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Spatial placement limits of nitrogen vacancy centers in diamond via ion implantation[1] C.D. WEIS, Accelerator and Fusion Research Division, Lawrence Berkeley National Laboratory, D.M. TOYLI, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, E. HERRMANN, A. PERSAUD, Accelerator and Fusion Research Division, Lawrence Berkeley National Laboratory, I. CHAKAROV, Silvaco International, Santa Clara, CA, USA, G.D. FUCHS, F.J. HEREMANS, D.D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, T. SCHENKEL, Accelerator and Fusion Research Division, Lawrence Berkeley National Laboratory
— Nitrogen-vacancy (NV) centers in diamond are an interesting candidate for spin qubits in quantum information processing due to their long coherence times at room temperature. A common technique to place NV centers in diamond is via ion implantation [1] and thermal annealing. We discuss the contributions of ion beam spot size, range straggling and ion channeling as well as diffusion during annealing on the placement accuracy of nitrogen ions and NV-centers in diamond for ion implantation energies below 40 keV. Placement accuracy limits are compared to requirements for NV-center placement in proposed multi-qubit coupling schemes. [1] C. D. Weis et al., J.Vac.Sci.Tech. B 26, 2596 (2008)

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