



**Vljudno vabljeni na predavanje:**

***NDE for carbon fiber reinforced plastics - CFRP***

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The lecture deals with methods for nondestructive analysis of carbon fiber reinforced plastics (CFRP), of which applications has been extended in the last years from aerospace industry to sports goods. In these conditions, the safety in exploitation of these materials is required. The principals factors that recommend the use of CFRP are low density (lower than those of AlMg alloys, currently used in aeronautics), high elastic modulus along the carbon fibers direction, high ultimate strength along the same direction, have not fatigue phenomena and the expansion coefficient is small. The disadvantages of these materials are low strength at impact even at low energies ( $1\div 10$ J) that can lead to delaminations with and without fiber breaking, matrix deterioration due to chemical action of adsorbed water, the impossibility to use CFRP at temperature exceeding glass transition temperature. In present, C-scan or top view ultrasound, Lamb waves using non-contact transducers, with Hertzian contact or compression waves generated by normal transducers or phased array are used for NDE of CFRP. The electromagnetic methods for detection and evaluation of CFRP's degradations are based on using focused electromagnetic transducers and eddy current holography developed on dyadic Green's functions and integral volume methods. Also, active thermography is used for characterization of CFRP, detecting delaminations and desbonding.

In conclusion these NDE methods and the results presented have the advantage of quickness and the possibility to examine complex structures of big dimensions.

**O predavatelju:**

Prof. Dr. Raimond Grimberg is Senior Scientist, Head of Nondestructive Testing Department at National Institute of Research and Development for Technical physics, Iasi, Romania. His teaching assignments are toward of master's studies to NDT domain at Faculty of Mechanical Engineering, Technical University, Iasi, Romania and Faculty of Physics, Al.I.Cuza University, Iasi, Romania, as well as personnel instruction in Nondestructive Testing in Romania. He is associated professor at Ecole Normale Supérieure de Cachan, France and Visiting Professor at College of Engineering, Michigan State University, USA. He is chief investigator of several national as well as international research projects. His principal directions of research are development of new procedures for nondestructive evaluation of new and advanced materials; electromagnetic procedures using focused transducers, microsensors array, ultrasound procedures using transducers without contact and with hertzian contact, electromagnetic and magnetic procedures for materials characterization and evaluation of fatigue state of materials and complex structures, development of models for interaction between electromagnetic field and discontinuities and elastic waves-discontinuities, development of new methods for signal and image processing and post processing for automatic evaluation of state of the materials, development of procedures for estimating the probability of detection, design of electromagnetic optimal sensors. He is the author of numerous papers published in professional journals, reviewer of thematic scientific publications and co-author of the books: Remnant Stresses and Nondestructive Testing of Metals – Laboratory works.

**Vljudno vabljeni!**



  
Prof. dr. Jozef Duhovnik