon the many themes addressed ... this very attractive book will remain a standard reference work in its field for years to come.' Dennis Rouvray, Chemistry World

#### About the Author

Alexander Altland is Professor of Theoretical Condensed Matter Physics at the Institute of Theoretical Physics, University of Köln. His main areas of research include mesoscopic physics, the physics of interacting many-particle systems, and quantum nonlinear dynamics.

Ben Simons is Professor of Theoretical Condensed Matter Physics at the Cavendish Laboratory, University of Cambridge. His main areas of research include strongly correlated condensed matter systems, mesoscopic and ultracold atom physics.

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