

Applications of dark states in diamond NV centers

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Coherent optical techniques that make use of an optically “dark” state are excellent tools for achieving all-optical measurement and control of atomic systems. As a leading candidate for solid-state quantum information processing, the nitrogen vacancy (NV) center in diamond represents an important system for the demonstration of these techniques. We present several applications of dark states in NV centers including coherent population trapping and stimulated Raman adiabatic passage. These are both shown to be nuclear spin dependent. We also discuss our work towards using dark state resonances to realize sub-wavelength optical detection and control of NV centers.