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Localized Spectroscopy using a Magnetic Resonance Force Microscope. GIORGIO MORESI, QIONG LIN, ETHZ, SCHAHRAZEDE MOUAZIZ, EPFL, ANDREAS HUNKELER, CHRISTIAN DEGEN, URBAN MEIER, ETHZ, JUERGER BRUGGER, EPFL, BEAT MEIER, ETHZ, LABORATORY OF PHYSICAL CHEMISTRY, ETHZ, CH-8093 ZUERICH TEAM, LABORATORY OF MICROSYSTEMS, EPFL, CH-1015 LAUSANNE TEAM — The Magnetic Resonance Force Microscope (MRFM) constitutes a promising next-generation magnetic resonance detection device at room temperature. A MRFM observes nuclear (or electron) spin magnetization as a force, which occurs when a paramagnetic sample is polarized in inhomogeneous static magnetic field (10E5 T/m) and a high frequency drives the cantilever on-resonance by a cyclic adiabatic modulation, which make able to measure T1 rho. In this contribution, we combine the MRFM with spin-echo spectroscopy to add spectral resolution to NMR signals of micro-scale objects at room temperature. First experimental spectra recorded with the amplitude detection technique from a sample of barium chlorate monohydrate and ammonium sulfate single crystals mounted on a non commercial cantilever show resolution of 2μm and a sensitivity of 10E13 spins. The new microscope, which uses the frequency detection down to m-Hz resolution and the annealed non-commercials cantilevers, which have Q factor up to 250000 at room temperature, improve the sensitivity to 10E9 spins. This new setup and a new measurement technique should make able to measure T1.

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