Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Measurement of Nanoparticle Magnetic Hyperthermia Using Fluorescent Microthermal Imaging XIAOWAN ZHENG, EDWARD VAN KEUREN, Georgetown Univ — Nanoparticle magnetic hyperthermia uses the application of an AC magnetic field to ferromagnetic nanoparticles to elevate the temperature of cancer cells. The principle of hyperthermia as a true cell-specific therapy is that tumor cells are more sensitive to high temperature, so it is of great importance to control the locality and magnitude of the temperature differences. One technique to measure temperature variations on microscopic length scales is fluorescent microthermal imaging (FMI). Since it is the local temperature that is measured in FMI, effects such as heating due to nearby field coils can be accounted for. A dye, the rare earth chelate europium thenoyltrifluoroacetonate (Eu:TTA), with a strong temperature-dependent fluorescence emission has been incorporated into magnetic nanoparticles dispersed in a polymer films. FMI experiments were carried out on these samples under an applied high frequency magnetic field. Preliminary results show that FMI is a promising technique for characterizing the local generation of heat in nanoparticle magnetic hyperthermia.

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Date submitted: 04 Nov 2015 Electronic form version 1.4