

“Magnetic Relaxation Switching”- the Physical Method of Diagnostic of a Malignant Tumor

Archil Ugulava, Giorgi Mchedlishvili, Oleg Kharshiladze

E-mail: archil.ugulava@tsu.ge

Department of Physics, Faculty of Exact and Natural Sciences
Ivane Javakhishvili Tbilisi State University
3, I. Chavchavadze Ave., Tbilisi, 0179, Georgia

The presence of magnetic nanoparticles in the area of a malignant tumor significantly reduces the spin-spin transverse relaxation time of water protons in the body. The phenomenon of reducing the relaxation time of the transverse component of magnetization when introducing magnetic nanoparticles into the body called "magnetic relaxation switching" (MRSw), makes it possible to detect the presence of a malignant tumor in the human body. In this work, we obtained the criteria that the parameters of magnetic nanoparticles (diameter, concentration, and magnetic moment) must meet so that the change in the relaxation time would be noticeable during switching.