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Autore	Kopietz Peter <1961->
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Altri autori (Persone)	BartoschL SchutzF
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Sommario/riassunto	This book, based on a graduate course given by the authors, is a pedagogic and self-contained introduction to the renormalization group with special emphasis on the functional renormalization group. The functional renormalization group is a modern formulation of the Wilsonian renormalization group in terms of formally exact functional differential equations for generating functionals. In Part I the reader is introduced to the basic concepts of the renormalization group idea, requiring only basic knowledge of equilibrium statistical mechanics. More advanced methods, such as diagrammatic perturbation theory, are introduced step by step. Part II then gives a self-contained introduction to the functional renormalization group. After a careful definition of various types of generating functionals, the renormalization group flow equations for these functionals are derived. This procedure is shown to encompass the traditional method of the mode elimination steps of the Wilsonian renormalization group procedure. Then, approximate solutions of these flow equations using expansions in powers of irreducible vertices or in powers of derivatives

are given. Finally, in Part III the exact hierarchy of functional renormalization group flow equations for the irreducible vertices is used to study various aspects of non-relativistic fermions, including the so-called BCS-BEC crossover, thereby making the link to contemporary research topics.
