

Abstract

Quantum continuous measurement and feedback can be utilized for applications in quantum metrology. We theoretically investigate the possibility of using a Nitrogen-Vacancy (NV) Center as a magnetic field sensor. By using a technique of coherent population trapping in selected three energy levels of the NV center, we can prepare a dark state and let the fluctuating magnetic field disturb and induce the population in the excited state, which can be used for the readout. We numerically simulate quantum trajectories of the NV Center state conditioned on continuous readouts of the excited state population and explore Bayesian estimation and feedback protocols for improving the quality of magnetic field sensing.