



## TABLE OF CONTENTS

### Quantum Computing General

1. **Quantum Computer as a Quantum-Thermodynamical Machine**  
Gunter Mahler, Jochen Gemmer, Marcus Stollsteimer  
University of Stuttgart, Germany
2. **Quantum Trajectory Methods for Simulating Solid-State Qubit Systems**  
Jonathan P. Dowling, Jet Propulsion Laboratory, NASA, USA
3. **Molecular Memory and Future Molecular Nano-Electronics Devices**  
Kazumi Matsushige, Kyoto University, Japan
4. **Formation and Stacked Layers of Quantum Dots**  
Akio Sasaki, Osaka Electro-Communication University, Japan
5. **Control of Level Structures, and Electronic Processes in Quantum Dots**  
Hiroyuki Sakaki, G. Bastard T. Inoshita, R. Ferreira G. Yusa, T. Kawazu and Ph. Lelong, IIS, Univ. of Tokyo; ENS-CNRS, Paris, France, JST-ERATO (Tarucha) Project, Japan
6. **Self-Ordered Pyramidal Quantum Dots: Physics and Applications**  
Yann Ducommun, Martin Baier, Arno Hartmann, and Eli Kapon  
EPFL, Switzerland
7. **NeoSilicon: Silicon Quantum Dots with Controlled Interparticle Distance**  
Shunri Oda, Tokyo Institute of Technology and CREST, Japan

## **Simulations and Theory of Quantum Dots**

- 8. Status of the Nanoelectronic Modeling tool (NEMO 1-D and 3-D) and its planned extension to Spintronics**

Gerhard Klimeck<sup>a</sup>, Fabiano Oyafuso<sup>a</sup>, Timothy B. Boykin<sup>b</sup>, R. Chris Bowen<sup>a</sup>,

<sup>a</sup>JPL/NASA; <sup>b</sup>University of Alabama, USA

- 9. Melting and Reentrant Freezing of Finite Electron Systems on Two-Dimensional Quantum Dots**

Yoshihisa Enomoto and Takashi Mitsuda, Nagoya Institute of Technology, Japan

- 10. Reducing Design Constraints and Combating Decoherence in Quantum Dot Quantum Computers**

Daniel A. Lidar, Lianao Wu, Mark S. Byrd, University of Toronto, Canada

University of Toronto, Canada

## **General Theoretic and Prospective**

- 11. Interdependence Analysis in a Composite Quantum System and its Application to Partitioning of Quantum Dot Register**

Hiroshi Watanabe, Mukuta Research Institute, Japan

- 12. Electron Transfer through Pumped Quantum Dots**

Valdimir Yudson, Chiba University, Japan; Russian Academy of Science, Russia

- 13. Giant Photon-Photon Interactions and Entanglement in Photonic Crystals**

-Quantum Optics in Photonic Crystals

Gershon Kurizki, Tomas Opatrny, David, Petrosyan, Miriam Blaauboer

Weizmann Institute of Science, Israel

- 14. A Complete Set of Transformation Rules for Quantum Boolean Circuits with CNOT gates**

Kazuo Imawa , Shigeru Yamashita, ERATO; Kyoto University; NTT, Japan

## **Coherence in Quantum Dots and Quantum Networks**

### **15. Long Lived Coherence in Self-Assembled Quantum Dots**

D. Birkedal, K. Leosson, and Jorn M. Hvam, Technical University of Denmark, Denmark

### **16. Photon Beats from a Single Semiconductor Quantum Dot: A Coherence Study**

T. Flissikowski, A. Hundt, M. Lowisch, M. Rabe, and Fritz Henneberger  
Humboldt-Universitaet zu Berlin, Institut fuer Physik, Germany

### **17. Coherence Generation by Resonance Dynamic Dipole-Dipole Interaction among Quantum Dot Ensemble]**

Hideaki Matsueda, Kochi University, Japan

### **18. Control of Dipole-Dipole Interactions in Dielectric Structures**

Gershon Kurizki, Weizmann Institute of Science, Israel

### **19. Field-Coupled Devices for Nanoelectronic Integrated Circuits**

Wolfgang Porod and Arpad Csurgay, University of Notre Dame, USA

## **Quantum Computing Devices with Quantum Dots - Photonic 1**

### **20. Quantum Dots: Artificial Atoms and Quantum Computing [40]**

Anthony S. Lenihan, Gang Chen, T.H. Stievater, E.A. Tabak, X. Li, M.V.G. Dutt, D.G. Steel, S. Ghosh, P.K.Bhattacharya, The University of Michigan; D.S. Katzer, D.Park, D. Gammon, The Naval Research Laboratory; L.J. Sham, University of California, San Diego, USA

