

---

**ELECTROMAGNETIC WAVES**  
**PIERM 111**

---

**Progress**

**In**

**Electromagnetics**

**Research M**

© 2022 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**  
**PIERM 111**

---

**Progress**  
**In**  
**Electromagnetics**  
**Research M**

Chief Editors: Weng Cho Chew and Sailing He

EMW Publishing  
Cambridge, Massachusetts, USA



## CONTENTS

<b>Generalized Design Methodology of Highly Efficient Quad-Furcated Profiled Horns with Larger Apertures</b>	
Charalampos Stoumpos, Jean-Philippe Fraysse, George Goussetis, Ronan Sauleau, and Hervé Legay .....	1
<b>A Small Disk-Coupled Circularly Polarized Microstrip Ring Antenna for Microwave Energy Harvesting</b>	
Cheng Peng, Zhi-Hao Ye, Han Xiao, Jing Huang, Ning-Zhao Luo, and Dong Wu .....	13
<b>Comprehensive Analysis of a Novel Hybrid Excited permanent Magnet Vernier Motor</b>	
Kai Zhang, Li Quan, and Xu Zhong .....	27
<b>Design of a Novel Fractal Quad-Band-Notched UWB Antenna with Bionic Structure</b>	
Lei Zhang and Quanyuan Feng .....	41
<b>High-Isolation Wide-Beam Dual-Polarized Antenna Utilizing Symmetrical Feeding</b>	
Le Thi Cam Ha, Son Xuat Ta, Nguyen X. Quyen, Nguyen K. Kiem, and Dao-Ngoc Chien .....	53
<b>Decoupling Control on Outer Rotor Coreless Bearingless Permanent Magnet Synchronous Motor Using LS-SVM Generalized Inverse</b>	
Zichen Zhang and Huangqiu Zhu .....	65
<b>A Novel Radar Waveform Design for Suppressing Autocorrelation Side-Lobe Based on Chaotic and Single Fusion Encoding Method</b>	
Ji Li, Min Liu, Jianping Ou, and Wei Wang .....	77
<b>A Dual-Band Ultra-Wideband Conformal Antenna for WCE</b>	
Maohai Ran, Ming Ye, and Bo Yin .....	89
<b>A Three-Interval PWM Duty Cycle Adaptive Method for Torque Ripple Suppression of Switched Reluctance Motor</b>	
Chaozhi Huang, Yuliang Wu, Wensheng Cao, Zhaoxin Zhu, and Yongmin Geng .....	103
<b>Study on the Propagation Characteristics of Gold-Silver Hybrid Chain Nanostructures</b>	
Shenxiang Yang, Dan Zhang, Huiwen Chen, Shuo Wang, and Chun-Ping Chen .....	119
<b>Graphene-Based Material for Microstrip Bandpass Filter</b>	
Nur I. Z. Azman, Nur A. A. Zaini, You K. Yeow, Fahmiruddin Esa, Rodziah Nazlan, and Mohamad A. Jusoh .....	133
<b>Dipole Antenna with Horn Waveguide for Energy Harvesting in DTV Systems</b>	
Watcharaphon Naktong and Natchayathron Wattikornsirikul .....	145
<b>A Miniaturized <math>2 \times 2</math> Double Flare Horn Shaped MIMO Antenna with Enhanced Isolation for K and Ka Band Applications</b>	
Aditya Kumar Singh, Amrees Pandey, Piyush Kumar Mishra, and Ram Suchit Yadav .....	159

---

<b>Refractive Index Sensing Performances of a Mid-Infrared Asymmetric MZI Based on Suspended GaAs Waveguides</b>	
Fang Wang, Shoudao Ma, Tao Ma, Xu Wang, Kun Yu, and Lei Li . . . . .	173
<b>Pattern Reconfigurable End-Fire Antenna Array with High Directivity</b>	
Sruthi Dinesh, Chaluvayalil Vinisha, Deepti D. Krishna, Jean M. Laheurte, and Chandroth K. Aanandan . . . . .	185
<b>A Novel Low Profile Circularly Polarized GNSS Antenna with Wide 3 dB Axial Ratio Beamwidth</b>	
Jingchun Zhai, Gengliang Chen, Wen Wang, Yiqing Liu, Luzhen Wang, and Zhuopeng Wang . . .	199
<b>Switchable Active Metasurface for Dual Band Gain Enhancement</b>	
Arun Shaji and Anju Pradeep . . . . .	209
<b>Maximum Torque Output Strategy of a Bearingless Induction Motor in the Field-Weakening Region</b>	
Wenxin Fang, Zebin Yang, Xiaodong Sun, and Guangxin Wang . . . . .	221
<b>Design of a Microstrip Sensor Based on a CSRR-Derived Structure for Measuring the Permittivity and Permeability of Materials</b>	
Yun-Rui Wang and Hong-Gang Hao . . . . .	235
<b>Characterization of an Intra-Body Wireless Link in the UHF Band</b>	
Fatiha Mghar, Antoine Diet, Chadi Gannouni, Lionel Pichon, Olivier Meyer, and Stavros Koulouridis . . . . .	247