

# PIERS 2016 Shanghai

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Progress In Electromagnetics Research Symposium

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## Program

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August 8 - 11, 2016

Shanghai, CHINA

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- 09:20 Frequency Selective Surface in Millimeter-wave Automotive Radar Radome Applications  
*Huan Lei Chen (Tongji University); Li Bo Huang (Tongji University); Mei Song Tong (Tongji University);*
- 09:40 A Nystrom Scheme Based on Cuboid Elements for Solving Volume Integral Equations  
*Zhi Guo Zhou (Tongji University); Mei Song Tong (Tongji University);*
- 10:00 **Coffee Break**
- 10:20 Transient Analysis for Electromagnetic Scattering by Dielectric Objects Based on PMCHWT Equations  
*Peng Cheng Wang (Tongji University); Mei Song Tong (Tongji University);*
- 10:40 A Microwave Imaging Chamber Using Bowtie Antennas for Biomedical Applications  
*Muhammad Hassan Khalil (Tsinghua University); Maokun Li (Tsinghua University); Fan Yang (Tsinghua University); Shenheng Xu (Tsinghua University);*
- 11:00 Numerical Modeling of the Interaction of Laser Beams with Plasma at the Entrance Hole of ICF Hohlraum  
*Zhili Lin (Huaqiao University); Jixiong Pu (Huaqiao University);*
- 11:20 Hybrid  $T$ -matrix Modeling of Electromagnetic Scattering from Simplified Leaf Structures  
*Paul Jason Co (Tokyo Institute of Technology); Jun-Ichi Takada (Tokyo Institute of Technology);*
- 11:40 Statistical Moments of Scattered Ordinary and Extraordinary Waves in the Turbulent Plasma  
*George Vakhtang Jandieri (Georgian Technical University); Zh. M. Diasamidze (Batumi Shota Rustaveli State University); M. R. Diasamidze (Batumi State Maritime Academy); Ioseb Aleksandr Nemsadze (Batumi Shota Rustaveli State University);*
- 08:00 A Dual-band Balanced Amplifier with CRLH Transmission Lines Fully Implemented  
*Jongsik Lim (Soonchunhyang University); Qi Wang (Chonbuk National University); Yongchae Jeong (Chonbuk National University);*
- 08:20 Radial Uniform Circular Antenna Array for Dual-mode OAM Communication  
*Zhi-Gui Guo (Fudan University); Guo-Min Yang (Fudan University); Yu Fu (Fudan University);*
- 08:40 RF/Microwave Processing in RF Systems  
*Sang-Min Han (Soonchunhyang University); Seok Jae Lee (Soonchunhyang University); Won-Sang Yoon (Hoseo University);*
- 09:00 A Design of Phase Shifter with Constant Insertion Loss  
*Seungho Jeong (Chonbuk National University); Boram An (Chonbuk National University); Phirun Kim (Chonbuk National University); Yongchae Jeong (Chonbuk National University); Jongsik Lim (Soonchunhyang University);*
- 09:20 Low Noise Figure CMOS 2-Port Active Inductor Using LC Resonator  
*Jageon Koo (Chonbuk National University); Seungwook Lee (Chonbuk National University); Junhyung Jeong (Chonbuk National University); Giridhari Chaudhary (Chonbuk National University); Yongchae Jeong (Chonbuk National University);*
- 09:40 A Novel Dual-band Filtering Power Divider with U-section Loaded Resonator  
*Min-Hong Yang (Zhejiang University); Yun Long Lu (Ningbo University); Kai Li (Zhejiang University);*
- 10:00 **Coffee Break**
- 10:20 The Compact Waveguide Filters with Complex Aperture Resonant Diaphragms  
*Viacheslav V. Zemlyakov (Southern Federal University); Sergey V. Krutiev (Southern Federal University); Anatoliy B. Kleshchenkov (Southern Federal University);*
- 10:40 RF Characteristics of SU-8 and Quartz Particle Composite Dielectric for Terahertz Applications  
*Jung-Mu Kim (Chonbuk National University); Ignacio Llamas-Garro (Centre Tecnologic de Telecomunicacions de Catalunya (CTTC)); Moises Espinosa-Espinosa (Centre Tecnologic de Telecomunicacions de Catalunya); Maolong Ke (Dynex Semiconductor Ltd); Michael J. Lancaster (The University of Birmingham); Marcos T. de Melo (Universidade Federal de Pernambuco);*

