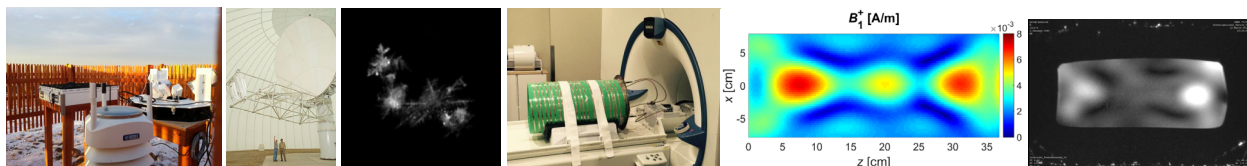


Predavanje, Elektrotehnički Fakultet u Beogradu, Beograd
Četvrtak, 8. oktobar 2015., 16h, sala 61

Branislav M. Notaroš, Professor and Director of Electromagnetics Laboratory
Dept. of Electrical & Computer Engineering, Colorado State University, Fort Collins, Colorado, USA
E-mail: notaros@colostate.edu, Web: www.engr.colostate.edu/~notaros

Computational Electromagnetics and Its Applications in Meteorology and Biomedical Engineering

Abstract: The importance of computational electromagnetics (CEM) to antenna, microwave, radar, and wireless technologies can hardly be overstated. There is a continuing and growing demand for CEM tools that can handle full-wave simulations of larger and more complex electromagnetic problems. This seminar presents our recent developments in higher order CEM, conformal modeling, hybrid methods, fast direct solvers, parallelization, and high performance computing. It also presents a new approach to remote sensing, characterization, and radar-based classification of atmospheric precipitation through a synergistic use of advanced optical imaging disdrometers performing microphysical and geometrical measurements of snow, ice, and rain particles, image processing techniques to reconstruct realistic particle shapes (e.g., snowflakes), CEM to calculate “particle-by-particle” scattering matrices and radar observables, and state-of-the-art polarimetric radars. It presents and discusses results from several interesting events observed during the 2014/2015 winter and summer campaigns at our field instrumentation site in Colorado. The seminar also presents a new method for excitation of RF fields in next-generation high- and ultra-high-field magnetic resonance imaging (MRI) scanners using subject-loaded multichannel helical antennas as RF coils. It discusses design and analysis of the new RF coils when situated in 3-T (Tesla), 7-T, and 10.5-T MRI bores and loaded with different phantoms using CEM. Results from imaging experiments with our helical-antenna RF coils in state-of-the-art human-size MRI scanners at 7 T and 10.5 T are also presented. Several other applications of CEM in radar, meteorology, and biomedical engineering are addressed as well. In all cases, some basics are provided for ease of following for students, for example, of radar meteorology and MRI.



Branislav M. Notaroš is Professor in the Department of Electrical and Computer Engineering at Colorado State University, where he also is Director of Electromagnetics Laboratory. He received a Ph.D. in Electrical Engineering from the University of Belgrade, Yugoslavia, in 1995, where he served as Assistant (TA/RA) and Assistant Professor from 1989 to 1999. He also was Assistant and Associate Professor at the University of Massachusetts Dartmouth from 1999 to 2006. His research publications in computational and applied electromagnetics include more than 150 journal and conference papers. He is the author of textbooks “Electromagnetics” (2010) and “MATLAB-Based Electromagnetics” (2013), both

with Pearson Prentice Hall. Prof. Notaroš served as General Chair of FEM2012, Colorado, USA, and as Guest Editor of the Special Issue on Finite Elements for Microwave Engineering, in Electromagnetics, 2014. He was the recipient of the 1999 IEE Marconi Premium, 2005 IEEE Microwave Prize, 2005 UMass Dartmouth Scholar of the Year Award, 2012 Colorado State University System Board of Governors Excellence in Undergraduate Teaching Award, 2012 IEEE Region 5 Outstanding Engineering Educator Award, 2014 Carnegie Foundation for the Advancement of Teaching Colorado Professor of the Year Award, 2015 American Society for Engineering Education ECE Distinguished Educator Award, 2015 IEEE Undergraduate Teaching Award, and many other research and teaching awards.