Abstract Submitted
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Nanofabrication of single spins and spin arrays in diamond[1] D.M. TOYLI, G.D. FUCHS, D.J. CHRISTLE, D.D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, CA, C.D. WEIS, T. SCHENKEL, Lawrence Berkeley National Laboratory, Berkeley, CA — The properties of isolated nitrogen vacancy (NV) centers in diamond make them a promising solid-state qubit candidate for spin-based quantum information processing. However, scaling this system to multi-qubit NV center devices requires methods to accurately place single NV centers in pure diamond substrates. To address this challenge we have developed a method for fabricating single NV centers on 50 nm length scales based on ion implantation and electron beam lithography.[2] Secondary ion mass spectroscopy measurements facilitate depth profiling of the implanted nitrogen to provide three-dimensional characterization of the NV center spatial distribution. Finally, electron spin resonance measurements of single NV centers, including temperature-dependent spin coherence measurements, suggest a pathway for optimizing single spin coherence in future devices.

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[2]D. M. Toyli *et al.*, Nano Lett. 10, 3168 (2010).

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