

470

# IEEE TRANSACTIONS ON MICROWAVE THEORY AND TECHNIQUES

A PUBLICATION OF THE IEEE MICROWAVE THEORY AND TECHNIQUES SOCIETY



MAY 2013

VOLUME 61

NUMBER 5

IETMAB

(ISSN 0018-9480)

PART II OF TWO PARTS

SPECIAL ISSUE ON BIOMEDICAL APPLICATIONS OF RF/MICROWAVE TECHNOLOGIES

---

Guest Editorial ..... *M.-R. Tofighi and J.-C. Chiao* 1977

---

PAPERS

**Bioelectromagnetic and Bioeffects**

Microwave Exposure Systems for <i>In Vivo</i> Biological Experiments: A Systematic Review .....	1980
..... <i>A. Paffi, C. Merla, R. Pinto, G. A. Lovisolo, M. Liberti, C. Marino, M. Repacholi, and F. Apollonio</i>	
A Waveguide Applicator for <i>In Vitro</i> Exposures to Single or Multiple ICT Frequencies .....	1994
..... <i>S. Romeo, C. D'Avino, D. Pinchera, O. Zeni, M. R. Scarfi, and R. Massa</i>	
Enhancing Exposure Efficiency and Uniformity Using a Choke Ring Antenna: Application to Bioelectromagnetic Studies at 60 GHz .....	2005
..... <i>A. V. Boriskin, M. Zhadobov, S. Steshenko, Y. Le Dréan, L. Le Coq, C. Person, and R. Sauleau</i>	
Experimental Microdosimetry Techniques for Biological Cells Exposed to Nanosecond Pulsed Electric Fields Using Microfluorimetry .....	2015
..... <i>S. Kohler, R. P. O'Connor, T. D. T. Vu, P. Leveque, and D. Arnaud-Cormos</i>	
Recent Advances in Microwave-Based Dielectric Spectroscopy at the Cellular Level for Cancer Investigations ( <i>Invited Paper</i> ) .....	2023
..... <i>K. Grenier, D. Dubuc, T. Chen, F. Artis, T. Chretiennot, M. Poupot, and J.-J. Fournié</i>	
Feasibility for Microwaves Energy to Affect Biological Systems Via Nonthermal Mechanisms: A Systematic Approach .. .....	2031
..... <i>F. Apollonio, M. Liberti, A. Paffi, C. Merla, P. Marracino, A. Denzi, C. Marino, and G. d'Inzeo</i>	

**Radar-Based Systems for Vital Sign Monitoring**

A Review on Recent Advances in Doppler Radar Sensors for Noncontact Healthcare Monitoring ( <i>Invited Paper</i> ) .....	2046
..... <i>C. Li, V. M. Lubecke, O. Boric-Lubecke, and J. Lin</i>	
Analysis of an Indoor Biomedical Radar-Based System for Health Monitoring .....	2061
..... <i>M. Mercuri, P. J. Soh, G. Pandey, P. Karsmakers, G. A. E. Vandenbosch, P. Leroux, and D. Schreurs</i>	
Circularly Polarized Ultra-Wideband Radar System for Vital Signs Monitoring .....	2069
..... <i>K. K.-M. Chan, A. E.-C. Tan, and K. Rambabu</i>	

(Contents Continued on Back Cover)

