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Infrared Spectroscopy and Vibronic Structure of the Nitrogen-Vacancy Center in Diamond PAULI KEHAYIAS, UC Berkeley Physics Department, MARCUS DOHERTY, Laser Physics Centre, RSPE, Australian National University, DAMON ENGLISH, UC Berkeley Physics Department, RAN FISCHER, Department of Physics, Technion - Israel Institute of Technology, ANDREY JARMOLA, KASPER JENSEN, NATHAN LEEFER, UC Berkeley Physics Department, PHILIP HEMMER, Department of Electrical and Computer Engineering, Texas A&M University, NEIL MANSON, Laser Physics Centre, RSPE, Australian National University, DMITRY BUDKER, UC Berkeley Physics Department — The negatively charged nitrogen-vacancy (NV) color center in diamond has created much recent excitement. Since their ground state can be optically spin-polarized and readout and they have a long transverse spin relaxation time at room temperature, NV centers are used in an array of applications including quantum computing, sensing, and sub-diffraction-limited imaging. Despite the progress in developing these applications, many of the basic questions about NV centers remain unresolved. We present a pump-probe spectroscopy experiment on the NV infrared transition that sheds light on the vibronic structure of NV centers. From this measurement, we were able to compare the vibronic properties of two NV electronic states and find unexpected differences between them.

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