

Abstract Submitted
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Decoherence and electric field noise analysis of nitrogen vacancy center diamonds due to the surface charge fluctuations and lattice strain¹

DEBORAH SANTAMORE, Delaware State University — We theoretically investigate the decoherence mechanisms due to the electric field noise in nitrogen vacancy (NV) center diamonds. The noise is caused by both the surface charge fluctuations and strain due to surface contaminants and bulk impurities. The system is modeled with nitrogen impurities in diamond and hydrogen surface terminations with water. We obtain the equations of motion, calculate the electric field fluctuations, and analyze noise. We find that the surface effect is greater than lattice distortion by the bulk impurity substitution. We also discuss how to minimize the noise. Finally, we examine lattice distortion and stability of NV centers under high pressure.

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Deborah Santamore
Delaware State University

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