

5th Asia-Pacific Engineering Research Forum on Microwaves and Electromagnetic Theory



July 29-30, 2004
Venture Business Laboratory
Kyushu University, Fukuoka, Japan

Sponsored by
Faculty of Information Science and Electrical Engineering
Faculty of Engineering, Kyushu University



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INVITED SPEAKERS

Ikuo Awai Ryukoku University, Japan
Chi Hou Chan City University of Hong Kong, China
Hung-chun Chang National Taiwan University, Republic of China
Hyo J. Eom Korea Advanced Institute of Science and Technology, Korea
Zhenghe Feng Tsinghua University, China
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Atsushi Kusunoki Oita University, Japan
Le-Wei Li National University of Singapore, Singapore
Kwai-man Luk City University of Hong Kong, China
Hiroshi Maeda Fukuoka Institute of Technology, Japan
Yoshihiro Naka Kumamoto University, Japan
Norimasa Nakashima Kyushu University, Japan
Masahiko Nishimoto Kumamoto University, Japan
Takeshi Ohashi Nagasaki University, Japan
Dong Chul Park Chungnam National University, Korea
Mitsuru Tanaka Oita University, Japan
Yoichi Okuno Kumamoto University, Japan
Kazunori Uchida Fukuoka Institute of Technology, Japan
Hiroyuki Watanabe Nagasaki University, Japan
Koki Watanabe Fukuoka Institute of Technology, Japan
Shanjia Xu University of Science and Technology of China, China
Toshiyuki Yakabe University of Electro-Communications, Japan
Kiyotoshi Yasumoto Kyushu University, Japan
Mitsuhiro Yokota Miyazaki University, Japan

TECHNICAL SESSIONS

July 29 (Thursday)

9:00–9:10 **Opening Remarks**

Session 1: Antennas I (Chairman: K. M. Luk)

9:10–9:35

A New Ominidirectional Circular Rod Antenna with Double Dielectric Gratings for Millimeter-Wave Applications **1**

Xu Shan-jia, Lin Kai-hui, and Jing Heng-zhen, University of Science and Technology of China, China

9:35–10:00

A Novel Wideband Probe Fed Patch Antenna **11**

K. M. Luk and H. W. Lai, City University of Hong Kong, China

10:00–10:25

Some Proposals for Reconfigurable Antennas in Next Generation of Wireless Applications **21**

Takeshi Fukusako and Nagahisa Mita, Kumamoto University, Japan

10:25–10:45 **Coffee break**

Session 2: Complex Media and Structures (Chairman: Dong Il Kim)

10:45–11:10

Kernel Independent Solvers for Electrically Small but Complex Structures **29**

Haogang Wang¹, Chi Hou Chan², and Leung Tsang², ¹Zhejiang University, China, ²City University of Hong Kong, China

11:10–11:35

Optimal Design Procedure for a Polarization-Transformation Filter Composed of Left-Handed Materials and Chiral Media **35**

Atsushi Kusunoki and Mitsuru Tanaka, Oita University, Japan

11:35–12:00

Development of Electromagnetic Wave Absorbers with Alnico Magnets **41**

Jae Man Song, Dong Il Kim, Seung Jae Shin, Sang Hyun Moon, and Ki Man Kim, Korea Maritime University, Korea

12:00–12:25

Macroscopic Characteristics of Electromagnetic Waves Radiated by a Dipole in the Presence of Metamaterial Sphere **46**

Le-Wei Li^{1,2}, Qun Wu², and Zhong-Cheng Li¹, ¹National University of Singapore, Singapore, ²Harbin Institute of Technology, China

12:25–13:45 **Lunch**

Session 3: Scattering and Diffraction (Chairman: Mitsuhiro Yokota)

