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All-Optical Nanoscale Thermometry using Silicon-Vacancy Centers in Diamond CHRISTIAN NGUYEN, RUFFIN EVANS, ALP SIPAHIGIL, MIHIR BHASKAR, DENIS SUKACHEV, MIKHAIL LUKIN, Harvard University
— Accurate thermometry at the nanoscale is a difficult challenge, but building such a thermometer would be a powerful tool for discovering and understanding new processes in biology, chemistry and physics. Applications include cell-selective treatment of disease, engineering of more efficient integrated circuits, or even the development of new chemical and biological reactions. In this work, we study how the bulk properties of the Silicon Vacancy center (SiV) in diamond depend on temperature, and use them to measure temperature with 100mK accuracy. Using SiVs in 200nm nanodiamonds, we measure the temperature with 100nm spatial resolution over a 10μm area.

Christian Nguyen
Harvard University

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