

CONTENTS

Preface	V
Contents	vii
Chapter 1. Plenary lectures	
Some reminiscences about my early career C. Domb	1
Low-dimensional quantum antiferromagnets: criticality and series expansions at zero temperature (Extended abstract) M.E. Fisher	22
Dynamic mechanisms of disorderly growth: recent approaches to understanding diffusion limited aggregation H.E. Stanley, A. Bunde, S. Havlin, J. Lee, E. Roman and S. Schwarzer	23
Looking through walls and around corners I. Freund	49
The structures of silicon and germanium: theory and experiment converge M. Hart and M. Deutsch	66
Advanced technology and truth in advertising R. Landauer	75
Asymptotic behavior of densities in diffusion dominated two-particle reactions M. Bramson and J.L. Lebowitz	88
New “anomalous” multiplicative multifractals: left sided $f(\alpha)$ and the modelling of DLA B.B. Mandelbrot	95
One-dimensional transport phenomena in GaAs heterojunction structures M. Pepper, R.J. Brown, C.G. Smith, D.A. Wharam, M.J. Kelly, R. Newbury, H. Ahmed, D.G. Hasko, D.C. Peacock, J.E.F. Frost, D.A. Ritchie and G.A.C. Jones	112
Do fluctuations exist in the law of mass action? M. Gitterman	121

Chapter 2. Interfacial phenomena

Partial order in phospholipid monolayers H. Mbwald, R.M. Kenn, D. Degenhardt, K. Kjaer and J. Als-Nielsen	127
New studies of liquid and solid surfaces using second harmonic generation G. Berkovic	140
Line tension at the wetting transition B. Widom and A.S. Clarke	149
Critical phenomena at interfaces S. Dietrich	160
On the theory of tripod amphiphiles, chiral discrimination and phase transitions in Langmuir monolayers D. Andelman	172
Exact curvature energies of charged membranes of arbitrary shapes B. Duplantier	179
Domain wall fluctuations and instabilities in monomolecular films M. Seul	198
Relationship between microemulsion structure and surfactant layer bending elasticity L.T. Lee, D. Langevin and R. Strey	210

Chapter 3. High-T_c superconductivity

High-temperature superconductors above T_c N. Mott	221
Superconductivity and antiferromagnetism in Cu(2) layers of $\text{RBa}_2\text{Cu}_3\text{O}_2$ I. Felner, E.R. Bauminger, D. Hechel, U. Yaron and I. Nowik	229
Origin of high-temperature superconductivity in copper oxides — clues from the normal-state resistivity C.C. Tsuei	238
Flux flow effects in YBaCuO & YBaCuO Josephson junctions E. Polturak and D. Cohen	255
Flux creep and vortex potential well structure in high-temperature superconductors E. Zeldov	260
Dissipation in granular high-temperature superconductors A.D. Caplin, S.S. Bungre, S.M. Cassidy, J.R. Laverty and Z.X. Shen	268

Non-Debye relaxation and dynamical scaling in high-T _c granular superconductors A. Gianelli and C. Giovannella	277
Heat capacity of untwinned YBa ₂ Cu ₃ O _{7-x} in magnetic fields: dimensional cross-over near T_c M.B. Salamon, S.E. Inderhees, J.P. Rice and D.M. Ginsberg	283
Flux pinning enhancement after electron irradiation in YBa ₂ Cu ₃ O ₇ M. Konczykowski	291
Fast decay of supercurrents in high-T _c , heavy fermion and organic superconductors A.C. Mota, A. Pollini, G. Juri, P. Visani and B. Hiltl	298
Remanent magnetization lower critical fields and surface barriers in an YBa ₂ Cu ₃ O ₇ crystal M.W. McElfresh, Y. Yesurun, A.P. Malozemoff and F. Holtzberg	308
Flux lattice melting and collective creep in high-T _c superconductors M.V. Feigel'man	319
A dynamic Jahn-Teller theory for high-T _c superconductivity M. Weger and R. Engelman	324
Breakdown field in highly anisotropic superconductors G. Deutscher and A. Kapitulnik	338
Current transport across grain boundary networks in high-T _c superconductors J. Mannhart, R.P. Huebener, F. Kober, D. Koelle, P. Chaudhari, D. Dimos, R. Gross, A. Gupta, G. Koren and C.C. Tsuei	345
Harmonic generation by field modulation of the microwave complex impedance of high-T _c superconductors M. Golosovsky, D. Davidov, E. Farber, T. Tsachl and M. Schieber	353
Residual irreversibility in high-T _c superconductors L. Krusin-Elbaum, A.P. Malozemoff, C.C. Cronemeyer, F. Holtzberg, G.V. Chandrashekhar, J.R. Clem and Z. Hao	367
Superconductivity in the fractional-statistics gas D. Schmeltzer	378
Chapter 4. Classical and quantum localization	
Photon propagation and the statistics of electromagnetic modes in random media A.Z. Genack, N. Garcia, J. Li, W. Polkošnik and J.M. Drake	387
Maximal fluctuations – a new phenomenon in disordered systems J.B. Pendry, A. MacKinnon and A.B. Pretre	400

Eigenstates of incommensurate systems M.Ya. Azbel'	408
The quantum mechanical transmittance of disordered two-dimensional potentials T.J. Godin and R. Haydock	419
The multichannel Landauer formula in curvilinear constrictions M. Yosefin and M. Kaveh	427
Universal conductance fluctuations in ballistic transport Y. Avishai, J. Bar Touv, Y.B. Band and M. Kaveh	433
Quantum transport in the presence of phase-breaking scattering: generalized Landauer formula S. Feng	439
Conduction in strongly anisotropic metals N. Kumar, P.A. Lee and B. Shapiro	447
Zener dynamics beyond Zener's assumptions D. Lubin, Y. Gefen and I. Goldhirsch	456
Physical properties of hyper-porous systems R. Maynard	469

Chapter 5. Disordered systems

Multifractals in physics: successes, dangers and challenges A. Aharony	479
Mass multifractals T. Vicsek	490
Diffusion-limited growth in bacterial colony formation M. Mathushita and H. Fujikawa	498
Multifractals in diffusion and aggregation S. Havlin	507
Damage spreading H.J. Herrmann	516
Upper bounds for the growth rate of DLA H. Kesten	529
Diffusion in disordered systems: effect of short and long range interactions A. Bunde	536
Effective medium approximation for flicker noise and weak nonlinearities in composite media D.J. Bergman	546

Superdiffusion in random velocity fields S. Redner	551
Dynamic scaling and phase transitions in interface growth F. Family	561
Invasion noise during drainage in porous media J.F. Gouyet	581
Random walk model for viscoelastic reponse of glassy polymers J.T. Benders and G.H. Weiss	592
Modelling the collapse transition in branched polymers D.S. Gaunt and S. Flesia	602
Droplets in Ising models D. Stauffer	614
A spin-glass model of chemical evolution L. Peliti	619
Lattice models for heterogeneous catalysis D. ben-Avraham	626
Levy walk approach to anomalous diffusion J. Klafter, A. Blumen, G. Zumofen and M.F. Shlesinger	637
Solid-on-solid models: series, simulation and telescopes J. Adler	646
Fracture in concrete due to percolating cracks and pores R. Englman and Z. Jaeger	655
List of speakers	673
List of contributors	675