Abstract Submitted
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Detection of Target Biomolecules by Magnetic Reporting Using Rod-Like Nanosensors R.P. GUERTIN, E. GOLDBERG, T.P. HARRAH, S. SONKUSALE, K. PARK, Tufts University, S. SUN, Brown University, J. I. OH, M. NAUGHTON, Boston College — We describe the ongoing development of a device to assay a variety of cellular, viral and molecular targets by measuring the increase of the Brownian relaxation time, τ, in solution of magnetically-tagged nanoscale detectors. The shift shows as a frequency reduction of the peak of the complex magnetic susceptibility, $\chi(\omega)$". Measurements of $\chi(\omega)$" with 12 nm monodisperse nanoparticles of $CoFe_2O_4$ coated with polyethelyne glycol reveal spectra with the narrowest lines yet reported. Thin avidin coating of these particles reveals small shifts in $\chi(\omega)$". Bacteriophage T4 tail fibers, engineered to specific lengths (30-150 nm), were employed as the platform for magnetic nanoparticle attachment and at the other end for an inserted target peptide epitope. Attachment of the nanoparticles to bacteriophage T4 tail fibers was successful, though no detectable shifts in $\chi(\omega)$" were detected due to weak attachment. The advantages associated with non-spherical geometry detectors will be discussed, as will preliminary measurements with rare earth oxide magnetic nanoparticles. Progress on miniaturization and low power requirements of the electronic detection system will be reported. Supported by NERCE/BEID (NIAID).

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