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Theme Issue: Scaling and Disordered Systems

Guest editors: M.R.H. Khajepour, M.R. Kolahchi and M. Sahimi

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PREFACE

For the first time in this series of reviews, a volume is dedicated to one theme: Scaling and Disordered Systems. This is possible because it presents the proceedings of the Regional Summer School on this subject, held in July 1999 in Zanjan, Iran, at the Institute for Advanced Studies in Basic Sciences. We are all grateful to the organizers of this international meeting, M. R. H. Khajepour, M. R. Kolahchi and M. Sahimi, for making it possible. In addition, I thank M. Hashemi and M. Sahimi for guiding me through Tehran, and N. Jan and NSERC of Canada for hospitality and supporting me during August and September 1999 when the articles were collected.

As usual in this series, all texts were submitted electronically and were with the publisher the day after the October 2, 1999, deadline. No author missed it. The cover picture shows an aperiodic tiling of the Friday mosque in Isfahan, Iran, as discussed in the quasicrystalline article of Rivier, Fig. 1.

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Dietrich Stauffer

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CONTENTS

Preface	v
<i>Dietrich Stauffer</i>	
Introduction	ix
<i>M. R. H. Khajepour, M. R. Kolahchi and M. Sahimi</i>	
Main Lectures	
Stochastic Dynamics of Growing Films	1
<i>M. Kardar</i>	
Kinetics of Epitaxial Thin Film Growth	49
<i>F. Family</i>	
Wavelet Transformations and Data Processing: Application to Characterization and Simulation of Large-Scale Porous Media	83
<i>M. Sahimi</i>	
Pore-Scale Characterization of Porous Rocks: Evidence of Correlated Heterogeneity and Implications to Fluid Displacement Processes	113
<i>M. A. Knackstedt</i>	
Directed Percolation, the Fixed Scale Transformation and the Renormalization Group	133
<i>A. Erzan</i>	
Statistical Mechanics and Scaling Theories of Macromolecules	157
<i>T. B. Liverpool</i>	
The Dissipative Dynamics and Relaxation Behavior of a Generic Model for Hydrophobic Collapse	205
<i>E. Tüzel and A. Erzan</i>	

Fluctuation-Induced Phenomena: From Biophysics to Cavity QED <i>R. Golestanian and M. Kardar</i>	229
Scaling as Inflation Symmetry, and its Physical Consequences <i>N. Rivier</i>	261
Shorter Talks	
Percolation Simulation: Large Lattices, Varying Dimensions <i>D. Stauffer and N. Jan</i>	287
Some Aspects of Dynamics of Josephson-Junction Array at Golden Mean Frustration <i>M. R. Kolahchi</i>	301
Monte Carlo Simulation of Microscopic Stock Market Models <i>D. Stauffer</i>	307
A History-Dependent Model for Predator–Prey Problem <i>R. Gerami and M. R. Ejtehadi</i>	321
Biological Ageing in the 20th Century <i>D. Stauffer</i>	329

INTRODUCTION

The Regional Summer School on Scaling and Disordered Systems was held at the Institute for Advanced Studies in Basic Sciences (IASBS) in Zanjan, Iran, during July 3–14, 1999. The motivation for organizing this international school was twofold: (1) To bring to Iran some of the leading researchers in the field of scaling and disordered media in order to provide a forum in which a wide range of problems in this active research area can be discussed, and (2) to introduce to the physics community the recent progress that has been made in physics education and research in Iran, and in particular at IASBS. Our motivation is perhaps best described by the Inauguration Address of the School, delivered by Professor Y. Sobouti, the Director of IASBS, from which we quote:

Mohammad ibn Musa al-Khwarazmi, mathematician (d. 846), Mohammad ibn Zakariyya al-Razi, physician and chemist (d. 925), al-Farabi, philosopher and musicologist (d. 950), Avicenna, philosopher and man of medicine (d. 1037), al-Biruni, astronomer and chronologist (d. 1046), Omar Khayyam, mathematician and poet (d. 1131), and Khaajeh Nasiruddin Tusi, astronomer, mathematician, and statesman (d. 1274) are but a few among the many top-ranking thinkers that the people and culture of Iran have offered the world in the course of their long history. The same potential still exists in this land. The key to rekindle this long forgotten tradition is to provide the youth of Iran with the proper environment and means that trigger their ingenuity and imagination.

The papers in this volume represent the lectures that were delivered at the School. Computer simulations and algorithms played an important role in most of the lectures and discussions that took place in the School, which is why these papers are published in the Annual Reviews of Computational Physics VIII. (The word “algorithm” has its root in this name al-Khwarazmi.) The School was highly successful in introducing to many talented students, who had been selected from amongst universities of the region, the enormous success that the

ideas of scaling and universality have enjoyed in describing disordered media, while at the same time making it clear that many of the theoretical approaches and models for such media have found practical applications in the industry.

The School was sponsored by IASBS, the Abdus Salam International Centre for Theoretical Physics (ICTP) in Trieste, Italy, and the Physical Society of Iran. We are also grateful to the Office of External Activities at ICTP and Professor Y. Sobouti for their support. We would like to thank all the lecturers for their efforts to make their presentations of the highest quality, and Dietrich Stauffer who made publication of these Proceedings possible, and who pushed everybody to deliver his/her paper on time.

The organizers and Guest Editors,
M. R. H. Khajepour
M. R. Kolahchi
M. Sahimi