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An introduction to the physics of the superconducting state

The physics of superconductors.
Introduction to fundamentals and applications
Schmidt V V (Eds P Müller, A V Ustinov)
(New York: Springer, 1997)
PACS numbers: 01.30.Mm, **74.90.+n**

The author is internationally known among solid state and low temperature physicists — particularly for his work on superconducting fluctuations in low-dimensional systems above T_c and on the non-stationary thermal Josephson effect — and is often referred to as the 'Russian' Schmidt as opposed to his two Western namesakes involved in fluctuation studies. Shortly before his death in 1985, V V Schmidt published the "Introduction to the Physics of Semiconductors" (Moscow: Nauka, 1983) based on his lecture course at the Moscow Institute of Steel and Alloys. The huge popularity this short book enjoys with both researchers and undergraduate students has long made it a bibliographical rarity. The publication under review is its augmented and revised English version.

The author's lucidity of exposition and good feeling for physics (both very rare qualities, alas) are to a large extent due to the combination of his theoretical and experimental skills and his long experience as a laboratory head. The scope of the book is rather broad, as the table of contents shows:

1. Introduction. 2. Linear electrodynamics of superconductors. 3. Ginzburg – Landau theory. 4. Weak superconductivity. 5. Second-kind superconductors. 6. Microscopic theory of superconductivity. 7. Non-equilibrium effects in superconductors.

Schmidt died a year before the discovery of high-temperature superconductivity so this spectacular (but not yet fully understood) phenomenon remained uncovered in the Russian book. The English publishers, A V Ustinov and P Müller, of whom the former was Schmidt's student and the latter, his Erlangen colleague and namesake of the Nobel Prize winner A Müller, filled this gap by surveying the basic properties of HTSC in the present publication.

A valuable introduction to the physics of superconductivity, the book assumes a minimum background knowledge and will be of benefit to a broad range of readers, especially to prospective researchers in low temperature physics and technology. With the Russian edition long sold out and the English one hardly available, a new Russian version, augmented with a (translated and possibly expanded) addendum to the present edition, would certainly be a timely venture.

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