

Cambridge University Press

0521017416 - Polarons and Bipolarons in High- $T_c$  Superconductors and Related Materials

Edited by E. K. H. Salje, A. S. Alexandrov and W. Y. Liang

Frontmatter

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This book is the first to give a comprehensive view on the polaron and bipolaron theory of high-temperature superconductivity, one of the most significant discoveries in physics in the past decade.

With the discovery of high-temperature superconductors, research into polarons and bipolarons has attracted much attention. It appears that carriers in some high-temperature superconductors are strongly correlated, both in the normal and in the superconducting states. In the strong-coupling limit the Fermi-liquid ground state may be destroyed by the formation of small polarons and bipolarons. The experimental and theoretical study of such particles is a central issue in current research into high-temperature superconductivity.

Polarons and bipolarons have been observed previously in magnetic semiconductors and transition metal oxides. Thorough investigation of these non-superconducting materials has contributed greatly to the basic understanding of the physical properties of both polarons and bipolarons. This book contains a series of authoritative articles on the most advanced research on polarons and bipolarons in high-temperature superconductors and related materials.

This book will be of great interest to researchers in condensed matter physics, and especially to those working in the field of superconductivity.

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## Contents

	<i>page</i>
<i>Preface</i>	<i>ix</i>
1 A polaron theory of high-temperature superconductors <i>N. F. Mott</i>	1
2 On the possibility of non-BCS superconductivity <i>G. M. Eliashberg</i>	11
3 A bipolaron Bose liquid in high- $T_c$ superconductors <i>A. S. Alexandrov</i>	26
4 Spin polarons in high- $T_c$ superconductors <i>R. F. Wood</i>	45
5 The polaron scenario for high- $T_c$ superconductors <i>J. Ranninger</i>	67
6 Formation, phase separation and superconductivity of large bipolarons <i>D. Emin</i>	80
7 Polarons and bipolarons in $\text{WO}_{3-x}$ and $\text{YBa}_2\text{Cu}_3\text{O}_7$ <i>E. K. H. Salje</i>	110
8 Polaron bands in the far- and mid-infrared spectra of e-doped cuprates <i>P. Calvani, S. Lupi, P. Roy, M. Capizzi, P. Maselli,</i> <i>A. Paolone, W. Sadowski, and S.-W. Cheong</i>	133
9 Electron–phonon interaction of non-equilibrium carriers in the photoinduced state of $\text{YBa}_2\text{Cu}_3\text{O}_{7-\delta}$ <i>D. Mihailović and</i> <i>I. Poberaj</i>	146
10 Experimental evidence of local lattice distortion in superconducting oxides <i>T. Egami, W. Dmowski,</i> <i>R. J. McQueeney, T. R. Sendyka, S. Ishihara, M. Tachiki,</i> <i>H. Yamauchi, S. Tanaka, T. Hinatsu, and S. Uchida</i>	155
11 The Hall effect due to small polarons and conduction in narrow energy bands <i>L. Friedman</i>	180
12 Static and dynamic conductivity of untwinned $\text{Y}_1\text{Ba}_2\text{Cu}_4\text{O}_8$ : gaps or condensation? <i>P. Wachter, B. Bucher and R. Pittini</i>	188

viii	<i>Contents</i>	
13	The near infrared and optical absorption of high- $T_c$ superconductors using powders <i>C. H. Rüscher</i>	206
14	Polaronic theory of mid-infrared conductivity: a numerical cluster study <i>A. S. Alexandrov, V. V. Kabanov and D. K. Ray</i>	218
15	Electromagnetic properties of local pair superconductors <i>S. Robaszkiewicz, R. Micnas and T. Kostyrko</i>	224
16	Electron–hole asymmetric polarons <i>J. E. Hirsch</i>	234
17	On the nature of the superconducting state in high- $T_c$ cuprates <i>T. Schneider</i>	258
18	High- $T_c$ superconductivity with polarons and bipolarons: an approach from the insulating states <i>S. Aubry</i>	271
19	Coexistence of small-polaron and Anderson localization in high- $T_c$ superconducting materials <i>J. Tateno</i>	309
20	Concentration and temperature-dependence of magnetic polaron spectra in the $t$ – $J$ model <i>N. M. Plakida, V. S. Oudovenko and V. Yu. Yushankhai</i>	320
21	Mass enhancement without band-narrowing in $t$ – $t'$ – $J$ and related models: predictions for Fermi-surface and optical conductivity <i>S. I. Mukhin and L. J. de Jongh</i>	334
22	Polarons in Peierls–Hubbard models <i>A. R. Bishop and M. I. Salkola</i>	353
23	Exact estimates of inter-polaron coupling constants resulting in bipolaron formation <i>P. E. Kornilovitch</i>	367
24	Coulomb interaction and the criteria for bipolaron formation <i>D. Khomskii</i>	375
25	Large bipolarons and high- $T_c$ materials <i>J. T. Devreese, G. Verbist and F. M. Peeters</i>	385
26	Collective excitations in the ground state of a two-dimensional attractive Fermi gas <i>S. V. Traven</i>	392
27	Strong two-band electron self-trapping, state hybridization effects and related pressure-induced phenomena in semiconductors <i>M. I. Klinger and S. N. Taraskin</i>	402
28	Bismuth disproportionation in super- and semi-conducting barium bismuthates <i>N. C. Pyper and P. P. Edwards</i>	427
29	Magnetic polarons in concentrated and diluted magnetic semiconductors <i>S. von Molnár, I. Terry and T. Penney</i>	437
30	Energy scales of exotic superconductors <i>Y. J. Uemura</i>	453
	<i>Index</i>	461

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## Preface

With the advent of high-temperature superconductors, research on polarons and bipolarons has gained renewed attention. It appears that carriers in some high-temperature superconductors are strongly correlated both in the normal and in the superconducting state. In the strong-coupling limit the Fermi-liquid ground state may be destroyed by the formation of small polarons and bipolarons. Experimental and theoretical analysis of such particles is a central issue for current research in superconductivity.

This book contains a series of authoritative articles on the most advanced research on polarons and bipolarons. They were invited for presentation during a workshop on 'Polarons and Bipolarons in High- $T_c$  Superconductors and Related Materials', which was held at the Interdisciplinary Research Centre (IRC) in Superconductivity, Cambridge, UK, between 7th and 9th April 1994. Over 50 participants from ten countries took part in this workshop, representing the major research centres currently working in this field. The workshop was held in honour of Sir Nevill Mott in recognition of his important contributions to the physics of polarons.

The editors are grateful to all contributors for their overwhelmingly positive response to the idea of publishing this book. We are indebted to Ken Diffey and Margaret Hilton who ensured the smooth running of the workshop, to all of the referees and to William Beere for their help editing the manuscripts. We also thank Simon Capelin of Cambridge University Press for his encouragement and help throughout the publication of this book.

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