

Book Review: *Theory of Fluctuations in Superconductors.*

Theory of Fluctuations in Superconductors. Anatoly Larkin and Andrei Verlamov. Oxford University Press, Oxford, 2005.

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The book *Theory of Fluctuations in Superconductors* by Anatoly Larkin and Andrei Verlamov constitutes a general and self-consistent compendium about fluctuation phenomena in superconducting systems. The book centers mainly around theoretical aspects, discussing these from the phenomenological and microscopic points of view and setting forth applications to conventional and unconventional superconductors. It also contains a brief introduction to recent theories of high-temperature superconductors.

The material presented is organized in four parts. The first deals with basic phenomenological aspects introducing the Ginzburg-Landau theory, the major facets of scaling and the renormalization group as well as the main notions of fluctuation transport, exposed through the time-dependent Ginzburg-Landau equation, and ideas over transport in vortex structures. The second part includes basic fundamentals of microscopic fluctuation theory discussing the microscopic derivation of the time-dependent Ginzburg-Landau equation and the application to conductivity fluctuations. In the last two parts there are manifestations of superconducting fluctuation phenomena in different properties. The third part analyzes fluctuations in magnetic fields, in tunnel junctions and the effect of fluctuations on thermoelectricity. The last part is dedicated to the study of fluctuations in nanostructures and in fluctuations in nanograins and nanodrops and in Josephson junctions.

The presentation of the material facilitates considerably the comprehension of the different concepts. The preface contains a historical overview of superconductivity viewed from the perspective of second-order phase transitions. The different chapters are well-organized and well-written resulting in an easy reading and comprehension of the ideas presented. The first two parts are readily accessible even for nonspecialists and could be used for an introductory course on the subject. The examples and situations selected in the second part perfectly illustrate the applications of the theory and, as in the case of superconducting nanostructures, constitute systems which are object of current interest in research work. A

complete list of references, including classical literature and more recent papers on the subject, given at the end of the monograph can be useful as a complement to some of the aspects discussed and as an aid to people seeking introduction into the field.

The book is highly recommended for specialists who can use it as a reference work where they may find a complete overview of the major results of fluctuation phenomena in superconducting systems as well as for nonspecialists who can learn about the fundamentals and state-of-the-art developments in this field. The publication of this book is very timely since it covers crucial aspects of this problem, classical yet still of high interest nowadays, which has played a very important role in theoretical developments and applications of condensed matter physics.

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