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Towards Magnetic Resonance Imaging of Semiconducting and Biological Nanostructures D.P. WEBER, FEI XUE, P. PEDDIBHOTLA, M. POGGIO, University of Basel, Switzerland — In recent years a technique combining nuclear magnetic resonance (NMR) and sensitive force microscopy has emerged as a viable method for doing magnetic resonance imaging (MRI) on the nanometer scale [1]. This method, known as magnetic resonance force microscopy (MRFM), has the potential to create three-dimensional (3D), non-destructive, sub-surface images of the density of particular nuclear magnetic moments with isotopic contrast. Resolution better than $10\,nm$ has been achieved with ^{1}H in a single virus particle [2]. Here we discuss the application of this technique to nanobiological samples, such as viruses, small bacteria, or cell membranes, and to various semiconductor nanostructures including quantum wells (QWs) and nanowires (NWs). In particular, we focus on the sample preparation challenges presented by these samples. Transfer and attachment of these sub-micrometer samples to our micrometer-sized force sensor includes the use of a focused ion beam (FIB) technique and manual micromanipulators used together with optical microscopy.

[1] Nanotechnology 21, 342001 (2010).
[2] Proc. Nat. Acad. Sci. U.S.A. 106, 1313 (2009).

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