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**YITP Workshop**  
**New Developments in Statistical Physics**  
**Similarities in Diversities**

February 17 -19, 1993

at

Yukawa Institute for Theoretical Physics  
Kyoto University

**Workshop Organizing Committee:**

Tohru Morita(Tohoku Univ.)  
Miki Wadati(Tokyo Univ.)  
Hiroaki Hara(Tohoku Univ.)  
Yoshiyasu Tamura(Inst. Statistical Math.)  
Michio Tokuyama(Toho Univ.)  
Yasuhiro Shiwa(Kyushu Inst. Tech.)  
Tadashi Toyoda(Nagoya Shoka Daigaku)

**Preface**

In February, 1991, we had a workshop "Foundation of Statistical Physics: Similarities in Diversity" in the Yukawa Institute for Theoretical Physics of Kyoto University, and, in January, 1992, the next workshop "Statistical Physics and Statistical Mathematics: Similarities in Diversity" in the Institute of Statistical Mathematics. The present one is the third of this series.

Recently, the branch of statistical physics and fundamental theories in condensed matter physics in the meeting of the Physical Society of Japan is presented in a number of parallel sessions. There should be similarities in common to presentations in different sessions. The organizers who are interested in seeking those similarities, gathered and started organizing the workshops. This time, we asked some Korean physicists to participate. The participants of the workshop were 20 from Japan and 5 from Korea. The presentations and discussions were all given in English. The reports are also in English.

The meeting was held in aware of similarities in diversity. We enjoyed discussions in friendly atmosphere throughout the workshop. I believe that the workshop was a valuable step to develop communications between statistical physicists of two neighbouring countries.

Representative organizer,  
Tohru Morita.

Feb. 17 Wed. 1:30 pm- 6:00 pm  
[Afternoon 1:30-6:00]

Opening Talk Miki Wadati (Tokyo Univ.)

1. Tohru Morita (Tohoku Univ.)  
(40min.)
2. Chung In Um (Korea Univ.)  
Thermal conductivity and viscosity in bulk helium4 (50min.)

----- Coffee Break 3:20-3:40 -----

3. Kyu Hwang Yeon (Chungbuk National Univ.)  
Generalized invariance for the quantum bounded quadratic hamiltonian (40min.)
4. Toyoyuki Kitamura (Nagasaki Institute of Applied Science)  
Solitons and bound states of the self-consistent potential (40min.)
5. Kiyosi Sogo (Institute of Computational Fluid Dynamics)  
Time-dependent orthogonal polynomials and theory of soliton-applications to matrix model and level statistics (30min.)

Feb. 18 Thur. 9:00 am - 6:45 pm  
[Morning 9:00 - 12:40]

6. Hyng Gyu Park (Inha Univ.)  
Critical behavior of an interacting catalysis model (40min.)
7. Takeo Ishinabe (Yamagata Univ.)  
1/d expansion method for self-interacting self-avoiding walks (30min.)
8. Masatoshi Shiino (Tokyo Inst. of Technology) and Tomoki Fukai (Tokai Univ.)  
Statistical mechanics of attractor neural network and self consistent signal noise analysis (35min.)
9. Kazuyuki Tanaka and Tohru Morita (Tohoku Univ.)  
Asymptotic behavior of spin-pair correlation of Ising model on checkerboard lattice (30min.)

----- Lunch Break 12:40 - 1:50pm -----

[Afternoon 1:50-6:00]

10. Seung Joo Lee (Korea Univ.)  
Dimensional crossover of electrons and a low dimensional gas with tilted magnetic fields (50min.)
11. Miki Wadati (Tokyo Univ.)  
Integrable particle systems with long-range interactions (50min.)

----- Coffee Break 3:50-4:10 -----

12. Jong Bae Hong (Seoul National Univ.)  
Asymptotically exact solution of the dynamic structure factor of an electron gas (50min.)
13. Yasuhiro Shiwa (Kyushu Inst. of Technology)  
Fluctuation-induced first-order transition and dynamic scaling in Rayleigh-Bénard convection (40min.)
14. Hirotsugu Matsuda and Kasunori Sato (Kyushu Univ.)  
Statistical mechanics of population (35min.)

----- Reception Beer Party 6:45pm- -----

**Feb. 19 Fri. 9:00 am - 4:40 pm**

[Morning 9:00 - 12:40]

15. Toshihiro Shimizu (Kokushikan Univ.)  
Chaotic force in Brownian motion (40min.)
16. Hirokazu Fujisaka (Kyushu Univ.)  
Fluctuation spectrum and multicorrelation - Application to low dimensional systems (40min.)
17. Noboru Takimoto and Masatosi Tange (Tohoku Univ.)  
New aspect of the dynamics of driven pendulum (30min.)
18. Shinji Koga (Osaka Kyoiku Univ.)  
Unstable periodic orbits and chaos (30min.)

19. Masakazu Jimbo (Gifu Univ.)

A mathematical model of ternary collisions and tournament games (30min.)

----- Lunch Break 12:40 - 1:50pm -----

[Afternoon 1:50-4:20]

20. Toshitsugu Tanaka (Osaka Univ.)

Cluster formation and particle induced instability in gas-solid flows: Numerical simulation by the DSMS method (40min.)

21. Tohru Ouchi (Kobe Univ.)

Synchronized global activation in seismic activities and mathematical modeling (30min.)