

Abstract Submitted  
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**High Frequency Cantilevers for Magnetic Resonance Force Microscopy**<sup>1</sup> CHRISTIAN DEGEN, MARTINO POGGIO, BEN CHUI, JOHN MAMIN, DAN RUGAR, IBM Research Division, Almaden Research Center, San Jose, CA 95120 — We are exploring the possibility of using high frequency cantilevers for detection of magnetic resonance spin signals, possibly at the Larmor frequency of nuclear spins. For this purpose we have fabricated smaller, 20 micron long cantilevers that resonate at frequencies near 1 MHz. Operating at 4K, these levers can have surprisingly high Q values, over 300,000, and can achieve force noise levels in the few attonewton range, despite their rather high stiffness of about 0.1 Newton per meter. We discuss some experimental challenges that will be increasingly important for future generations of cantilevers with even smaller dimensions. Finally we look ahead into what we might expect when such high sensitivity, nanomechanical resonators become tightly coupled to small ensembles of nuclear spins.

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Christian Degen  
IBM Almaden Research Center

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