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**Session 3A8**
**Advanced Antenna and RF Circuits Design 1**


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 Wednesday AM, August 10, 2016

Room 3B

Organized by Malay Ranjan Tripathy, Yongchae Jeong

 Chaired by Jongsik Lim, Malay Ranjan Tripathy
 

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## Session 4P8

## Advanced Antenna and RF Circuits Design 2

Thursday PM, August 11, 2016

Room 3B

Organized by Malay Ranjan Tripathy, Yongchae Jeong

Chaired by Malay Ranjan Tripathy, Yongchae Jeong

- 13:00 Design of Lange-Ferrite Circulator for X-band Radar  
Desy Yusianor (Universitas Indonesia); Fitri Yuli Zulkifli (University of Indonesia); Eko Tjipto Rahardjo (Universitas Indonesia);
- 13:20 Dual Band Frequency Selective Surface for X-band Applications  
Sarika (Amity University Uttar Pradesh); Malay Ranjan Tripathy (Amity University Uttar Pradesh); Daniel Ronnow (University of Gavle);
- 13:40 Gap Coupled Half Circular Disk Patch Antenna Using D.G.S for Dual-wideband Application  
Nagendra Prasad Yadav (Nanjing University of Science and Technology); Xuefeng Liu (Nanjing University of Science and Technology); Malay Ranjan Tripathy (Amity University Uttar Pradesh);
- 14:00 Design of a High Gain and Low Noise CMOS Folded Mixer for 5 GHz with Low Power Consumption  
Yi Li (Hunan University); Chunhua Wang (Hunan University);
- 14:20 Novel Single Layer Proximity Fed Microstrip Patch Array with Gap Coupled Resonators  
Jacob Abraham (Mahatma Gandhi University Regional Center); Thomaskutty Mathew (Mahatma Gandhi University Regional Center);
- 14:40 Ultra Wideband Signal Detection with a Schottky Diode Based Envelope Detector  
Simon Rommel (Technical University of Denmark); Bruno Cimoli (Technical University of Denmark); G. Silva Valdecasa (Technical University of Denmark); Jesper Bevensee Jensen (Technical University of Denmark); Tom Keinicke Johansen (Technical University of Denmark); Juan Jose Vegas Olmos (Technical University of Denmark); Idelfonso Tafur Monroy (Technical University of Denmark);
- 15:00 Reduction of Mutual Coupling between Closely Spaced Microstrip Antennas with H-shaped Isolation Wall  
Chan-Hee Park (Chonbuk National University); Eun-Suk Yang (Chonbuk National University); Hae-Won Son (Chonbuk National University);
- 15:20 Coffee Break
- 15:40 Novel UWB Slotted I-shaped Flexible Microstrip Patch Antenna Design for Satellite Reconnaissance, Amateur Radio, Future Soil Moisture and Sea Surface Salinity Missions  
Nitika (Punjabi University); Maninder Singh (Punjabi University); Aman Nag (Punjabi University); Ameet Kaur (Punjabi University); Aastha (Punjabi University); Simarjit Singh Saini (Punjabi University); Ekambir Sidhu (Punjabi University);
- 16:00 A Broadband Reflectarray Antenna Based on Perforated Dielectric Laminates  
Yingran He (Zhejiang University); Zhiming Gao (The 54th Research Institute of China Electronic Technology Corporation); Biao Du (The 54th Research Institute of China Electronic Technology Corporation);
- 16:20 Applying X-parameter to the Design and Comparison of 24-GHz Fundamental and Subharmonic Quadrature Passive Mixers  
Lai He (Fudan University); Wei Li (Fudan University);
- 16:40 Novel Stacked Patch Array Antenna with Embedded Defective Ground Structure for Wireless Applications  
S. Sreenath Kashyap (Marwadi Education Foundation); Ved Vyas Dwivedi (Gujarat Technological University); Y. P. Kosta (Marwadi Education Foundation);
- 17:00 A Dual Polarization Reconfigurable Patch Antenna for Frequency Diversity  
Xing Yun Zhang (Beijing Institute of Technology); Wu Ren (Beijing Institute of Technology); Wei-Ming Li (Beijing Institute of Technology); Zheng-Hui Xue (Beijing Institute of Technology);
- 17:20 A Dual Frequency Reconfigurable Patch Antenna for Polarization Diversity  
Xing Yun Zhang (Beijing Institute of Technology); Wu Ren (Beijing Institute of Technology); Wei-Ming Li (Beijing Institute of Technology); Zheng Hui Xue (Beijing Institute of Technology);
- 17:40 A Mathematical Model for Energy Efficient SDN/NFV Using Autonomic Network Intelligence  
Huned Materwala (Amity University); Varsha Jain (IIT Mandi); Priya Ranjan (Amity University Uttar Pradesh);
- 18:00 Elliptic Function Based Band Pass mm Wave Filter for Wireless Communication  
Manish Sharma (Amity University Uttar Pradesh); Malay Ranjan Tripathy (Amity University Uttar Pradesh); Priya Ranjan (Amity University Uttar Pradesh); Yongchae Jeong (Chonbuk National University);

