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**Scanning tunneling microscopic (STM) studies of strain-induced local density of states modulations in single-layer graphene on $SiO_2$** A.P. LAI, M.L. TEAGUE, C.R. HUGHES, A.D. BEYER, N.-C. YEH, M.W. BOCKRATH, Phys. Dept, Caltech, Pasadena, CA, J. VELASCO, C.N. LAU, UC Riverside — We report strain-induced spatial modulations in the electronic density of states (DOS) of single-layer graphene on $SiO_2$. Spatially resolved topographic and spectroscopic measurements were performed simultaneously at 77 K and at pressures $< 10^{-7}$ torr. Fourier transformation of local topography shows a distorted hexagon with lattice vectors ranging from $a_0$=3.0 ±0.2Å to 2.1±0.2 Å as the result of surface corrugation from the roughness of the underlying substrate. A spatially varying strain map derived from local distortions of the lattice constants correlates well with the surface topography. Strained graphene, due to three dimensional surface corrugations of ± 5 Å over 10 nm lateral distance, show parabolic "U-shaped" conductance vs. biased voltage spectra rather than the Dirac-like "V-shaped" spectra. In contrast, for regions of relaxed graphene, Dirac-like spectra are recovered. The Dirac voltage, $V_D$, determined from the biased voltage of conductance minimum, appears to be position independent at $V_D$=36±5 meV, while the minimum conductance and the degree of derivation from the Dirac-like spectra at low energies appear to correlate directly with the topography. This work was supported by NSF/NRI under Caltech/CSEM.

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