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Electronic transport in nitrogen-rich diamond[1] F.J. HEREMANS, G.D. FUCHS, C.F. WANG, D.D. AWSCHALOM, Center for Spintronics and Quantum Computation, University of California, Santa Barbara, CA, R. HANSON, Kavli Institute of Nanoscience, Delft University of Technology, The Netherlands — Electronic transport in carbon-based materials, including carbon nanotubes, graphene, and diamond, have been receiving significant attention as potential alternatives to silicon-based electronics. In particular, diamond's excellent thermal properties provide a promising alternative in power-sensitive applications. Here we present studies of the photo-excited electronic transport in nitrogen-rich type IB diamonds. In addition to the study of the carrier dynamics within this system, we discuss a charge storage effect that may find potential application in charging-based memories. We find that the discharge curves follow a "stretched-exponential" form [1] with a fixed exponent, which does not depend on electrode spacing, voltage, and illumination intensity. These findings are discussed in the context of a transport mechanism in this nitrogen-rich diamond substrate.

[1] C.G. Van de Walle Phys. Rev. B, **53**, 11292 (1996)

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