

Seminar „Between physics, biology and medicine”

Organized by Department of Medical Physics
and Department of Experimental Particle Physics and Applications, Institute of Physics JU

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„Molecular Magnetic Resonance Imaging of Cancer using Core/Shell Nanoparticles”

Abstract

Magnetic Resonance Imaging (MRI) has been used for early cancer detection, treatment monitoring and image guided surgery. MRI has excellent spatial resolution and soft tissue contrast but low specificity. Standard contrast enhanced MRI based on tumors vasculature, including Gd-based T_1 contrast agents, does not provide sufficiently high specificity for tumor diagnosis and thus contrast agents providing T_2 contrast have been applied to provide information on tumor specificity. To improve the tumor contrast we have developed core/shell $\text{NaDyF}_4/\text{NaGdF}_4$ nanoparticles changing both T_1 and T_2 relaxation times of surrounding water molecules and conjugated them with tumor specific antibodies. The relaxation times (T_1 and T_2) of the nanoparticles with various core/shell sizes and concentrations were measured at 9.4T and 3T to find the optimum T_1/T_2 ratio for MRI. T_1 - and T_2 -weighted images using core/shell nanoparticles of the animal models of brain, breast and prostate cancer were collected and combined to provide enhanced contrast and edges.

when: 4th February 2020, 4:15 p.m.

where: A 1-08 (Aula), FAIS, Łojasiewicza 11