

SEMINARIUM Z MAGNETYZMU I NADPRZEWODNICTWA

Uprzejmie zawiadamiamy, że w środę

26 marca 2014 r., o godz. 9:30

w sali 203 (bud. 1) odbędzie się seminarium, na którym

Prof. Vitalii Zablotskii

Institute of Physics AS CR, Prague, Czech Republic

wyłosi referat na temat:

Control of living cell machinery by high gradient magnetic fields

To manipulate mesenchymal stem cells free of magnetic nanoparticles by a high-gradient magnetic field, we used high quality micro-patterned NdFeB films around which the stray field's value and direction drastically change across the cell body. Interactions between a micro-magnet array producing high-gradient magnetic fields and living cells may guide the establishment of cell networks due to the cellular response to a magnetic field. Such micro-magnet arrays affect the stem cells in two main ways: i) causing cell migration and adherence to a covered magnetic surface and ii) elongating the cells in the directions parallel to the edges of the micro-magnet. Manipulating the fate and spatial organization of stem cells and the creation of an interconnected cell network with externally applied magnetic fields opens exciting perspectives for tissue engineering and regenerative medicine. The influence of spatially modulated high gradient magnetic fields on cellular functions of human THP-1 leukemia cells is also studied. We demonstrate that micro-magnet arrays induce: i) cell swelling, ii) prolonged increased ROS production, iii) inhibit cell, proliferation, and iv) elicit apoptosis of THP-1 monocytic leukemia cells in the absence of chemical or biological agents. We discuss physical aspects of controlling cell functions by focused magnetic gradient forces and their implications in understanding a wide range of cell physiological processes.

Serdecznie zapraszamy

Roman Puźniak
Henryk Szymczak
Andrzej Wiśniewski