

# Contents

---

## Part I Introduction

---

Introduction	
By J. Kanamori, H. Fukuyama, and N. Nagaosa .....	3

---

## Part II Overviews

---

Localized to Itinerant Electronic Transitions in Perovskite-Related Structures	
By J.B. Goodenough and J.-S. Zhou .....	9
Crystal Distortions in Magnetic Compounds	
By J. Kanamori (With 2 Figures) .....	19
Present Status of the First-Principles Electronic Structure Calculations for the Strongly Correlated Transition-Metal Oxides	
By K. Terakura, Z. Fang, and I.V. Solovyev (With 6 Figures) .....	34
Aspects of Coupled Spin-Orbital Degrees of Freedom in <i>d</i> - and <i>f</i> -Electron Systems	
By H. Shiba and R. Shiina (With 1 Figure) .....	45

---

## Part III Manganites

---

Anisotropic Charge Dynamics in Layered Manganite Crystals	
By Y. Tokura, T. Kimura, and T. Ishikawa (With 5 Figures) .....	55
Roles of Orbitals in Transition Metal Oxides	
By Y. Endoh, K. Hirota, Y. Murakami, H. Nojiri, S. Ishihara, S. Maekawa, H. Kimura, T. Fukuda, and N. Okamoto (With 7 Figures) .....	69
Theory of Anomalous X-ray Scattering in a Variety of Orbital Ordered Manganites	
By S. Ishihara and S. Maekawa (With 5 Figures) .....	84

Nonlinear Optical Responses of Strongly Correlated Electronic System By E. Hanamura, Y. Tanabe, and M. Fiebig (With 6 Figures) .....	95
---	----

---

#### Part IV High $T_c$ Cuprates

---

Fermi-Liquid Versus Pseudogap Behaviors in Filling-Control Transition-Metal Oxides By A. Fujimori, T. Yoshida, A. Ino, T. Mizokawa, C. Kim, Z.-X. Shen, Y. Taguchi, T. Katsufuji, Y. Tokura, H. Eisaki, S. Uchida, and K. Kishio (With 6 Figures) ...	111
Metal-Insulator and Superconductor-Insulator Transitions in Correlated Electron Systems By M. Imada, F.F. Assaad, H. Tsunetsugu, and Y. Motome (With 2 Figures) ....	120
High Temperature Superconductors as a Member of Transition Metal Oxides By S. Maekawa (With 7 Figures) .....	136
Electronic Structure of Underdoped Superconductors and Related Mott Insulators By Z.-X. Shen (With 9 Figures) .....	144
Destruction of the Fermi Surface in Underdoped Cuprates By J.C. Campuzano, H. Ding, M.R. Norman, and M. Randeria (With 12 Figures) .....	152
Effects of Stripe Order on Charge Dynamics in La-Cuprates By S. Uchida, N. Ichikawa, T. Noda, and H. Eisaki (With 9 Figures) .....	163
Spin Excitations in Pure and Zn-Substituted $\text{YBa}_2\text{Cu}_3\text{O}_{6+x}$ By B. Keimer (With 9 Figures) .....	173
Static and Dynamical Incommensurate Spin Correlations in High- $T_c$ Cuprates of $\text{La}_{2-x}\text{Sr}_x\text{CuO}_{4+y}$ By K. Yamada, R.J. Birgeneau, Y. Endoh, T. Fukase, M. Greven, M. Fujita, K. Hirota, S. Hosoya, M.A. Kastner, Y.M. Kim, H. Kimura, K. Kurahashi, C.H. Lee, S.H. Lee, Y.S. Lee, H. Matsushita, G. Shirane, T. Suzuki, S. Ueki, and S. Wakimoto (With 3 Figures) .....	182
Experimental Studies on Singlet Formation in High- $T_c$ Oxides and Quantum Spin Systems By M. Sato (With 7 Figures) .....	192
Thermal Conductivity as a Probe of Quasi-Particles in the Cuprates By N.P. Ong, K. Krishana, Y. Zhang, and Z.A. Xu (With 4 Figures) .....	202

A New-Type Superconducting State Locally Induced Around a Vortex in the Two-Dimensional <i>t-J</i> Model By M. Ogata (With 4 Figures) .....	212
Instability of a 2-Dimensional Landau-Fermi Liquid Due to Umklapp Scattering By N. Furukawa and T.M. Rice (With 5 Figures) .....	221
Antiferromagnetism, Singlet and Disorder By H. Fukuyama and H. Kohno (With 6 Figures) .....	231
The Spin Gap and Superconducting States of Underdoped Cuprates By P.A. Lee (With 1 Figure) .....	241
Gauge Field, Confinement, and Superconductivity in Underdoped High- $T_c$ Cuprates By N. Nagaosa (With 1 Figure) .....	250
A Progress Report on the SO(5) Theory of High $T_c$ Superconductivity By S.-C. Zhang (With 1 Figure) .....	260
Nested Spin-Fluctuation Scenario for Anomalous Metallic Phase of High- $T_c$ Cuprates By K. Miyake and O. Narikiyo (With 6 Figures) .....	267

---

#### **Part V    New Materials: Ladders, Ruthenates and Others**

---

Novel Transition Metal Oxides Prepared at High Pressure and Their Electronic Properties By M. Takano, Z. Hiroi, M. Azuma, S. Kawasaki, R. Kanno, and T. Takeda (With 7 Figures) .....	279
Spin and Charge Dynamics in the Hole-Doped Two-Leg Ladder Compound $Sr_{14-x}Ca_xCu_{24}O_{41}$ By J. Akimitsu, T. Nagata, H. Fujino, N. Motoyama, H. Eisaki, S. Uchida, H. Takahashi, T. Nakanishi, N. Môri, M. Nishi, K. Kakurai, S. Katano, M. Hiroi, M. Sera, and N. Kobayashi (With 7 Figures) .....	289
NMR Probe of Magnetic Order and Spin Correlation in Hole-Doped Ladder Cuprates By Y. Kitaoka, T. Mito, S. Ohsugi, K. Magishi, S. Matsumoto, T. Nagata, J. Akimitsu, N. Motoyama, H. Eisaki, and S. Uchida (With 10 Figures) .....	299
Metal-Insulator and Magnetic Transitions in Layered Ruthenates By Y. Maeno, S. Nakatsuji, and S. Ikeda (With 5 Figures) .....	313

Spin Triplet Superconductivity in $\text{Sr}_2\text{RuO}_4$ – A New Territory for Experimentalists and Theorists By M. Sigrist, C. Honerkamp, D. Agterberg, T.M. Rice, M.E. Zhitomirsky, and A. Furusaki (With 1 Figure) .....	323
Concluding Remarks By R.B. Laughlin (With 1 Figure) .....	332
List of Contributors .....	335