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Dynamical Nuclear Magnetic Resonance Imaging of Micron-scale Liquids AIMEE SIXTA, ALEXANDRA CHOATE, JAKE MAEKER, SOPHIA BOGAT, DANIEL TENNANT, SHIRIN MOZAFFARI, JOHN MARKERT, University of Texas at Austin — We report our efforts in the development of Nuclear Magnetic Resonance Force Microscopy (NMRFM) for dynamical imaging of liquid media at the micron scale. Our probe contains microfluidic samples sealed in thin-walled (m) quartz tubes, with a micro-oscillator sensor nearby in vacuum to maintain its high mechanical resonance quality factor. Using 10 m spherical permalloy magnets at the oscillator tips, a 3D T_1-resolved image of spin density can be obtained by reconstruction from our magnetostatics-modelled resonance slices; as part of this effort, we are exploring single-shot T_1 measurements for faster dynamical imaging. We aim to further enhance imaging by using a 2ω technique to eliminate artifact signals during the cyclic inversion of nuclear spins. The ultimate intent of these efforts is to perform magnetic resonance imaging of individual biological cells.

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