# Elliptic Function Based Band Pass mm Wave Filter for Wireless Communication

Manish Sharma<sup>1</sup>, Malay Ranjan Tripathy<sup>1</sup>, Priya Ranjan<sup>1</sup>, and Yongchae Jeong<sup>2</sup>

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**Abstract**— A simple and novel millimeter-wave filtering structure is proposed with multiple transmission zeros. The structure is constructed by cascaded resonators. The proposed filter can generate multiple transmission zeros with the control of  $Q$  factors for multiple resonators, without using any couplings between adjacent/non-adjacent resonators.

The structure can be modified to tunable millimeter wave filter by using piezo electric transducer (PET) with dielectric base. The dielectric base can move and vary the effective dielectric constant of the filter, allowing higher or lower mode frequencies in the pass band by using PET. The tuning range of the filter can be achieved in the range of 5–10%.

A sharp roll off characteristic is achieved by transmission zeros within the pass band range, confirmed by simulation of the equivalent network and modeling of the structure. The resonant frequencies and the  $Q$  factors required for resonators are also synthesized. Filters are realized in multi-frequency platform, assessment of filters is done by gain compression point, thermal management, quality factor, low insertion losses (less than 3 dB) and impedance matching (50- $\Omega$ ).

## REFERENCES

1. Hong, J. S. and M. J. Lancaster, “Theory and experiment of novel microstrip slow-wave open-loop resonator filters,” *IEEE Transactions on Microwave Theory and Techniques*, Vol. 45, No. 12, 2358–65, Dec. 1997.
2. Ye, X. F., H. Y. Ke, and S. Y. Zheng, “A millimeter-wave bandpass filter and balun filter based on circular sector patch,” *2015 International Workshop on Electromagnetics: Applications and Student Innovation Competition (iWEM)*, 1–2, IEEE, Nov. 16, 2015.
3. Lan, F., Z. Yang, Z. Shi, and X. Tang, “Enhanced performance of THz bandpass filter based on bilayer reformative complementary structures,” *2015 40th International Conference on Infrared, Millimeter, and Terahertz Waves (IRMMW-THz)*, 1–2, IEEE, Aug. 23, 2015.
4. Zhang, S., L. Zhu, and R. Weerasekera, “Synthesis of inline mixed coupled quasi-elliptic bandpass filters based on resonators,” *IEEE Transactions on Microwave Theory and Techniques*, Vol. 63, No. 10, 3487–93, Oct. 2015.
5. Chu, H., S. Luo, L. Bian, and Y. X. Guo, “An SIW filtering antenna array with quasi-elliptic gain response based on intercavity bypass coupling,” *International Journal of RF and Microwave Computer — Aided Engineering*, Nov. 1, 2015.