SFB/TRR 21 - Colloquium

6. Juli 2012, Stuttgart

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Nano-mechanics, nano-magnetometry, and nano-MRI

The study and development of micro- and nano-mechanical resonators has become a vibrant field of physics attracting intense interest among researchers and lay-people alike. Measurement techniques with unprecedented sensitivity have emerged as important applications of these tiny devices. I will present two recent experiments exploiting sensitive nano-mechanical transducers. First, I will discuss torque magnetometry measurements of individual Ni nanotubes. These measurements shed light on the magnetic states present in these nanostructures. Second, I will present force-detected magnetic resonance imaging (MRI) experiments on semiconductor nanowires. At present, this technique – known as magnetic resonance force microscopy (MRFM) – has a sensitivity surpassing that of the best conventional, inductive MRI detectors by 8 orders of magnitude. In 2009, IBM researchers demonstrated the promise of MRFM by capturing 3D images of individual virus particles with a resolution better than 10 nm. I will describe our efforts to image the small ensemble of nuclear spins contained in a single InP nanowire.

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