Preface

To promote the exchange of ideas and the cooperation among the researchers working on statistical physics, nonlinear dynamics, and complex systems, some over-sea and mainland China physicists initiated the First Cross Taiwan-strait Conference on Statistical Physics. The organization of the conference began in the fall of 2002 and many over-sea scientists had accepted invitation to present talks at the conference in August 2003 at Yangzhou, China. However, due to the wide spread of SARS in the first half year of 2003, the conference was once postponed to December 2003. After the SARS was well under control in June 2003, the Organization Committee of the conference decided to hold the meeting on 27-31 August 2003 at West Lake Villa Hotel, Yangzhou, China. The Conference was co-organized by Yangzhou University and University of Science and Technology of China. The conference received great financial support from National Science Foundation of China, People’s government of Jiangsu Province, Department of Education of Jiangsu Province, Science and Technology Association of Anhui Province, and Yangzhou University.

In the opening session of the conference on 28 August, Professor Rong Guo (President of Yangzhou University), Professor Bing-Hong Wang (Director, Center of Nonlinear Science, University of Science and Technology of China), and Professor Xiang-Hua Zeng (Dean of Faculty of Science, Yangzhou University), delivered speeches to welcome about 200 participants of the conference, who came from Canada, Hong Kong, Japan, Singapore, Switzerland, Taiwan, and Mainland China. Professor Guo gave a brief introduction to the history and current status of Yangzhou University. He said that Yangzhou University, which was merged out of several existing colleges on May 19, 1992, is a key comprehensive university at provincial level. Its roots came from Yangzhou Teachers College, Jiangsu Agricultural College, Yangzhou Engineering College, Yangzhou Medical College, Jiangsu Water Conservancy College and Jiangsu Business College, some dating back as early as 1902. Professor Wang gave a brief introduction to the organization of the meeting.

The scientific program of the conference consisted of 20 plenary talks, and 48 invited and 80 contributed talks at 4 parallel sessions on the topics: Basic theory in statistical physics, nonlinear dynamics, physics of condensed matter and the systems far away from equilibrium, and the theory and applications of complexity science. Part of the reports concerned some novel investigations on the fundamental theory and the conventional research directions and revealed the new trend of getting into new fields and the heavy influence of computer and network on the development of statistical physics. These reports involved granular flow, soft matter, organic
Preface

material, nonlinear and quantum optics, econophysics, financial system, biological complexity, population control, traffic flow, complex network etc. Some reports even concerned geography and Chinese medicine study from the point of physics view. Statistical physics research in these new fields is just at its beginning stage and calls people to face the new challenge. Many of the reports inspired intensive discussions in the Conference and were expected to produce some meaningful impacts on the future development of statistical physics. Besides the academic program, the Organization Committee of the Conference also arranged tours of Yangzhou city on 27 and 31 August.

In the closing session of the conference on 30 August, Dr. Chin-Kun Hu (Vice Chairman, IUPAP Commission on Statistical Physics; Research Fellow, Institute of Physics of Academia Sinica, Taipei) first thanked the Organization Committee and Yangzhou University for organizing a successful conference. He then told the participants his own experience to attend and organize scientific meetings. Considering the importance of scientific meetings for researchers, especially for graduate students, he and his colleagues have been organizing a series of Taiwan International Symposium on Statistical Physics since 1991, whose proceedings were published in AIP Conference Proceedings 248, Physica A 205 (1994), 221 (1995), 254 (1998), 281 (2000), and 321 (2003). He said that IUPAP (International Union of Pure and Applied Physics) encourages the free circulation of scientists. He wished that in the future more scientists in Mainland China can come to Taiwan to attend this series of international symposium and other conferences.

Many participants felt that the Conference at Yangzhou to be very helpful for their researches on the modern topics of statistical physics. Therefore, it has been strongly suggested that such conference should be continued and, in fact, the second meeting has been proposed to be held in 2005 in Taiwan.

This special issue of IJMPB contains fully-refereed 25 invited papers and 43 contributed papers presented at the Conference. Thanks for the support of World Scientific Publisher and efforts of all the referees who go over strictly the manuscripts, which make the publication of this proceedings becomes possible.

