Studies of epitaxial graphene growth on vicinal silicon carbide

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School of Physics, Georgia Institute of Technology — The growth of epitaxial graphene on SiC has been shown to begin at step edges. Therefore, control of the step-edge density and step bunching on the substrate is important for the production of large-area and high-quality graphene. Additionally, recent experiments [1] have exploited the nucleation of graphene at step edges to produce graphene nanoribbons. Here we study the kinetics of graphene growth as a function of SiC step morphology by using dimple-ground SiC samples. This method of sample preparation allows for the study of a continuous range of miscut angles, prepared under identical growth conditions. Samples are annealed inside a graphite furnace with the flux of silicon controlled via physical confinement and a controlled background pressure of argon or silane. The morphology and graphene coverage of the samples are characterized in situ with LEED and Auger spectroscopy and ex-situ by AFM, SEM, and Raman spectroscopy.