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Nota di contenuto	Introduction to many-particle physics in Condensed Matter -- Introduction to Green-function methods -- Perturbation theory at zero temperature -- Finite temperature Green function formalism -- Linear response and collective modes -- Generalized Green function propagator -- Introduction to non-equilibrium: the Keldysh contour -- Perturbative expansion in the non-equilibrium formalism -- Applications: electron transport at the nanoscale -- Introduction to path integral methods -- Application of path integral methods: the renormalization group approach -- Hints for solving exercises.
Sommario/riassunto	This book presents the lecture notes and exercises corresponding to the course "Quantum Field Theoretical Methods in Condensed Matter" that the authors imparted for several years as part of the masters program on Condensed Matter and Biological Systems at the Autonoma University of Madrid. It provides a step-by-step description of the material which will benefit not only professors wishing to undertake a similar task, but also interested students. Additionally, the book provides a complete set of exercises on the various topics along with

hints about how to solve them, a feature frequently absent in textbooks on many-body techniques. As well as addressing the traditional topics in the field (diagrammatic techniques, screening in metals, Fermi liquid theory, electron-phonon interactions, etc.) the text also covers less conventional topics such as the application of non-equilibrium Green function techniques to quantum transport in normal and superconducting nanoscale devices.