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**Time-domain reconstruction of magnetic fields with an electron spin in diamond** ALEXANDRE COOPER, HONAM YUM, EASWAR MAGESAN, PAOLA CAPPELLARO, Massachusetts Institute of Technology — Solid-state quantum probes can sense magnetic fields with high sensitivity and spatial resolution. These quantum magnetometers are particularly promising for characterizing the dynamics of nanoscale physical systems. We experimentally demonstrate efficient time-domain reconstruction of magnetic fields with an electron spin qubit in diamond. The form of the control pulse sequences allows for efficient reconstruction methods with minimal error in the reconstructed waveform. The generated control filter functions extract information about the signal while decoupling the sensor from its dephasing environment. These methods will be useful for detecting transient magnetic fields in biological systems and time-resolved magnetic resonance imaging.

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