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Connecting the Microscopic and Macroscopic Transport Properties of Graphene NIKOLAI N. KLIMOV, Maryland NanoCenter, UMD/CNST, EEEL, NIST, MD, SUYONG JUNG, Maryland NanoCenter, UMD/CNST, NIST, MD, GREGORY M. RUTTER, CNST, NIST, Gaithersburg, MD, RANDOLPH E. ELMQUIST, EEEL, NIST, Gaithersburg, MD, NIKOLAI B. ZHITENEV, CNST, NIST, Gaithersburg, MD, DAVID B. NEWELL, EEEL, NIST, Gaithersburg, MD, JOSEPH A. STROSCIO, CNST, NIST, Gaithersburg, MD — Graphene with its extraordinary physical properties has attracted a lot of attention in the scientific community as a model system for two-dimensional (2D) condensed-matter physics and as a prospective material for nanoscale electronic device engineering. In contrast to conventional 2D electron systems, in which the 2D gas is buried inside of the device, the unique structure of graphene enables direct exploration of its both macroscopic and microscopic properties using electron transport and scanning probe microscopy (SPM) techniques. This allows one to connect the graphene macroscopic properties with their microscopic origins. We are fabricating graphene devices for both electrical transport and SPM measurements to investigate the physics in graphene ranging from the quantum Hall effect to superconducting proximity effects, in particular the role of disorder and metal-graphene interface effects. In this presentation we will report on the results of our graphene device fabrication and initial electrical and SPM measurements.

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