

---

**ELECTROMAGNETIC WAVES**  
**PIERC 79**

---

**Progress**

**In**

**Electromagnetics**

**Research C**

© 2017 EMW Publishing. All rights reserved.

No part of this publication may be reproduced. Request for permission should be addressed to the Publisher.

All inquiries regarding copyrighted material from this publication, manuscript submission instructions, and subscription orders and price information should be directed to: EMW Publishing, P. O. Box 425517, Kendall Square, Cambridge, Massachusetts 02142, USA.

---

**ELECTROMAGNETIC WAVES**  
**PIERC 79**

---

**Progress**  
**In**  
**Electromagnetics**  
**Research C**

Chief Editors: Weng Cho Chew and Sailing He

EMW Publishing  
Cambridge, Massachusetts, USA



## CONTENTS

<b>Simulation Design and Testing of a Dielectric Embedded Tapered Slot UWB Antenna for Breast Cancer Detection</b>	
Dheyaa T. Al-Zuhairi, John M. Gahl, Adil Al-Azzawi, and Naz E. Islam . . . . .	1
<b>Optimization of Micromachined Millimeter-Wave Planar Silicon Lens Antennas with Concentric and Shifted Matching Regions</b>	
Henrik Frid*, Fritzi Töpfer, Shreyasi Bhowmik, Sergey Dudorov, and Joachim Oberhammer . . . .	17
<b>Further Propagation Investigation of a Low Density Urban Environment with Drains</b>	
Chi Ken Lim, Soo Yong Lim, David Wee Gin Lim, Zhengqing Yun, and Magdy F. Iskander . . . .	31
<b>A Comparison between Carson’s Formulae and a 2D FEM Approach for the Evaluation of AC Interference Caused by Overhead Power Lines on Buried Metallic Pipelines</b>	
Andrea Cristofolini, Arturo Popoli, and Leonardo Sandrolini . . . . .	39
<b>Linear-to-Circular Polarizers for Multi-Octave Bandwidths and Wide Scan Angles at mm-Wave Frequencies Using Rotated Anisotropic Layers</b>	
Carl Pfeiffer and Boris Tomasic . . . . .	49
<b>Dynamic Thermal Processes in Ultra-High-Speed Microgenerators for UAV</b>	
Flur Rashitovich Ismagilov, Viacheslav Evgen’ev Vavilov, and Denis Valer’evich Gusakov . . . . .	65
<b>Recon UWB Antenna for Cognitive Radio</b>	
Deeplaxmi V. Niture, Santosh S. Jadhav, and S. P. Mahajan . . . . .	79
<b>A High-Performance Circularly-Polarized Rectenna for Wireless Energy Harvesting at 1.85 and 2.45 GHz Frequency Bands</b>	
Hakim Takhedmit, Zied Saddi, and Laurent Cirio . . . . .	89
<b>Gaussian Beam Electromagnetic Scattering from PEC Polygonal Cross-Section Cylinders</b>	
Mario Lucido, Fulvio Schettino, Marco D. Migliore, Daniele Pinchera, and Gaetano Panariello . .	101
<b>High Gain Slotted Waveguide Antenna Based on Beam Focusing Using Electrically Split Ring Resonator Metasurface Employing Negative Refractive Index Medium</b>	
Adel A. A. Abdelrehim and Hooshang Ghafouri-Shiraz . . . . .	115
<b>Efficient Range Alignment Algorithm for Real-Time Range-Doppler Algorithm</b>	
Joo-Ho Jung, Si-Ho Kim, Ji-Hoon Bae, Kyung-Tae Kim, and Sang-Hong Park . . . . .	127
<b>A Semi-Elliptical Wideband Directional Coupler</b>	
Yew-Chiong Lo, Boon-Kuan Chung, and Eng-Hock Lim . . . . .	139
<b>A Miniaturized Self-Matched Negative Group Delay Microwave Circuit</b>	
Te Shao, Zhongbao Wang, Shaojun Fang, Hongmei Liu, and Shiqiang Fu . . . . .	149

**Design of RF Sensor for Simultaneous Detection of Complex Permeability and Permittivity of Unknown Sample**

Pratik Porwal, Azeemuddin Syed, Prabhakar Bhimalapuram, and Tapan Kumar Sau . . . . . 159

**A MIMO Antenna Decoupling Network Composed of Inverters and Coupled Split Ring Resonators**

Luyu Zhao, Le Liu, and Yuan-Ming Cai . . . . . 175

**A Novel Reconfigurable UWB Filtering-Antenna with Dual Sharp Band Notches Using Double Split Ring Resonators**

Ammar Alhegazi, Zahriladha Zakaria, Noor Azwan Shairi, Imran Mohd Ibrahim and Sharif Ahmed . . . . . 185

**Development of an Improved Response Ultra-Wideband Antenna Based on Conductive Adhesive of Carbon Composite**

Erick Reyes-Vera, Mauricio Arias-Correa, Andrés Giraldo-Muñoz, Daniel Cataño-Ochoa and Juan Santa-Marín . . . . . 199

**Time Domain and Frequency Domain Deterministic Channel Modeling for Tunnel/Mining Environments**

Chenming Zhou, Ronald Jacksha, Lincan Yan, Miguel Reyes, and Peter Kovalchik . . . . . 209

**Design, Optimization and Initial Testing of a High-Speed 5-kW Permanent Magnet Generator for Aerospace Application**

Flur R. Ismagilov, Vyacheslav Ye. Vavilov, Aybulat H. Miniyarov, Aleksey M. Veselov and Valentina V. Ayguzina . . . . . 225

**Development of Graphene Based Tapered Slot Antennas for Ultra-Wideband Applications**

Reefat Inum, Md. M. Rana, and Kamrun N. Shushama . . . . . 241