

Abstract Submitted  
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**Picoliter NMR spectroscopy using nitrogen-vacancy centers in nanofabricated diamond** PAULI KEHAYIAS, Harvard-Smithsonian CFA, ANDREY JARMOLA, ODMR Technologies Inc., NAZANIN MOSAVIAN, ILJA FESCENKO, FRANCISCO BENITO, ABDELGHANI LARAOUI, JANIS SMITS, UNM Center for High Technology Materials, LYKOURGOS BOUGAS, Johannes Gutenberg Universitat Mainz, DMITRY BUDKER, Helmholtz Institut Mainz, ALEX NEUMANN, STEVEN BRUECK, VICTOR ACOSTA, UNM Center for High Technology Materials — Nuclear magnetic resonance (NMR) spectroscopy is a powerful tool for analytical chemistry, though one drawback is that its utility can be limited by poor sensitivity. This makes NMR characterization challenging for samples with few nuclear spins. Building on the recent advances of using nitrogen-vacancy (NV) color centers in diamond for NMR spectroscopy, we used an NV ensemble (a few-nm layer at the diamond surface) to improve sensitivity, which we further enhance by nanofabricating gratings for greater surface area. With nanofabricated diamond chips we detected the NMR signal from  $\sim 1$  molar  $^{19}\text{F}$  in glycerol in a  $\sim 1$  pL volume with nearly  $100\times$  improvement in concentration sensitivity compared to previous reported works. We will present details on our recent findings and ongoing attempts to use this technique in practical applications. [1] P. Kehayias *et al.*, arXiv:1701.01401 (2017).

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