Some invited talks were presented at the Conference, but the relevant papers were not included in the Proceedings. These are:

2. Ming-Chang Huang (Department of Physics, Chung-Yuan Christian University, Chungli): First-order Transition for Infinitely Long Ising-cylinder with Anti-periodically Joined Circumference.
3. Chang-De Gong (Department of Physics, Nanjing University, Nanjing): A Difficulty in Theories on Neutron-scattering and Photoemission of Untwined YBa2Cu3O7- Superconductor.
4. Gang Hu (Physics Department, Beijing Normal University, Beijing): Spatiotemporal Chaos Based Secure Communication.
Preface

(5) Xu Cai (Institute of Particle Physics, Central China Normal University, Wuhan): 3P (Propagation, prediction, purpose) Relative to Complex Systems as Machines.

(6) Lei-Han Tang (Department of Physics, Hong Kong Baptist University, Hong Kong): Rare Event Statistics Applied to DNA Unzipping.

(7) Rui-Bao Tao (Department of Physics, Fudan University, Shanghai): Field-tuned Quantum Tunnelling in Supermolecule Dimmer [Mn4]2.

(8) Tianquan Chen (Department of Mathematics, Tsinghua University, Beijing): A Non-equilibrium Statistical Mechanics without the Assumption of Molecular Chaos.

(9) Ji-Tao Wang (Department of Microelectronics, Fudan University, Shanghai): Non-equilibrium Non-dissipative Thermodynamics — About the Second Law Of Thermodynamics.

(10) Hai-Qing Lin (Department of Physics, Chinese University of Hong Kong, Hong Kong): Absence of Ground State Level Crossing in one-dimensional Correlated Fermion Systems.


(12) Xiao Hu (Computational Materials Science Center, National Institute for Materials Science, Tsukuba Japan): Finite-Magnetic-Field Superconductivity Transition in Type II Superconductors.

(13) Bing-Hong Wang (Department of Modern Physics, University of Science and Technology of China, Hefei): The Study of Nonlinear Dynamics and Statistical Mechanics for Phase Transition of Traffic Flows.

(14) Baowen Li (Department of Physics, National University of Singapore, Singapore): Anomalous Heat Conduction and Anomalous Diffusion in One Dimensional Systems.

(15) Guan-shan Tian (Department of Physics, Peking University, Beijing): Lieb’s Spin-Reflection- Positivity Method and its Applications to the Strongly Correlated Electron Systems.

(16) Xiao-Hong Wang (Department of Thermal Science and Energy Engineering, University of Science and Technology of China, Hefei): Directed Polymers at Finite Temperatures.

(17) Yu-qiang, Ma (Department of Physics, Nanjing University, Nanjing): Ordering Mechanisms in Soft Matter.

(18) Daren He (College of Physics Science and Technology, Yangzhou University, Yangzhou): The Current Research Trend of Complex Networks.

(19) Zhen-qiu Ren (China Institute of Meteorological Science, Beijing): The Important Cause of Formation for Catastrophe in Complex Systems and Their Special Equilibrium states.
Preface

(20) Zhong-zhu Liu (Department of Physics, Central China University of Science and Technology, Wuhan): The Phase Transition in Canonical and Grand-canonical Ensembles for Potts model of Rumor Spreading.
(21) Pei-Ling Zhou, (Department of Electronic Science and Technology, University of Science and Technology of China, Heifei): Mathew Effect in Artificial Stock Market.
(22) Quanlin Jie (Department of Physics, Wuhan University, Wuhan): A Stable Pre-exponential Factor for the Herman and Kluk’s Semiclassical Propagator.
(23) Yong-jun Liu (College of Physics Science and Technology, Yangzhou University, Yangzhou): Spin Excitation of the 2D spin-1/2 Anti-ferromagnetic Heisenberg Model with Asymmetric Sublattices.

There are also some papers not presented in the Conference, but included in the Proceedings. These are:

(2) Evolving Networks Driven by Node Dynamics, by Zhengping Fan and Guanrong Chen.
(3) Anticipating and Lag Synchronization in Chaotic Laser System, by Shiqun Zhu and Liang Wu.
(4) Non-classical Quantum Correlations in Quantum Games, by Jiangfeng Du, Guanglei Cheng, and Hui Li.
(5) Scaling Law of SARS Onset, by Zhongliang Wu.
(6) Complicated Electrical Activities in Cardiac Tissue, by Yuo-Hsien Shiau, Ming-Pin Hsueh, Shu-Shya Hseu, and Huey-Wen Yien.

The Editorial Committee of Proceedings:

Chin-Kun Hu (Institute of Physics, Academia Sinica, Taipei)
Zhong-Can Ou-Yang (Institute of Theoretical Physics, CAS, Beijing)
Bambi Hu (Center Nonlinear Study Center, Hong Kong Baptist University, Hong Kong)
Bing-Hong Wang (Department of Modern Physics, University of Science and Technology of China, Hefei)