13:45–14:10		
Electromagnetic Field Diffracted by Two Edges with Arbitrary Angle Plane		54
<i>Jiro Iwashige and Yuichi Fukuyama, Fukuoka Institute of Technology, Japan</i>		
14:10–14:35		
On Accuracy of Ray Tracing Method in Comparison with Rigorous Wiener-Hopf Solutions		62
<i>Kazunori Uchida, Mayami Nakagawa, Hironori Fujii, and Waka Adachi, Fukuoka Institute of Technology, Japan</i>		
14:35–15:00		
Application of Multigrid Moment Method to Scattering of a Gaussian Beam by a Dielectric Cylinder		71
<i>Mitsuhiro Yokota, Miyazaki University, Japan</i>		
15:00–15:25		
Multiple Scattering of Electromagnetic Waves by Three Dimensional Objects		77
<i>Mitsunori Kawano¹ and Hiroyoshi Ikuno², ¹Kumamoto National College of Technology, Japan, ²Kumamoto University, Japan</i>		
15:25–15:50		
Fast Computation of Scattering from N Dielectric Cylinders		83
<i>Norimasa Nakashima, Seiji Fujino, and Mitsuo Tateiba, Kyushu University, Japan</i>		
15:50–16:10	Coffee break	

Session 4: Inverse Scattering, Remote Sensing, and Communications (Chairman: Mitsuru Tanaka)

16:10–16:35		
Information Retrieval from Polarimetric EM Scattering in SAR Imagery		91
<i>Ya-Qiu Jin, Fudan University, China</i>		
16:35–17:00		
A Novel Regularization Method Applied to Two-Dimensional Inverse Scattering Problem		98
<i>Mitsuru Tanaka and Ryouji Kurogi, Oita University, Japan</i>		
17:00–17:25		
A Method for Landmine Detection Using Sequential GPR Data		102
<i>Masahiko Nishimoto and Ken-ichiro Shimo, Kumamoto University, Japan</i>		
17:25–17:50		
Satellite Link Model Based on a Statistical Analysis of the Received Signal Level and the Occurred Bit-Errors		108
<i>Fondjo F. Franklin¹, Kiyotaka Fujisaki¹, Tsuyoshi Matsuoka², and Mitsuo Tateiba¹, ¹Kyushu University, Japan, ²Kyushu Sangyo University, Japan</i>		
18:00–20:00	Forum Banquet	

July 30 (Friday)

Session 5: Antennas II (Chairman: Zheng He Feng)

9:00–9:25

Mode-Matching Modeling of Multiple Aperture Antennas **116**
Hyo J. Eom, Korea Advanced Institute of Science and Technology, Korea

9:25–9:50

Design Multi-Band Planar Antennas for Wireless Communication Terminals **122**
Zheng He Feng, Bing Bai, Ming Yan Fan, and Wen Hua Chen, Tsinghua University, China

9:50–10:15

Planar Dipole Antenna within a Rectangular Parallelepiped Cavity for UWB System **126**
Mitsuo Taguchi, Takeshi Ohashi, and Kazumasa Tanaka, Nagasaki University, Japan

10:15–10:35 **Coffee break**

Session 6: Waveguide, Transmission Lines, and Measurements (Chairman: Fengchao Xiao)

10:35–11:00

Six-Port Based Wave-Correlator and Its Applications **132**
Toshiyuki Yakabe and Fengchao Xiao, University of Electro-Communications, Japan

11:00–11:25

Analysis of Finite-Length Multiconductor Transmission Lines in Arbitrary Directions **139**
Sang Wook Park, Jae Cheol Ju, and Dong Chul Park, Chungnam National University, Korea

11:25–11:50

A $TE_{10\delta}$ -Mode Waveguide Filter Made of Artificial Dielectric Rectangular Resonators **145**
Ikuo Awa¹, Achmad Munir², Hiroshi Kubo², and Atsushi Sanada², ¹Ryukoku University, Japan, ²Yamaguchi University, Japan

11:50–12:15

Analysis of Electromagnetic Crystals Formed by Vertical Posts in a Rectangular Waveguide **152**
Kiyotoshi Yasumoto, Hongting Jia, and Naoya Koike, Kyushu University, Japan

12:15–13:35 **Lunch**

Session 7: Photonics (Chairman: Hiroshi Maeda)

