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Quantum Diamond Microscope for Geosciences and Electronics RAISA TRUBKO, MATTHEW TURNER, NICHOLAS LANGELLIER, Harvard University Physics Department, ROGER FU, Harvard University Earth and Planetary Sciences Department, EDLYN LEVINE, MITRE, MARKO LONCAR, Harvard University School of Engineering and Applied Science, AMIR YACOBY, Harvard University Physics Department, RONALD WALSWORTH, Harvard-Smithsonian Center for Astrophysics — We present a 'quantum diamond microscope' (QDM) that uses nitrogen-vacancy (NV) defects in diamond for imaging magnetic fields with micron-scale spatial resolution and mm-scale field-of-view for a range of studies in both geosciences and electronics. For the geosciences, the QDM allows us to spatially resolve different ferromagnetic minerals within a rock sample. This capability enables the paleomagnetic study of samples with complex, heterogeneous magnetization, thereby greatly expanding the range of broader scientific questions that can be addressed. For electronics, we can non-invasively monitor the activity of microwave electronics with higher spatial resolution, which is important for moving towards localizing the current flow down to the individual circuit component level.

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