

Contents

Part I	Plenary Lecture	
---------------	------------------------	--

The Pairing Theory – Its Physical Basis and Its Consequences By J.R. Schrieffer	3
--	---

Part II	Theory	
----------------	---------------	--

II.1 Electronic Structure	
Electronic Excitations Within the Cu-O Planes By P. Fulde (With 2 Figures)	21
Physical Parameters in High-Temperature Superconductors By S. Maekawa, Y. Ohta, and T. Tohyama (With 16 Figures)	29
Binding and Structural Aspects of High- T_c Superconductivity By H. Eschrig (With 2 Figures)	45
Electronic State in Oxide Superconductors By M. Tachiki, S. Ishihara, M. Sasaki, and H. Matsumoto (With 3 Figures)	55
Key Factors for the Superconducting and Normal State Properties of Cuprates By H. Kamimura (With 6 Figures)	63
Evidence in Favor of a Nematic Ordering in $\text{La}_2\text{CuO}_{4+\delta}$ By L.P. Gor'kov (With 1 Figure)	71
II.2 Physical Properties	
Strong Correlation Models for High- T_c Superconductors By T.M. Rice (With 1 Figure)	75
On the Spin Excitations of High- T_c Oxides By H. Fukuyama, T. Tanamoto, and K. Kuboki (With 5 Figures)	85

Gauge Field Theory of the Normal State Properties of High- T_c Superconductors	
By N. Nagaosa	97
Microscopic Theory of Luttinger Liquids in One Dimension	
By N. Kawakami and S.-K. Yang (With 3 Figures)	103

II.3 Superconducting Mechanism and Properties

Generalization of BCS Superconductivity to Non-Phonon Mediated Interactions: The Excitonic Interaction	
By W.A. Little (With 1 Figure)	113
Formation, Motion, and Superconductivity of Large Bipolarons	
By D. Emin (With 4 Figures)	125
Application of Marginal Fermi-Liquid Phenomenology to the Superconductive State of Cu-O Materials	
By C.M. Varma (With 5 Figures)	137
Antiferromagnetic Fluctuations in High- T_c Oxides	
By T. Moriya (With 2 Figures)	145
The Physics Underlying High- T_c Superconductivity: Novel vs Exotic	
By J.R. Schrieffer (With 19 Figures)	151
A (Very) Brief Overview of Semionic Superconductivity	
By A. Zee	169
Fluctuations in Type-II Superconductors: A Dense Vortex Plasma Picture	
By Z. Tešanović (With 1 Figure)	177

Part III Experiment

III.1 Materials

Material Design of High- T_c Oxides	
By Y. Tokura (With 11 Figures)	191
High Pressure Synthesis and Characterization of Single Crystalline $YBa_2Cu_4O_8$ ($T_c = 80$ K) and $Y_2Ba_4Cu_7O_{15\pm x}$ ($14\text{ K} \leq T_c \leq 94\text{ K}$)	
By E. Kaldis, J. Karpinski, and S. Rusiecki (With 6 Figures)	207

III.2 Physical Properties and Electronic Structure

Physical Properties of Cuprate Superconductors: An Introduction	
By B. Batlogg (With 15 Figures)	219
Successive Structural Transitions of $La_{2-x}Ba_xCuO_4$	
By M. Sato (With 6 Figures)	239

The Normal-State Transport Properties of the High-Temperature Cuprate Superconductors By N.P. Ong (With 5 Figures)	247
Optical Properties of High-Temperature Superconductors By S. Uchida (With 6 Figures)	259
An Introduction to Infrared Properties of High- T_c Superconductors By Z. Schlesinger, L.D. Rotter, R.T. Collins, F. Holtzberg, C. Feild, U. Welp, G.W. Crabtree, J.Z. Liu, Y. Fang, and K.G. Vandervoort (With 8 Figures)	269
Electronic Structure Studies of Cuprate Superconductors by High-Energy Spectroscopy By N. Nücker (With 12 Figures)	283
Angle-Resolved Photoemission, Inverse Photoemission, and X-Ray Absorption Studies of Superconductive and Non-Superconductive Bi-Sr-Ca-Y-Cu-O By T. Takahashi (With 7 Figures)	299
Electronic Structure of Electron- and Hole-Doped 3d Transition-Metal Oxides By A. Fujimori (With 3 Figures)	307
Anisotropy of Cuprate Superconductors Under STM/STS By K. Kitazawa, T. Hasegawa, H. Ikuta, M. Nantoh, W. Wei, and N. Motohira (With 9 Figures)	313
Unusual (Anomalous) Properties of the Normal and Superconducting State of Cu-Oxides By H.R. Ott	327

III.3 Anisotropic Properties

Anisotropy in Elastic Properties of HTSC Seen by Ultrasonics By T. Fujita and T. Suzuki (With 3 Figures)	333
Some Consequences of Anisotropy By T.H. Geballe (With 1 Figure)	339
Anisotropic Properties of Layered Superconductors By Y. Iye (With 6 Figures)	347
Thin Films and Superlattices of High- T_c Superconductors By Ø. Fischer, J.M. Triscone, L. Antognazza, O. Brunner, L. Miéville, I. Maggio-Aprile, A.D. Kent, and O. Eibl (With 10 Figures)	353

III.4 Superconducting Properties

Critical Currents in High- T_c Superconductors By J. Mannhart (With 15 Figures)	367
--	-----

Anisotropy of Flux Lattice Structures in the Low Field Mixed State of the High- T_c Superconductor BSCCO (2212) By P.L. Gammel (With 4 Figures)	395
Some Implications of a Short Coherence Length in High-Temperature Superconductors By P. Chaudhari	405
Flux Quantisation in Superconducting Rings and the Mixed State By C.E. Gough (With 5 Figures)	411
Flux Quantisation and Its Application to rf and dc SQUIDS By C.E. Gough (With 8 Figures)	423
Index of Contributors	437