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Berry phase magnetometry using a single electronic spin in diamond KEIGO ARAI, JUNGHYUN LEE, Massachusetts Institute of Technology, CHINMAY BELTHANGADY, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics — We present a new approach for improving the sensitivity and dynamic-range of nitrogen-vacancy (NV) center magnetic field sensing using Berry phase. In the conventional Ramsey interferometry, an NV spin accumulates dynamic phase proportional to the Larmor frequency. This approach provides high sensitivity in exchange for the dynamic-range due to 2π phase ambiguity. Our approach, in which the magnetic field is encoded in the Berry phase of the spin, can unwrap this ambiguity due to a chirped magnetometry curve. This work will provide a new modality not only for magnetometry but also for thermometry and electrometry using solid-state spins.

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