13:35–14:00

Yee-Mesh-Based Finite Difference Optical Waveguide Eigenmode Solver with Perfectly Matched Layer Absorbing Boundary Conditions **158**
Hung-chun Chang and Chin-ping Yu, National Taiwan University, Republic of China

14:00–14:25
Numerical Analysis of Photonic Crystal Directional Coupler with Kerr-Type Nonlinearity **165**
Xuefeng Li and Hiroshi Maeda, Fukuoka Institute of Technology, Japan

14:25–15:00
Analysis of Two-Dimensional Photonic Crystal Sharply Bent Waveguides with Microcavity **169**
Yoshihiro Naka and Hiroyoshi Ikuno, Kumamoto University, Japan

15:00–15:25
Design of an Optical Filter **175**
Hiroyuki Watanabe, Takafumi Fujimoto, Toshiyuki Tanaka, Mitsuo Taguchi, and Kazumasa Tanaka, Nagasaki University, Japan

15:25–15:45 **Coffee break**

Session 8: Periodic Structures (Chairman: Koki Watanabe)

15:45–16:10
Excitation of Surface Plasmons on a Metal Grating and Its Application for Refractive-Index Measurement **181**
Y. Okuno¹, T. Suyama¹, and T. Matsuda², ¹Kumamoto University, Japan, ²Kumamoto National College of Technology, Japan

16:10–16:35
Performance Evaluation of Spectroscopic Ellipsometry for Lamellar Gratings Made of Lossless Dielectrics **186**
Koki Watanabe, Fukuoka Institute of Technology, Japan

16:35–17:00
Rigorous Analysis of Electromagnetic Scattering from Layered Periodic Arrays of Circular Cylinders Embedded in Magnetized Ferrite Slab **194**
Hongting Jia, Kiyotoshi Yasumoto, and Hiroshi Toyama, Kyushu University, Japan

17:00–17:10 **Closing Remarks**

PRESENTATION

1. Each speaker is given 25 minutes. The first 20 minutes is for presentation and the last 5 minutes is for discussion.
2. A PC projector based on the power point format and an OHP projector are available for presentation.

FORUM BANQUET

All of the guests are invited to participate in a banquet to be held at the Faculty Restaurant in the evening of July 29. The banquet will start at 18:00 and end at 20:00.

LOCATION OF THE CONFERENCE ROOM

The conference room is located on the 3rd floor of the Venture Business Laboratory, Kyushu University. The building of the Venture Business Laboratory is marked on the attached campus map.

ACCOMMODATION FOR FOREIGN GUESTS

The accommodation for the participants has been reserved at a hotel near *Hakata Station* of JR Kyushu line. It takes about 3 minutes by walk from the exit of *Chikushi-guchi* at Hakata Station to the hotel. Three nights is booked. The checkin date is July 28 and the checkout date is July 31. The room type is a single room and the room charge per one night without breakfast is ¥6,000 including the tax and service charges. No deposit is required. You can order a breakfast by paying ¥800 additionally. The following is the name and Phone/Fax number of the hotel:

Name: Hakata Green Hotel (No.1 Buliding)
Phone: +81-92-451-4111
Fax: +81-92-451-4508.

TRANSPORTATION

From Fukuoka Airport to Hakata Station

Fukuoka city subway is the most reasonable transportation. *Hakata Station* is two stations away by the city subway line from *Fukuoka International Airport*. It takes only 5 minutes.

From Hakata Station to Kyushu University

Fukuoka city subway is the most reasonable transportation. The fare from *Hakata Station* to *Hakozaki-Kyudaimae Station* which is nearest to Kyushu University is ¥250. If you take a subway, please follow the route below.

1. *Hakata Station* to *Nakasu-Kawabata* : 5 minutes ride. All trains are available. Change the subway line here.
2. *Nakasu-Kawabata* to *Hakozaki-Kyudaimae* : 10 minutes ride. Take trains for Kaizuka.
3. *Hakozaki-Kyudaimae* to Kyushu University : 5 minutes walk.