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A stroboscopic approach to combining diamond magnetometry with Atomic Force Microscopy SUNGKUN HONG, MICHAEL GRINOLDS, PATRICK MALETINSKY, MIKHAIL LUKIN, RONALD WALSWORTH, AMIR YACOBY, Harvard University — Nitrogen-Vacancy (NV) defect centers in diamond have been recently considered as a promising candidate for sensitive magnetic field detection[1, 2] with nanometric spatial resolution. Most applications requiring high spatial resolution necessitate stabilizing the NV center in close proximity to the sample of interest, which can be accomplished using standard Atomic Force Microscopy (AFM) techniques[2]. However, the fluctuations associated with AFM tip oscillation set limits to both spatial resolution and magnetic field sensitivity[2]. Here we demonstrate a stroboscopic approach that locks the magnetic signal acquisition to a particular position of the tip. Our approach allows us to reach the sensitivity and spatial resolution given by the intrinsic properties of NV centers.

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