### **21. Coherent Control of Single Dot Exciton Wavefunction**

Hidehiko Kamada, H. Gotoh, NTT Basic Research Laboratories; H. Ando, Konan UniversityT. Takagahara, Kyoto Institute of Technology; J. Temmyo, Shizuoka University, Japan

## **Quantum Computing Devices with Quantum Dots - Photonic 2**

### **22. Single Quantum Dots and Quantum Dot Molecules in Externally Controllable Fields**

Alfred Forchel, M. Bayer, G. Bacher, J. P. Reithmaier, M. Kamp, University of Wuerzburg, Germany; T. L. Reinecke, Naval Research Laboratory, USA; P. Hawrylak,

Institute for Microstructural Science, Canada

### **23. Ultrafast Quantum Information Processing using Excitons in Quantum Dots**

E. Biolatti I.D'Amico, Paolo Zanardi, F. Rossi, Politecnico di Trino; ISI Foundation, Italy

### **24. Intrinsic Exciton-Exciton Coupling in GaN-based Quantum Dots: Application to Solid-State Quantum Computing**

I.D'Amico, E. Biolatti, Paolo Zanardi, Fausto Rossi, S. De Rinaldis R. Rinaldi R. Cingolani, ISI Foundation; Politecnico di Trino; Universita di Lecce, Italy

### **25. Quantum Computation with Coupled-Quantum-Dots Embedded in Optical Microcavities**

Xin-Qi Li, National Laboratory for Superlattices and Microstructures, China

## **Quantum Computing Devices with Quantum Dots - Electronic and Spintronic 1**

- 26. Quantum Information Processing with Ferroelectrically Coupled Quantum Dots**  
Jeremy Levy, University of Pittsburgh, USA
- 27. Time-Dependent Phenomena of Charge State and Spin State in Quantum Dots**  
Toshimasa Fujisawa, NTT Basic Research Laboratories, Japan
- 28. Qubit System in Capacitively Coupled Semiconductor Quantum Dots**  
Tetsufumi Tanamoto, Toshiba Corporation, Japan
- 29. Quantum Computation Using Artificial Molecules**  
Nan-Jian Wu, National Laboratory for Superlattices and Microstructures, China
- 30. Coherent Control of Quantum State in Josephson Junction Circuits**  
Jaw-Shen Tsai, Yasunobu Nakamura, Yuri Pashkin, Tsuyoshi Yamamoto  
NEC Fundamental Research Laboratories, Japan

**Quantum Computing Devices with Quantum Dots  
Electronic and Spintronic 2**

**31. Quantum Computation and Communication using Electron Spins in Quantum Dots**

Guido Burkard and Daniel Loss, University of Basel, Switzerland

**32. Spin Control and Spin Coherence in Semiconductors**

Yuzo Ohno, T. Adachi, H. Ohno, F. Matsukura, G. Salis, D.D. Awschalom Tohoku

University, Japan; University of California, Santa Barbara, USA

## **Molecular and other Quantum Dots for Quantum Computing**

### **33. Single and Coupled Quantum Dots in Single-Wall Carbon Nanotubes**

Koji Ishibashi, M. Suzuki, T. Ida, Y. Aoyagi

RIKEN; Toyo University; Tokyo Institute of Technology, Japan

### **34. Quantum Coherence in Solid Hydrogen**

Kohzo Hakuta, University of Electro-Communications; CREST, Japan

### **35. Solid Hydrogen: Towards Manipulation of Orthohydrogen Nuclear-Spin**

Anil K. Patnaik, J. Q. Liang, and K. Hakuta, University of  
Electro-Communication; CREST, Japan

### **36. Spin Quantum Dots by Electrophoretic NMR**

Toshio Fukumi, National Institute of Advanced Industrial Science& Technology,  
Japan

## **Poster Session**

### **P1. Giant Photon-Photon Interactions and Entanglement in Photonic Crystals**

#### **Quantum Optics in Photonic Crystals**

Gershon Kurizki, Tomas Opatrny, David Petrosyan, Miriam Blaauboer

Weizmann Institute of Science, Israel

### **P2. Melting and Reentrant Freezing of Finite Electron Systems on Two-Dimensional**

#### **Quantum Dots**

Yoshihisa Enomoto and Takashi Mitsuda, Nagoya Institute of Technology, Japan

### **P3. Quantum Computing and Modern Supercomputing**

Leland Jameson and John Johnson, Lawrence Livermore National Laboratory,

USA