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Electron and hole puddles in monolayer graphene on SiO_2 B.J. LEROY, A. DESHPANDE, University of Arizona, W. BAO, F. MIAO, C.N. LAU, University of California at Riverside — We have performed spatially resolved scanning tunneling spectroscopy measurements on single layer graphene. The graphene was prepared on SiO_2 by the mechanical exfoliation technique and an electrode was attached by electron beam lithography. Atomically resolved topography images over 40 nm areas show that the graphene conforms to the SiO_2 surface as well as having intrinsic ripples. In addition to the topography measurements, we have mapped the local density of states as a function of position and energy. We observe a spatially varying Dirac point which leads to electron and hole puddles at low energy. These puddles have a characteristic size scale of about 5 nm. The puddles arise due to curvature in the graphene film which induces shifts in the chemical potential as well as long range scattering from charged impurities.

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