

Abstract Submitted
for the MAR15 Meeting of
The American Physical Society

Biological Cell Manipulation by Magnetic Nanoparticles

ALEXANDER KHITUN, FREDERICK GERTZ, University of California Riverside — We report experimental data on biological cells (erythrocytes) manipulation by magnetite (Fe_3O_4) nanoparticles. The experiments were accomplished on the top of the device consisting of two conducting contours. An electric current flowing through the contours generates a non-uniform magnetic field making magnetic nanoparticles to move towards the magnetic energy minima. In turn, magnetic nanoparticles drag biological cells in the same direction. We present experimental data showing cell manipulation by controlling the electric current. This technique allows us to capture and move cells located in the vicinity (5-10 microns) of the current-carrying wires. One of the most interesting results shows a periodic motion of erythrocytes, which frequency is controlled by the electric circuit. The obtained results demonstrate the feasibility of non-destructive cell manipulation by magnetic nanoparticles with micrometer-scale precision.

Alexander Khitun
University of California Riverside

Date submitted: 12 Nov 2014

Electronic form version 1.4