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Fabrication of Magnetic Particles to Directly Measure Torque and Force on Single DNA Molecules PAULA VIVAS, ADAM HAUSER, MAREK SIMON, FENGYUAN YANG, EZEKIEL JOHNSTON-HALPERIN, MICHAEL POIRIER, The Ohio State University — A common approach for manipulating single biomolecules is to attach them to a super-paramagnetic bead and manipulate the bead with a magnetic trap [1]. An advantage of this approach is that it is straightforward to apply forces and twists to single DNA molecules. However, ***torque*** measurements have remained elusive because of the complication in determining the direction of the spherical bead's magnetic moment. To overcome this difficulty, we fabricated anisotropic, elongated micron-to-nanometer sized magnetic particles. We grow ferromagnetic films using ultra high vacuum (UHV) sputtering and photolithography patterning to create magnetic particles with elongated shapes. The particles are coated with gold and functionalized for single DNA molecule attachment. Preliminaries results on magnetic particle preparation, functionalization and manipulation will be presented.

[1] *Kapanidis AN, Strick T. Biology, one molecule at a time. Trends Biochem Sci. 2009 May;34(5):234-43.*

Paula Vivas
The Ohio State University

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