MEDICAL PHYSICS

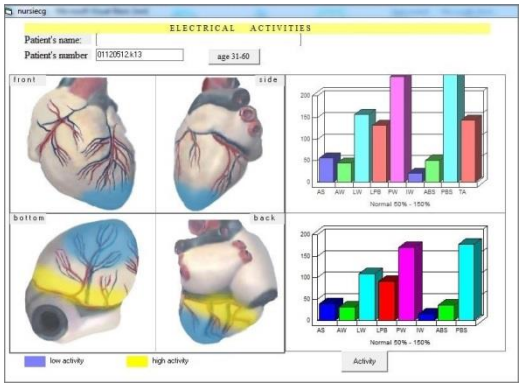
Faculty of Physics

Medical physics deals with the development of physical methods used in medical therapy and diagnostics. In addition to radiotherapy, it also includes diagnostic methods such as electrocardiography, pulse oximetry, electroencephalography and various types of tomography that illustrate the interior of the body.

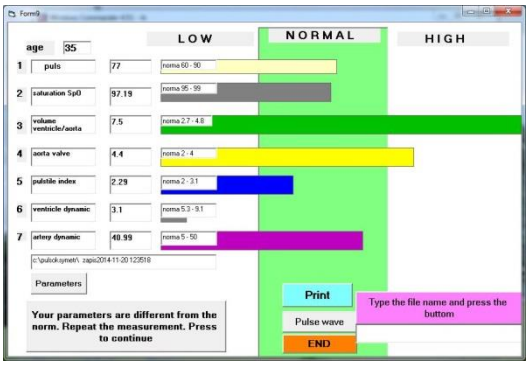
ELECTROPHYSIOLOGY

In Medical Physics Division modern methods of analysis of standard ECG record – NURSE-ECG (Numerical Resolution Electrocardiography) and pulse wave – HSR-PW (High Signal Resolution Pulse Wave) method have been developed. The NURSE-ECG in a graphical form shows the electrical activity of the myocardial fragments. In turn, the HSR-PW method allows you to examine the condition of the cardiovascular system on the way that the blood passes from the left ventricle to the point of measurement (usually the finger on which the pulse oximeter is inserted). They can detect small changes in the heart and circulatory system that are not detectable by standard examinations.

PULSE OXIMETER

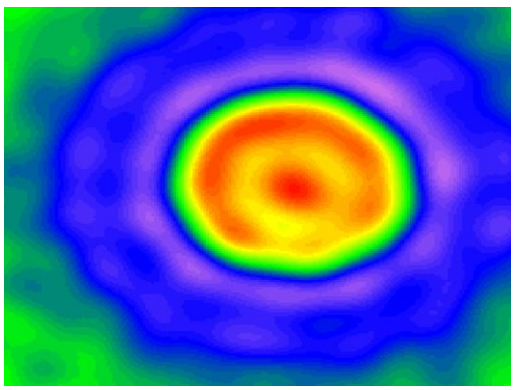


EXEMPLARY RESULT OF NURSE-ECG EXAMINATION



EXEMPLARY RESULT OF HSR-PW EXAMINATION

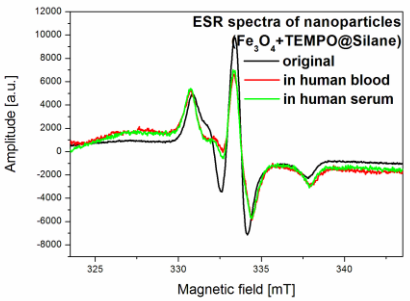
Nanotechnology is becoming increasingly popular in many areas of life, including medicine. One of the potential applications of nanomaterials over which we work is the transport of drugs in targeted therapies. This applies to both chemotherapy and nanoparticles functionalized with anticancer drug and radiotherapy with properly functionalized nanoparticles as radiosensitizers.

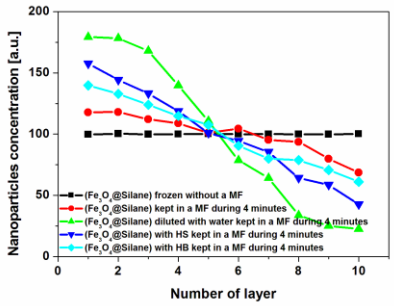


ESR IMAGING OF MAGNETITE NANOPARTICLES DIFFUSION

NANOTECHNOLOGY IN MEDICINE

In Medical Physics Division we mainly investigate the physical properties of functionalized magnetic and polymer (micelles) nanoparticles. We also study paramagnetic species and free radicals in biologically active materials. In this study we use Electron Spin Resonance (ESR).





NANOPARTICLES DIFFUSION FORCED BY A MAGNETIC FIELD – ESR STUDY

MEDICAL PHYSICS DIVISION: http://www.staff.amu.edu.pl/~zfmed/