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**Towards a spin radar with Nitrogen Vacancy centers in diamond**

ASHOK AJOY, YIXIANG LIU, PAOLA CAPPELLARO, Massachusetts Institute of Technology — Nitrogen Vacancy (NV) centers in diamond are a promising platform for nanoscale magnetic resonance imaging. The NV spin can be used to sense the presence of external nuclear spins, and through them biomolecule structure, by exploiting anisotropic hyperfine interactions. The NV center thus effectively acts as a dipole "antenna", detecting and identifying spins at different spatial locations. The antenna dipole is typically set by the diamond and target sample geometry, and nuclear spins are often found in the NVs dipole blind spot. In this work, we demonstrate an experimental technique by which one can controllably turn and manipulate the direction of this effective NV antenna over a wide range of approximately  $\pm 40$  degrees. In combination with filtered back projection techniques, this method allows reconstructing with high resolution the real space position of spins in the NV center environment.

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