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**Quantum Matter Meets Living Matter**

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Magnetic resonance imaging (MRI) is a powerful tool for biology and medicine, but has limited spatial resolution (about 0.1 millimeters in living creatures) and thus cannot visualize individual living cells or subcellular structures, let alone the constituent molecules and atoms. However, recent developments in quantum science have rapidly and radically changed this story, enabling a new form of optical MRI with nanoscale spatial resolution and applicable to living biological cells. I will describe how special quantum defects in room temperature diamond crystals, known as nitrogen vacancy (NV) color centers, provide a practical means for extending the reach of MRI to the nanoscale and even Angstrom scale, with wide-ranging applications in biology, medicine, and materials science.