---

IR-UWB Radar Demonstrator for Ultra-Fine Movement Detection and Vital-Sign Monitoring .....	2076
..... <i>B. Schleicher, I. Nasr, A. Trasser, and H. Schumacher</i>	
A Novel Method for Respiration-Like Clutter Cancellation in Life Detection by Dual-Frequency IR-UWB Radar .....	2086
..... <i>Z. Li, W. Li, H. Lv, Y. Zhang, X. Jing, and J. Wang</i>	
Six-Port Radar Sensor for Remote Respiration Rate and Heartbeat Vital-Sign Monitoring .....	2093
..... <i>G. Vinci, S. Lindner, F. Barbon, S. Mann, M. Hofmann, A. Duda, R. Weigel, and A. Koelpin</i>	
<b>Microwave Imaging</b>	
1-D Microwave Imaging of Human Cardiac Motion: An <i>Ab-Initio</i> Investigation .....	2101
..... <i>J. Wang, X. Wang, Z. Zhu, J. Huangfu, C. Li, and L. Ran</i>	
An Integrated Microwave Imaging Radar With Planar Antennas for Breast Cancer Detection .....	2108
..... <i>M. Bassi, M. Caruso, M. S. Khan, A. Bevilacqua, A.-D. Capobianco, and A. Neviani</i>	
Microwave Breast Imaging With a Monostatic Radar-Based System: A Study of Application to Patients .....	2119
..... <i>E. C. Fear, J. Bourqui, C. Curtis, D. Mew, B. Docktor, and C. Romano</i>	
Tomographic Microwave Imaging With Incorporated Prior Spatial Information .....	2129
..... <i>A. H. Golnabi, P. M. Meaney, and K. D. Paulsen</i>	
Defining Regions of Interest for Microwave Imaging Using Near-Field Reflection Data .....	2137
..... <i>D. Kurrant and E. Fear</i>	
<b>EM Interaction with Human Body</b>	
Fetus MRI at 7 T: $B_1$ Shimming Strategy and SAR Safety Implications .....	2146
..... <i>S. X. Xin, Q. Huang, Y. Gao, B. Li, Y. Xu, and W. Chen</i>	
Calculation Errors of the Electric Field Induced in a Human Body Under Quasi-Static Approximation Conditions .....	2153
..... <i>S. W. Park, K. Wake, and S. Watanabe</i>	
SAR, SA, and Temperature Variation in the Human Head Caused by IR-UWB Implants Operating at 4 GHz .....	2161
..... <i>K. M. S. Thothahewa, J.-M. Redouté, and M. R. Yuce</i>	
Analysis of Electromagnetic Fields Induced in Operation of a Wireless Fully Passive Backscattering Neurorecording Microsystem in Emulated Human Head Tissue .....	2170
..... <i>H. N. Schwerdt, F. A. Miranda, and J. Chae</i>	
<b>Integrated Microwave Systems</b>	
5.2-GHz RF Power Harvester in 0.18- $\mu\text{m}$ CMOS for Implantable Intraocular Pressure Monitoring .....	2177
..... <i>M. H. Ouda, M. Arsalan, L. Marnat, A. Shamim, and K. N. Salama</i>	
A 125-GHz Permittivity Sensor With Read-Out Circuit in a 250-nm SiGe BiCMOS Technology .....	2185
..... <i>B. Laemmlé, K. Schmalz, J. C. Scheytt, R. Weigel, and D. Kissinger</i>	
Microwave-Based Noninvasive Concentration Measurements for Biomedical Applications .....	2195
..... <i>M. Hofmann, G. Fischer, R. Weigel, and D. Kissinger</i>	
A Miniaturized Broadband Multi-State Reflectometer Integrated on a Silicon MEMS Probe for Complex Permittivity Measurement of Biological Material .....	2205
..... <i>K. Kim, N. Kim, S.-H. Hwang, Y.-K. Kim, and Y. Kwon</i>	
Phase Noise and Fundamental Sensitivity of Oscillator-Based Reactance Sensors .....	2215
..... <i>H. Wang, C.-C. Weng, and A. Hajimiri</i>	
<b>Biomedical Antennas</b>	
The Design and Development of an Integrated Multi-Functional Microwave Antenna Structure for Biological Applications .....	2230
..... <i>C. P. Hancock, N. Dharmasiri, M. White, and A. M. Goodman</i>	
New Microwave Antenna Structures for Treating Gastro-Oesophageal Reflux Disease (GERD) .....	2242
..... <i>C. Hancock, N. Dharmasiri, C. I. Duff, and M. White</i>	
A Smart Wearable Textile Array System for Biomedical Telemetry Applications .....	2253
..... <i>P. J. Soh, B. Van den Bergh, H. Xu, H. Aliakbarian, S. Farsi, P. Samal, G. A. E. Vandenbosch, D. M. M.-P. Schreurs, and B. K. J. C. Nauwelaers</i>	
Information for Authors .....	2262
<hr/> <b>CALLS FOR PAPERS</b>	
Special Issue on Wireless Power Transfer .....	2263

---