Abstract Submitted
for the MAR13 Meeting of
The American Physical Society

Noise Analysis on Graphene Devices via Scanning Noise Microscopy DUCKHYUNG CHO, Department of Physics, Seoul Nat Univ, MOON GYU SUNG, HYUNGWOO LEE, KWANG HEO, KYUNG-EUN BYUN, TAEKYEONG KIM, DAVID H. SEO, SUNAE SEO, SEUNGHUN HONG, Seoul National University — Until now, the studies about low-frequency noises in electronic devices have mostly relied on the scaling behaviour analysis of current noise measured from multiple devices with different resistance values. However, the fabrication of such multiple devices for noise analysis is a labor-intensive and time-consuming work. Herein, we developed the scanning noise microscopy (SNM) method for nanoscale noise analysis of electronic devices, which allowed us to measure the scaling behaviour of electrical current noises in a graphene-strip-based device. In this method, a conductive atomic force microscopy probe made a direct contact on the graphene strip channel in the device to measure the noise spectra through it. The SNM method enabled the investigation of the noise scaling behaviour using only a single device. In addition, the nanoscale noise map was obtained, which allowed us to study the effect of structural defects on the noise characteristics of the graphene strip channel. Our method should be a powerful strategy for nanoscale noise analysis and play a significant role in basic research on nanoscale devices.

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Date submitted: 11 Nov 2012 Electronic form version 1.4