Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Electrical and mechanical tuning of a silicon vacancy defect in SiC for quantum information technology[1] ONEY O. SOYKAL, THOMAS L. REINECKE, Naval Research Laboratory — We develop coherent control via Stark effect over the optical transition energies of silicon monovacancy deep center in hexagonal silicon carbide. We show that this defects unique asymmetry properties of its piezoelectric tensor and Kramers degenerate high-spin ground/excited state configurations can be used to create new possibilities in quantum information technology ranging from photonic networks to quantum key distribution. We also give examples of its qubit implementations via precise electric field control.

[1]This work was supported in part by ONR and by the Office of Secretary of Defense, Quantum Science and Engineering Program.

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Date submitted: 22 Nov 2016 Electronic form version 1.4